

**DR. W. GARY ANDERSON**  
**CURRICULUM VITAE – NOVEMBER 2015**

**PERSONAL DETAILS**

Name: **W. Gary Anderson** Date of Birth: **19.12.68**  
Nationality: **British and Canadian** Marital status: **Married**  
Home address: 936 North Drive, Fort Garry, Winnipeg, MB R3T 0A8.  
Work address: Department of Biological Sciences, University of Manitoba,  
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**1. CURRENT POSITION**

March 2015-present: **Professor**, Department of Biological Sciences, University of Manitoba, Winnipeg, MB, Canada

April 2015-present: NSERC/Manitoba Hydro Industrial Research Chair in Conservation aquaculture of Lake Sturgeon, *Acipenser fulvescens*

**2. EMPLOYMENT AND EDUCATIONAL RECORD**

2008-2015: **Associate Professor**, Department of Biological Sciences, University of Manitoba, Winnipeg, MB, Canada

2004-2008: **Assistant Professor**, Department of Biological Sciences, University of Manitoba, Winnipeg, MB, Canada

2001-2004: **Named Postdoctoral Research Fellow at the University of St. Andrews, Scotland**. Project title: Investigation of osmoregulatory plasticity in the euryhaline bullshark, *Carcharhinus leucas*. UK NERC funded, grant ref. No. NER/A/S/2000/01270.

1998-2001: **Postdoctoral Research Fellow at the University of St. Andrews, Scotland**. Investigating the hyper-osmoregulatory strategy of the European Lesser spotted dogfish, *Scyliorhinus canicula*. UK NERC funded, grant ref. No. GR3/11420.

1996-1998: **Applications Director, Applied Biometrics Inc. Waterloo, Ontario, Canada**. Design, implementation and testing of fish protection measures at water intakes for hydroelectric generating stations and irrigation.

1995-1996: **Postdoctoral Fellow at the University of Waterloo, Ontario, Canada**. Examining catch and release effects on heart rate in Atlantic Salmon, *Salmo salar*

1991-1995: **Ph.D. Gatty Marine Lab, University of St. Andrews, Scotland**. The endocrine control of the rectal gland in the European lesser-spotted dogfish, *Scyliorhinus canicula* (S.E.R.C. funded). Supervisor: Dr. N. Hazon.

1987-1991: **B.Sc. (Hon), class 2.1 Animal Biology, University of St. Andrews, Scotland**. 1<sup>st</sup> and 2<sup>nd</sup> year courses: Chemistry, Genetics, Evolutionary Biology, Cell Biology and Zoology. Junior and senior honours years: Marine and Environmental Biology. Senior honours project: The effects of secretagogues on cortisol production in the interrenal gland of the European eel *Anguilla anguilla*.

### **3. RESEARCH**

While my principle research interests are in comparative endocrinology they have evolved considerably in recent years as a result of growing and productive collaborations with colleagues both locally, nationally and internationally. Primarily I am interested in functional evolution of endocrine agents found throughout the vertebrate phyla and their role in the control of salt and water balance, specifically the more ancient fishes. The vertebrate group I have most extensively published on are the elasmobranch fishes, however, more recently the majority of my research has focused on physiological ecology of Lake Sturgeon, *Acipenser fulvescens*. Studies have included examination of the endocrine stress response, calcium metabolism, juvenile ecology, growth variation, reproductive endocrinology, inter-reservoir gene flow in Lake Sturgeon populations, and the impact of hydro-electric dams on Lake Sturgeon movement ecology. I have examined aspects of renal, cardiovascular and extra-renal mechanisms both from the perspective of environmental and endocrine manipulation. In addition to the growing publication record in Lake Sturgeon I have collaborations with a number of ecologists in the Department of Biological Sciences examining glucocorticoid levels in a variety of biological tissues including blood, fecal matter, hair and blubber. These collaborations are establishing correlations between the physiological glucocorticoid stress response to behavioural, life history and perceived environmental stressors in a variety of mammals including ground squirrels, arctic foxes, caribou, moose, wolves, beluga whales and ringed seals. I began the job of an academic to do research, I continue to do so, although I might not get hands on as regularly as I would like I am fortunate in that the students and trainees involved in the many different research projects conducted in the lab continue to challenge me intellectually bringing new ideas and concepts to the work we do.

### **SUPERVISION**

#### **Postdoctoral**

Dr. Kari Dammerman: Environment/genotype interactions in developing Lake Sturgeon (Oct 2015 – Sept 2017)

Dr. David Deslauriers: Modelling of energetics and swimming performance in developing Lake Sturgeon (Oct 2015 – Sept 2017)

Dr. Janet Genz: Reproductive endocrinology in the Lake Sturgeon, *Acipenser fulvescens* (April 2011 – May 2013)

Dr. L. Skyner: Shy-bold continuum in Richardson's ground squirrels. (April 2010-Sept 2010) (co-supervised with Dr. J. Hare)

Dr. P. J. Allen: Physiological ecology in lake sturgeon, using calcium regulation as a physiological correlate for reproductive status in wild lake sturgeon (Sept 2006 – June 2009).

#### **Graduate Student**

##### **PhD**

Ben Kissinger (2012-present). Lake trout in the MacKenzie delta, salinity adaptation and distribution.

Cheryl Klassen (2014). Growth Rate and Size Variability among Juvenile Lake Sturgeon, *Acipenser fulvescens*: Implications for Recruitment

Kyle Elliot (2013). Endocrine and behavioural indicators of senescence in seabirds (co-supervised with Dr. J. Hare)

Cameron C. Barth (2011). The Ecology of Juvenile lake sturgeon in the Winnipeg River

### **MSc**

Rex Yoon (2015 – present). Metabolic activity and swimming performance in larval and juvenile Lake Sturgeon raised in differing environments

Forrest Bjornson (2015 - present). Influence of rearing environment on predator response in larval Lake Sturgeon, *Acipenser fulvescens*

Bailey Rankine (2012 - present). Examining fate and effects of polyoxy-ethyleneamine (POEA) in an Experimental Lakes Area Lake using a mesocosm approach (co-supervised with Dr. V. Palace)

Ben Carriere (2015). The use of isotopic marking techniques in Lake sturgeon, *Acipenser fulvescens*

Randi Anderson (2012-present). The effects of body condition on stress hormone levels in Canadian arctic Ringed seals (*Phoca hispida*): Implications on a subsistence hunting staple. (co-supervised with Dr. G. Tomy)

Elisa Van Wallegham (2015). The Detection and Characterisation of the Namao Virus in Lake Sturgeon (*Acipenser fulvescens*) (co-supervised with Dr. S. Clouthier)

Duncan Burnett (2014). The development of the thyroid hormone axis in larval lake sturgeon, *Acipenser fulvescens*. (co-supervised with Dr. V. Palace)

Craig MacDougall. (2011) Downstream movements of juvenile lake sturgeon and the impact of hydro-electric facilities.

Ahmed Waheed, MSc (2011). The catecholamine response in juvenile lake sturgeon, *Acipenser fulvescens*

Patricia Dasiewicz, MSc (2010). The role of the Kallikrein kinin system in the regulation of the cardiovascular system in the little skate, *Raja erinacea*.

Sadaf Zubair, MSc (2009) The ontogeny of the stress axis in juvenile lake sturgeon, *Acipenser fulvescens*.

Christopher R. Singh, MSc (Zoology), 2005 – voluntary withdrawal in 2006

### **Undergraduate student supervision**

#### **Hons**

Julia Wiens (2015) Steroidogenesis in elasmobranch fish (co-supervised with K. Brassinga)

Ashley Soloway (2013) The effect of Selenium on developmental deformities in cutthroat trout (co-supervised with Dr. V. Palace)

Lauren Shute (2013) The role of various cell types in calcium regulation in larval lake sturgeon *Acipenser fulvescens*

Catherine Brandt (2013) The influence of chlorpyrifos on sex steroid synthesis in adult lake sturgeon *Acipenser fulvescens* (co-supervised with Dr. V. Palace)

Alex Hare (2013) Sociality and the acute stress response in lake sturgeon, *Acipenser fulvescens*

Christopher McCabe (2012) Urea uptake across the intestine of the spiny dogfish, *Squalus acanthias suckleyi*

Ben Carriere (2012) The roles of calcium concentration on calcium flux in the spiral

- valve of the lake sturgeon, *Acipenser fulvescens*
- Ryan Ho (2012) Characterisation of tissue bacteria in the little skate, *Leucoraja erinacea*. (co-supervised with Dr. K. Brassinga)
- Murtaza Kapasi (2011) The effect of PTH and PTHrP on the rate of calcium excretion in Lake Sturgeon, *Acipenser fulvescens*
- Marina Beaudry (2011) Oxidative stress and growth in Alligator gar *Altractosteus spatula*, exposed to environmentally relevant concentrations of the herbicide, Diquat (co-supervised with Dr. V. Palace)
- Calen Ryan (2010) Struggling Mother Strong sons: The adaptive sex allocation in Richardson's squirrels, *Spermophilus richardsonii* (co-supervised with Dr. J. Hare)
- Vanessa Grandmaison (2010): The effects of environmental calcium on calcium flux rates across the intestine of juvenila lake sturgeon, *Acipenser fulvescens*
- Laura Gardiner (2010): The relationship between social status and the stress response in Richardson's ground squirrels, *Spermophilus richardsonii* (co-supervised with Dr. J. Hare)
- Patricia Daseiwicz (2007): The effects of environmental calcium on calcium flux rates in juvenile lake sturgeon, *Acipenser fulvescens* calcium flux rates in lake sturgeon.
- Taylor Sando (2007) Does the Stress axis in Lake Sturgeon undergo Habituation?

### **Summer students**

- Alex Borecky (2015) Rearing larval Lake Sturgeon
- Nick Czehryn (2014/2015) Lake trout physiological and behavioural plasticity to different salinities
- Julia Wiens (2013/2014/2015) The role of bacteria in steroid synthesis in the little skate, *Leucoraja erinacea*. (co-supervised with Dr. Karen Brassinga)
- Lianne Arcinas (2012) Egg and sperm quality in spawning Lake Sturgeon, *Acipenser fulvescens*
- Shivani Khetoo (2011) Egg and sperm quality in spawning Lake Sturgeon, *Acipenser fulvescens*
- Angela Wall (2007) Using microscopy to determine sex in the Lake sturgeon, *Acipenser fulvescens*
- Suadi Liban (2007) Gut function in the little skate, *Leucoraja erinacea*
- Natalie Nikkel (2006) Determination of bullshark life history using vertebrae microchemistry
- Patricia Daseiwicz (2006) Blood volume measurement of the little skate, *Leucoraja erinacea*

### **Research assistants and technicians**

- James Tansley (May 2010-Sept 2010) Grade 3 Technician
- Calen Ryan (May 2013-Dec 2013) Research assistant (co-supervised with Dr. J. Hare)
- Darcy Childs (May 2015 – present). Grade 4 technician

### **Graduate student Advisory committees**

#### **PhD**

- Alex Quijada-Rodriguez (2015-present) Supervised by Dr. Dirk Weihrauch
- Ala'a Eideh (2014-present) Studying the potential protective effects of the main



- antioxidant component in the olive tree “Oleuropein” against doxorubicin cardiotoxicity-induced inflammation. Supervised by Dr. Peter Eck
- Nasibeh Daneshvar (2015-present) Exploring the role of a neuro-repellent protein, Semaphorin3A, in functional muscle regeneration using pre-treatment with an NO-donor drug. Supervised by Dr. J. Anderson
- Sandra Fehsenfeld (2011-present) Effects of elevated pCO<sub>2</sub> on acid-base balance, ion regulation, and nitrogen household in crustaceans. Supervised by Dr. D. Weihrauch
- Karen Dunmall (2011-present) Salmon in the Arctic: Indicators of Change. Supervised by Drs. M. Docker and J. Reist.
- Tracey Loewen (2009-present). Otolith micro-chemical techniques to reveal insights into Char biodiversity: migration patterns of Arctic Char (*Salvelinus alpinus erythrinus*; *S. alpinus oquassa*) and stock discrimination in Dolly Varden Char (*S. malma malma*) in the Canadian Polar North. Supervised by Dr. J. Reist.
- Lisa Peters (2009-2014) Reproductive hormone disruptors in the aquatic environment. Supervised by Dr. M. Hanson.
- Johnathan Hare (2008-2014) Aquatic contamination and toxicology of atrazine, glyphosate, clopyralid and chlorpyrifos to fish. Supervised by Dr. V. Palace
- Melissa Pink (2010) The abiotic environment and predator-prey interactions: direct and indirect effects within aquatic environments with a specific look at temperature. Supervised by Dr. M. Abrahams
- Lisa Friedrichs (2009) Otolith Microchemistry: The Geochemical Link between Environment and Biomineralization in Fish. Supervised by Dr. N. Halden

### **MSc**

- Lauren Shute (2015-present) The effects of neuropeptide Y on dissociated subfornical organ neurons. Supervised by Dr. Mark Fry
- Lilian Wiens (2015-present) Mitochondria Respiration Capacity and ROS Production with Changing Temperature in the Heart of *Oncorhynchus mykiss*, *Cyprinus carpio* and *Acipenser fulvescens*. Supervised by Dr. Jason Treberg
- Stephanie Hans (2014-present) Acid-base regulation in the American horseshoe crab, *Limulus Polyphemus*. Supervised by Dr. Dirk Weihrauch
- Michele Ewacha (2013-present) Stress response of caribou, moose, and wolves to industrial activity in Manitoba. Supervised by Dr. J. Roth
- Deanna Gigliotti (2013-present) Cell and molecular analysis of pre-operative supraspinatus muscle from patients with rotator cuff injury. Supervised by Dr. J. Anderson
- Kelsey O’Brien (2012-2015) Eco-Immunology: Trade-offs between immunity, hormones and other life history traits of male Cape ground squirrels. Supervised by Dr. J. Waterman
- Marci Trana (2014) Variation in blubber cortisol in stress in beluga whales of the Canadian Arctic. Supervised by Dr. J. Roth.
- Helia Zhang (2013) Satellite cell activation in adult zebrafish (*Danio rerio*) single muscle fibre culture. Supervised by Dr. J. Anderson.
- Ryan MacDonald (2013) Impact of prey availability and diet on stress in arctic foxes. Supervised by Dr. J. Roth
- Matthew Martens (2013) The comparative growth and survival of a naturalized and

aquaculture strain of rainbow trout (*Oncorhynchus myliss*) in laboratory and whole-ecosystem experiments. Supervised by Dr. P. Blanchfield.

Molly Phillips (2012) Fecal steroid hormones in ground squirrels. Supervised by Dr. J. Waterman

Bethany Schroeder (2011) Using morphological and microsatellite analysis to investigate post-glacial diversity in an isolated population of threespine stickleback, (*Gasterosteus aculeatus*) in Nueltin Lake, Manitoba. Supervised by Dr. Randy Mooi.

### **Invited External Thesis Examiner**

Edgar Zhipeng Liu (2011) Cyclic GMP signaling systems in lower vertebrates. MSc thesis, supervisor-Dr. John Donald, Deakin University, Australia

Josi Taylor (2009). Intestinal HCO<sub>3</sub><sup>-</sup> secretion in fish: A widespread mechanism with newly recognized physiological functions. PhD thesis, supervisor-Dr. M. Grosell, University of Miami.

Jason Thiem (2013) Behaviour and energetics of sturgeon fishway passage. PhD thesis, supervisor-Dr. S. Cooke, Carleton University

Michael Donaldson (2012) Understanding the consequences of fisheries related stressors on adult migrating Pacific Salmonids. PhD thesis, supervisor-Dr. S. Hinch, University of British Columbia

### **FUNDING**

#### **Research grants applied for**

ArcticNet – Phase four 2015-2018; \$343,75

Title: Marine habitat usage and occupancy by coastal fishes: insights from linking otolith isotope and trace element parameters with oceanographic determinants (unsuccessful)

Canadian Foundation for Innovation Major Science Initiative Fund 2014; \$2,462,889

Title: Bamfield Marine Science Centre. PI: Dr. Brad Anholt, Bamfield Marine Science centre. I was one of six key participants invited to join the application (unsuccessful)

#### **Research Grants currently held**

NSERC Associate Industrial Research Chair 2015-2020; \$2,150,000

Title: Conservation aquaculture: Understanding the role of the environment in shaping the future of stocked Lake Sturgeon, *Acipenser fulvescens*.

NSERC Discovery 2015-2020; \$165,000

Title: Endocrine regulation of metabolism in elasmobranch fish

#### **Research Grants previously held**

NSERC Discovery 2010-2015; \$135,000

Title: Regulation of Solute and Water Balance in Primitive Fishes

Manitoba Hydro research and Development Grant 2012-2014; \$115,950

Title: Lost and Found: Tagging techniques for young of the year Lake Sturgeon

Anderson, W.G. Curriculum Vitae October 2014

DFO contaminants Advisory group 2012-2013; \$9,950

Title: Histological and enzymatic effects of the surfactant POEA on fish

Department of Indian Affairs and Northern development 2012-2013; \$13,500

Title: Evaluation of hydro-climatic drivers of contaminant transfer in aquatic food webs in the Husky Lakes watershed. PI: Dr. Niklaus Gantner. I was co-applicant with one other participant.

Manitoba Hydro Research and Development Grant 2011-2013; \$203,800

Title: Using Ovaprim as a conservation tool for Lake Sturgeon, *Acipenser fulvescens*: the short and long term effects of endocrine manipulation during the reproductive cycle

NSERC RTI 2011; \$13,196

Title: Centrifuge for Bamfield Marine Science Centre. PI: Dr. T Allison I was one of seven applicants invited to participate

French Embassy in Canada Programme de mobilite en science and technologie 2010

Title: Central and renal actions of bradykinin in the control of cardiovascular, ventilator and kidney function in the trout, *Onchorhynchus mykiss*

NSERC Discovery 2005-2010; \$157,910

Title: The Kallikrein-kinin system in an elasmobranch fish, characterization and physiological function

CFI-leaders opportunity fund 2007-2008; \$255,290

Title: Endocrine control of ion and water balance in primitive fish

NSERC Collaborative Research and Development grant 2005-2009; \$136,790

Title: An evaluation of current strategies to mitigate the impact of hydroelectric activity on Lake Sturgeon, *Acipenser fulvescens*. PI: Dr. Stephan Peake, University of New Brunswick, Fredericton. I was co-investigator with one other.

University of Manitoba research grant 2005-2006; \$7,500

Title: Growth rate and life history determination of Bullsharks

NSERC RTI, 2005-2006: \$57,756

Title: Physiological equipment and data acquisition

Natural Environment Research Council, UK, 2001-2004: \$528,185

Title: Investigation of osmoregulatory plasticity in the euryhaline bullshark, *C. leucas* PI: N. Hazon, myself as a named post-doc

Research Contract, client Abitibi consolidated 1998

Title: Assessment of fish guidance efficiency of a louver array in a power canal at Grand Falls, Exploits River, Newfoundland, Canada

Research Contract, client Alberta Department of Environmental Protection Natural Resources Service 1997

Title: Design and testing of a louver system for the diversion of trout from irrigation intakes

Research contract: Client Ontario Hydro 1996-1998

Title; Investigation of a physical/perceptual barrier for diverting the free swimming movement of lake sturgeon, *Acipenser fulvescens*

European Union (research training grant) Host institution: University Autonoma Barcelona 1996-1998.

Title: The adaptational capacity of primary and secondary stress responses to chronic, repeated acute and novel stressors in aquacultured, *Sparus aurata*, Declined. PI: Dr. L. Tort I was named post-doctoral fellow

### **COLLABORATIONS**

The collaborations listed below range from myself or my collaborator providing significant time, advice and/or resources to students to further their research, to active participation in formulation of research hypotheses and experimental design to address those hypotheses and conducting of experiments that have resulted in peer-reviewed publication. I have included only those people that I have actively collaborated with in the last six years.

#### **Departmental collaborations**

Dr. Margaret Docker – environmental DNA of Lake Sturgeon

Dr. Darren Gillis –quantitative analysis of Lake trout life history types

Dr. James Hare – endocrine correlates of life history in ground squirrels

Dr. Erwin Huebner – Microscopy examination of Lake Sturgeon larvae

Dr. Michele Piercey-Normore – Evolutionary examination of urea transporter genes

Dr. Jim Roth – endocrine correlates of life history in wolves, foxes and beluga whales

Dr. Jason Treberg – elasmobranch metabolism and endocrinology

Dr. Jane Waterman – endocrine correlates of life history in cape ground squirrels

Dr. Dirk Weihrauch – nitrogen metabolism and transport in elasmobranch fish

#### **Inter-departmental collaborations**

Dr. Karen Brassinga (Microbiology) – bacteria in elasmobranch fish

Dr. Norm Halden (Environment) – microchemistry of otoliths and fin rays of fishes

Dr. Gregg Tomy (Chemistry) – environmental contaminants and endocrine disruption

#### **External collaborations – Department of Fisheries and Oceans Freshwater Institute**

Dr. Sharon Clouthier – immunology in Lake Sturgeon

Dr. Eva Enders – swimming and behaviour in Lake Sturgeon

Dr. Steve Ferguson – endocrine correlates of life history in arctic sea mammals

D. Jim Reist – adaptive radiation of Lake Trout in the arctic

#### **External collaborations – national and international**

Dr. Mark Abrahams – behaviour and stress physiology of Lake Sturgeon  
Dr. Ron Bruch – Lake Sturgeon life history and conservation  
Dr. Andrew Evans – elasmobranch endocrinology and metabolism  
Dr. Craig Franklin – elasmobranch osmoregulation  
Dr. Martin Grosell – elasmobranch gut function and osmoregulation  
Dr. Susumu Hyodo – elasmobranch osmoregulation and endocrinology  
Dr. Jean Claude Le-Mével – Rainbow Trout endocrinology and renal physiology  
Dr. Vince Palace – Thyroid hormone and endocrine disruption in Lake Sturgeon  
Dr. Stephan Peake – Juvenile life history of Lake Sturgeon  
Dr. Molly Webb – Sturgeon endocrinology  
Dr. Amy Welsh – Population genetics of Lake Sturgeon  
Dr. Chris Wood – Elasmobranch intestinal physiology

## **PUBLICATIONS**

This bibliography includes: submitted, in review and accepted, papers, book chapters and abstracts.

### **2015**

73. Trana, M.R. Roth, J.D., Tomy, G., Anderson, W.G., and Ferguson S. (2015). Increased blubber cortisol in ice-entrapped beluga whales Polar Biology. *Polar Bio.* (in revision)
72. Carriere, B., Gillis, D., Halden, N. and Anderson, W.G. (2015) Strontium metabolism in the juvenile Lake Sturgeon, *Acipenser fulvescens*, and further evaluation of the isotope as a marking tool for stock discrimination. *J. Appld. Ichthyol.* (in revision)
71. Shute, L., Anderson, W.G. and Huebner, E. (2015). Microscopic examination of novel cell types in the integument of larval Lake Sturgeon, *Acipenser fulvescens*. *J. Morph.* (accepted)
70. Barth, C.C. and Anderson W.G. (2015). Factors influencing spatial distribution and growth of juvenile Lake Sturgeon (*Acipenser fulvescens* Rafinesque, 1817). *Can. J. Zool.* **93**, 823-831
69. McDougall, C.A., Welsh, A.B., Anderson, W.G. and Nelson, P.A. (2015). Rethinking the influence of hydroelectric development on gene flow of Lake Sturgeon, (*Acipenser fulvescens*) in a large riverine system. *PloS One* (submitted)
68. Kissinger, B, Gantner, N., Anderson, W. G., Gillis, D.M., Halden, N.M., Harwood, L. A. and Reist, J.D. (2015). Brackish-water residency and semi-anadromy in Arctic Lake Trout (*Salvelinus namaycush*) inferred from otolith microchemistry. *J. Great Lakes Res.* (In press)
67. Anderson, W.G. (2015). Endocrine systems in elasmobranchs. In: Physiology of Elasmobranch Fishes: Fish Physiology. Eds: Chadwick, R.E., Farrell, A.P., Brauner, C.J. 34B, pp 457-530
66. Hare, A.J., Waheed, A., Hare, J.F. and Anderson, W.G. (2015). Cortisol and catecholamine responses to social context and alarm pheromones in juvenile Lake Sturgeon, *Acipenser fulvescens*. *Can. J. Zool.* **93**, 605-613
65. Brandt, C., Burnett, D.C., Arcinas, L., Palace V.P. and Anderson, W.G (2015).

Effects of Chlorpyrifos on *in vitro* Sex Steroid Production and Thyroid Follicular Development in adult and larval Lake Sturgeon, *Acipenser fulvescens*. *Chemosphere*, **132**, 179-187

64. Anderson, W.G., McCabe, C., Brandt, C. and Wood, C.M. (2015). Examining urea flux across the intestine of the spiny dogfish, *Squalus acanthias*. *Comp. Biochem. Physiol.* **181**, 71-78
63. Trana, M.R., Roth, J.D., Tomy, G., Anderson, W.G., and Ferguson S. (2015) Influence of sample degradation and tissue depth on blubber cortisol in beluga whales. *J. Exp. Mar. Biol. Ecol.* **462**, 8-13
62. Elliott, K.H., Hare, J.F., LeValliant, M., Gaston, A.J., Rupert-Coudert, Y. and Anderson, W.G. (2015). Ageing gracefully: physiology but not behaviour declines with age in diving birds. *Func. Ecol.* **29**, 219-228

## 2014

61. Ryan, C.P., Anderson, W.G., Berkvens, C. and Hare J.F. (2014). Maternal gestational cortisol and testosterone are associated with trade-offs in offspring sex and number in a free-living rodent (*Uroditellus richardsonii*). *PLOS One* **9**, e111052.
60. Elliott, K.H., O'Reilly, K.M., Hatch, S.A., Gaston, A.J., Hare, J.F. and Anderson, W.G. (2014). The prudent parent meets old age: constraint and restraint in senescing seabirds. *Horm. Behav.* **66**, 828-837
59. McDougall, C.A., Blanchfield, P.J. and Anderson, W.G. (2014). Linking movement patterns of Lake Sturgeon, *Acipenser fulvescens*, in a small hydroelectric reservoir to abiotic variables. *J. Appl. Ichthyol.* **30**, 1149-1159.
58. Hare, J.F., Ryan, C.P., Enright, C., Gardiner, L.E., Skyner, L.J., Berkvens, C.N. and Anderson, W.G. (2014). Validation of a radioimmunoassay-based fecal corticosteroid assay for Richardson's ground squirrels (*Uroditellus richardsonii*) and behavioural correlates of stress. *Curr. Zool.* **60**, 591-601
57. Clary, D., Skyner, L.J., Ryan, C.P., Gardiner, L.E., Anderson, W.G. and Hare, J.F. (2014) Shyness-Boldness, but not Exploration, Predicts Glucocorticoid Stress Response in Richardson's Ground Squirrels, (*Uroditellus richardsonii*). *Ethology*, **120**, 1101-1109
56. Svendsen, J.C., Genz, J., Anderson, W.G., Stol, J.A., Watkinson, D. and Enders, E.C. (2014) Evidence of circadian rhythm, oxygen regulation capacity, metabolic repeatability and positive correlations between forced and spontaneous maximal metabolic rates in lake sturgeon *Acipenser fulvescens*. *PLoS ONE* **9**, e94693.
55. Genz, J., McDougall, C.A., Kheeto, S., Arcinas, L., Burnett D. and Anderson W.G. (2014). Induced spawning of wild-caught Lake Sturgeon (*Acipenser fulvescens*): assessment of hormonal and stress responses, gamete quality and survival. *J. Appl. Ichthyol.* **30**, 1565-1577
54. Genz, J., Shute, L. and Anderson, W.G. (2014) Regulation of Calcium Transport in the Early Life Stages of an Ancient Fish, *Acipenser fulvescens*. *Physiol. Biochem. Zool.* **87**, 299-309 doi: 10.1086/674919 (NSERC Discovery grant 311909-05 to WGA)
53. McDougall, C.A., Peake, S.J. and Anderson, W.G. (2014). Downstream passage through a Winnipeg River generating station: passage route determination, survival and fine-scale movements. *N. Am. J. Fish. Man.* **34**, 546-558 (NSERC grant#

CRDPJ 321520-05 to SJP and WGA; and NSERC Discovery grant 311909-05 to WGA)

### 2013

52. Barth, C. C., Anderson, W. G., Peake, S.J. and Nelson, P. (2013) Seasonal variation in the diet of juvenile lake sturgeon, *Acipenser fulvescens*, in the Winnipeg River. *J. Appl. Ichthyol.* **29**, 721-729, doi: 10.1111/jai.12193 (NSERC grant# CRDPJ 321520-05 to SJP and WGA; and NSERC Discovery grant 311909-05 to WGA)
51. Elliott, K.H., Welcker, J., Gaston, A.J., Hatch, S., Palace, V., Hare, J.F., Speakman, J.R., and Anderson, W.G. (2013). Thyroid hormones correlate with resting metabolic rate, not daily energy expenditure, in two charadriiform seabirds. *Biology Open* **2**, 580–586, doi: 10.1242/bio.20134358. (NSERC Discovery grants to WGA and JFH)
50. Genz, J., Carriere, B. and Anderson, W.G. (2013) Mechanisms of calcium absorption by anterior and posterior segments of the intestinal tract of juvenile lake sturgeon (*Acipenser fulvescens*). *Comp. Biochem. Physiol.* **166A**, 293-301, doi: 10.1016/j.cbpa.2013.06.033 (NSERC Discovery grant 311909-05 to WGA in addition to industrial support from Manitoba Hydro)
49. McDougall, C.A., Hrenchuk, C.L., Anderson W.G. and Peake, S.J. (2013). The rapid upstream migration of pre-spawn lake sturgeon, *Acipenser fulvescens*, following trap-and-transport over a hydroelectric generating station. *North Am. J. Fish. Man.* **33**, 1236-1242 (NSERC grant# CRDPJ 321520-05 to SJP and WGA; and NSERC Discovery grant 311909-05 to WGA)
48. McDougall, C.A., Blanchfield, P.J., Peake, S.J. and Anderson, W. G. (2013) Movement patterns and size-class influence entrainment susceptibility of lake sturgeon, *Acipenser fulvescens*, in a small hydroelectric reservoir. *Trans. Am. Fish. Soc.* **142**, 1508-1521 DOI:10.1080/00028487.2013.815659 (NSERC grant# CRDPJ 321520-05 to SJP and WGA; and NSERC Discovery grant 311909-05 to WGA)

### 2012

47. Anderson, W.G. (2012). The endocrinology of 1 $\alpha$ -hydroxycorticosterone in elasmobranch fish: A review. *Comp. Biochem. Physiol. A.* **162A**, 73-80
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**Technical reports**

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**Invited presentations**

19. Anderson, W.G., McCabe, C. and Wood, C.M. July 2014, Society of Experimental Biology annual meeting, Manchester UK. The role of the elasmobranch intestine regulating nitrogen balance.
18. Anderson, W. G. November 2013, Department of Biology, Carleton University. Physiological Ecology of the Lake Sturgeon, *Acipenser fulvescens*
17. Anderson, W.G. June 2013, Manitoba Hydro; Conservation Aquaculture,

- Understanding the role of the Environment in shaping the future of stocked Lake Sturgeon
16. Anderson, W.G. October 2012, Nature Manitoba Winnipeg; Ecology and physiology of a cultural icon, the Lake Sturgeon, *Acipenser fulvescens*
  15. Anderson, W. G. February 2012, Manitoba Hydro, Lost and Found, tagging techniques for young of the year Lake Sturgeon
  14. Anderson, W.G. June 2011, Department of Biology, University of Winnipeg. Waste not want not; intestinal handling of water and ions in elasmobranch fish
  13. Anderson, W.G. February 2011, Manitoba Hydro. Using Ovaprim as a conservation tool for Lake Sturgeon
  12. Anderson, W.G. June 2010, The American Elasmobranch Society, annual meeting, Providence, RI, USA. Probing the depths, What can the endocrine stress response in teleost fish tell us about the stress response in elasmobranch fish
  11. Anderson, W.G. April 2010, Strathendrick Rotary Club, Killearn, Scotland. A case study in an academic career
  10. Anderson, W.G. April 2010, Dunstaffnage Marine Lab, University of the Highlands and Islands, Oban Scotland. The role of the intestine in osmoregulation in elasmobranch fish
  9. Anderson, W.G. February 2010, Department of Biology, The Universite de Bretagne, Occidentale, Brest, France. Physiological Ecology of the Euryhaline Bullshark
  8. Anderson, W.G. June 2009, Society of Experimental Biology, Glasgow, UK. Waste not want not, intestinal handling of solutes and water in elasmobranchs.
  7. Anderson W.G. November 2007, Department of Zoology, University of British Columbia. The Euryhaline Bullshark, how does it do it and why?
  6. Anderson, W.G. November 2006, School of Life Sciences University of Queensland; Physiological regulation during acute transfer in the euryhaline bullshark from freshwater to saltwater
  5. Anderson W.G. September 2006, Department of Biology University of New Brunswick (Fredericton). Euryhalinity in an Elasmobranch Fish, the Bullshark, *Carcharhinus leucas*.
  4. Anderson, W.G. October 2006, Department of Biology, University of Regina; Salt and water balance in the Euryhaline Bullshark.
  3. Anderson, W.G., Taylor, J.R., Grosell, M. and Hazon, N. April 2006, Society of Experimental Biology, Canterbury, UK. Water metabolism in Elasmobranch fish
  2. Anderson, W.G. December 2005. Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, Florida, USA. Euryhaline bullshark physiological ecology in a changing salinity.
  1. Anderson, W.G. November 2005, Department of Biological Sciences, University of Alberta. Hormonal regulation of salt and water balance in the euryhaline bullshark, *Carcharhinus leucas*.

### Conference presentations - Oral

(†denotes presenter when there is more than one author)

Month-Year	location	Conference	Title	Authors
April-	St.	Society for	Control of rectal gland secretion in	Anderson†, Tierney and

95	Andrews, UK	Experimental Biology (SEB)	Elasmobranch fish.	Hazon
Sept-98	Waterloo, Ontario	American Fisheries Society (AFS) Southern Ontario Chapter	Fish Protection	Anderson
April- 99	Heriot Watt, UK	SEB	AVT and the role of renal function in elasmobranch fish.	Wells, Anderson and Hazon
April- 99	Heriot Watt, UK	SEB	The role of CNP and Angiotensin II in rectal gland secretion in elasmobranch fish.	Anderson <sup>†</sup> , Wells and Hazon
April- 2000	Exeter, UK	SEB	The role of the rectal gland and environmental manipulation on osmoregulation in elasmobranch fish.	Anderson <sup>†</sup> , Wells and Hazon
April- 2001	Canterbury, UK	SEB	Hormonal control of the kidney in elasmobranch fish.	Wells <sup>†</sup> , Anderson and Hazon
August- 2001	Sorrento, Italy	SEB special symposium	Hormonal control of drinking in elasmobranch fish.	Hazon, Anderson <sup>†</sup> and Wells
April- 2001	Canterbury, UK	SEB	Hormonal control of blood flow and rectal gland secretion in the elasmobranch <i>Scyliorhinus canicula</i>	Anderson <sup>†</sup> , Good, Wells and Hazon
March- 2003	Tokyo, Japan	Symposium on the function of Marine Organisms	Osmoregulation in the migratory bullshark, <i>Carcharhinus leucas</i> .	Anderson <sup>†</sup> , Pillans, Good, Tsukada, Meischke, Hyodo, Takei, Cramb, Franklin and Hazon
Sep-04	Cordoba, Spain	European Congress in Comparative Endocrinology	Investigation of C-Type natriuretic peptide in a euryhaline elasmobranch, <i>Carcharhinus leucas</i> , adapted to freshwater and seawater	Anderson <sup>†</sup> , Hyodo, Tsukada, Meischke, Pillans, Good, Takei, Franklin, Cramb and Hazon
June-05	Boston, USA	International Congress of in Comparative Endocrinology (ICCE)	Elasmobranch renin-angiotensin system and C-type natriuretic peptide – Interactions of systemic and local systems regulating renal and vascular function	Anderson <sup>†</sup> , Wells and Hazon
June-05	Boston, USA	ICCE	Ion and Urea regulation in elasmobranch fish.	Hazon, Anderson <sup>†</sup> , Wells, Good, Pillans and Franklin
May-06	Alberta	Canadian Society of Zoologists (CSZ)	Osmoregulation in the Migratory Bullshark, <i>Carcharhinus leucas</i>	Anderson <sup>†</sup>
Sep-07	San Francisco, USA	AFS	Is stress a motivating factor in lake sturgeon aggregations?	Allen <sup>†</sup> , Peake and Anderson
April - 07	Glasgow, UK	Society for Experimental Biology (SEB)	Endocrine regulation of blood flow and secretion rate in the salt gland of the estuarine crocodile, <i>Crocodylus porosus</i> .	Anderson <sup>†</sup> , DeVries, Cramp and Franklin
Jan-08	Halifax, NS, Canada	Canadian Congress for Fish and Fisheries Research	Understanding reproduction at low abundance: key indicators of reproductive development in lake sturgeon, <i>Acipenser fulvescens</i> .	Allen <sup>†</sup> , Anderson and Peake
Jun-08	Portland	International	Calcium regulation during the reproductive	Allen <sup>†</sup> , Webb, Cureton,

	OR, USA	Congress on the Biology of Fishes (ICBF)	cycle of a wild, freshwater, cartilaginous fish.	Guerreiro, Fuentes, Canario, Peake and Anderson
Aug-08	Ottawa	American Fisheries Society (AFS)	Indirect measures of reproductive state in lake sturgeon.	Allen <sup>†</sup> , Webb, Cureton, Guerreiro, Fuentes, Canario, Peake and Anderson
Jun-09	Glasgow, UK	SEB	Calcium metabolism in a freshwater cartilaginous fish, the lake sturgeon, <i>Acipenser fulvescens</i>	Allen, Peake, Weihrauch and Anderson <sup>†</sup>
Jun-09	Glasgow, UK	SEB	Life of the Dammed – development of the stress axis in lake sturgeon, <i>Acipenser fulvescens</i>	Zubair, Peake, Barth and Anderson <sup>†</sup>
Aug-09	Nashville, USA	AFS	Lake sturgeon environmental physiology: influence of water chemistry on calcium homeostasis.	Allen <sup>†</sup> , Weihrauch, Bruch, Daseiwicz, Peake and Anderson
Feb-10	Vicksburg, USA	Mississippi chapter of AFS	Using physiology to help understand ecology: an example of lake sturgeon and environmental calcium.	Allen <sup>†</sup> , Weihrauch, Peake and Anderson
May-10	UBC	CSZ	The effect of environmental calcium on whole body calcium flux in juvenile lake sturgeon, <i>acipenser fulvescens</i>	Anderson <sup>†</sup> , Allen and Peake
May-10	UBC	CSZ	Struggling mothers, strong sons: Optimization and adaptive sex allocation in <i>Spermophilus richardsonii</i> .	Ryan <sup>†</sup> , Anderson and Hare
May-10	UBC	CSZ	Homologous bradykin and in vivo cardiovascular responses in the little skate, <i>Leucoraja erinacea</i>	Daseiwicz <sup>†</sup> , Conlon and Anderson
Jun-10	Prague	SEB	The effect of the environment on the development of the cortisol stress response in juvenile lake sturgeon, <i>Acipenser fulvescens</i> .	Anderson <sup>†</sup> , Zubair and Peake
Jun-10	Prague	SEB	Myotropic actions of bradykinin in the little skate, <i>Leucoraja erinacea</i> .	Daseiwicz <sup>†</sup> , Conlon and Anderson
Aug-10	Pray, USA	World sturgeon Con. Soc. North American chapter	Relationships between water and salt regulation and migrational movements in juvenile sturgeons.	Allen <sup>†</sup> , Anderson, Peake, Weihrauch, Cech, and Kültz
Feb-11	New Orleans, USA	Aquaculture USA	Water chemistry, calcium regulation and growth in sturgeons.	Allen <sup>†</sup> , Weihrauch, Peake and Anderson
May-11	U of Ottawa	CSZ	The role of the colon in nitrogen balance in two chondrichthyan fishes, the ratfish, <i>Hydrolagus colliei</i> , and spiny dogfish, <i>Squalus acanthias</i> .	Anderson <sup>†</sup> , Nawata, Wood, Piercey-Normore and Weihrauch
Jul-12	Madison, WI, USA	ICBF	Are bacteria involved in nitrogen balance in Elasmobranch fish?	Ho, Weihrauch, Brassinga and Anderson <sup>†</sup>
Jul-12	Madison, WI, USA	ICBF	Effects of Environmental calcium on the early ontogeny of lake sturgeon	Svensen <sup>†</sup> , Enders, Wall, Watkinson and Anderson
Jul-12	Madison, WI, USA	ICBF	Calcium handling in the intestinal tract of a cartilaginous fish, the lake sturgeon	Carriere <sup>†</sup> , Genz and Anderson
Jul-12	Salzburg, Austria	SEB	Whole-body calcium regulation of larval freshwater lake sturgeon ( <i>Acipenser fulvescens</i> ) during growth	Genz <sup>†</sup> , Klassen and Anderson
Jul-12	Salzburg,	SEB	Calcium absorption by the gastrointestinal	Genz <sup>†</sup> , Carriere and

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	Austria		tract of freshwater juvenile lake sturgeon ( <i>Acipenser fulvescens</i> )	Anderson
Feb-13	U of M	Prairie Undergraduate Biological Symposium (PUBS)	Lake trout in Husky lakes (Northwest territories); otolith microchemistry and growth rates to determine movements among habitats	Kissinger <sup>†</sup> , Reist and Anderson
Feb-13	U of M	PUBS	Potential effects of chlorpyrifos on the development of the thyroid system in lake sturgeon, <i>Acipenser fulvescens</i>	Burnett <sup>†</sup> , Anderson and Palace
Feb-13	U of M	PUBS	The role of various cell types in calcium balance of larval lake sturgeon, <i>Acipenser fulvescens</i>	Shute <sup>†</sup> , Anderson, Genz and Huebner
Feb-13	U of M	PUBS	Increased cortisol concentration in Beluga Whale blubber over time	Trana <sup>†</sup> , Ferguson, Roth, Anderson, Tomy and Fisk
Feb-13	U of M	PUBS	Cortisol production in arctic foxes related to food availability	MacDonald <sup>†</sup> , Roth and Anderson
May-13	U of Guelph	CSZ	Lake trout habitat use and growth in an arctic environment	Kissinger <sup>†</sup> , Anderson, Gantner, Gillis, Halden, Harwood and Reist
May-13	U of Guelph	CSZ	Effects of Chlorpyrifos on in vitro sex steroid production in lake sturgeon, <i>Acipenser fulvescens</i>	Brandt <sup>†</sup> , Arcinas, Genz and Anderson
May-13	U of Guelph	CSZ	Friend or Foe: do conspecifics lower the acute stress response in juvenile lake sturgeon?	Hare <sup>†</sup> and Anderson
May-13	U of Guelph	CSZ	Growth and the role of MRC's during calcium stress in larval lake sturgeon	Genz <sup>†</sup> , Shute and Anderson
May-13	U of Guelph	CSZ	Urea balance across the gut of the spiny dogfish, <i>Squalus acanthias</i>	Anderson <sup>†</sup> , Wood and McCabe
Jul-13	Nanaimo, BC, Canada	International Sturgeon Symposium (ISS)	An inter-reservoir contribution of lake sturgeon: unforeseen consequences of survived downstream passage?	McDougall <sup>†</sup> , Welsh, Peake and Anderson
Jul-13	Nanaimo, BC, Canada	ISS	Post-stocking assessment of lake sturgeon in the Winnipeg River, Manitoba, Canada: Influence of age-at-release over a two year study	Klassen <sup>†</sup> and Anderson
Jul-13	Nanaimo, BC, Canada	ISS	Potential effect of chlorpyrifos, an organophosphate pesticide, on the development of the thyroid system in lake sturgeon, <i>Acipenser fulvescens</i>	Burnett <sup>†</sup> , Anderson and Palace
Jul-13	Nanaimo, BC, Canada	ISS	Friend or foe: do conspecifics lower the acute stress response in juvenile lake sturgeon?	Hare <sup>†</sup> and Anderson
May-14	Montreal, QC, Canada	CSZ	Friend or Foe: do conspecifics lower the acute stress response in juvenile lake sturgeon?	Hare <sup>†</sup> and Anderson
May-14	Montreal, QC, Canada	CSZ	Novel cell types in the skin of developing Lake Sturgeon	Shute <sup>†</sup> , Huebner and Anderson
Aug-14	Edinburgh, Scotland, UK	ICBF	Bacteria and steroid synthesis in the little skate	Wiens <sup>†</sup> , Brassinga and Anderson
Oct-14	San Diego,	American	Effects of calcium availability on growth and	Genz <sup>†</sup> and Anderson

	California	Physiological Society	survival of <i>Acipenser fulvescens</i> in early life stages	
Dec-14	Ottawa, Canada	ArcticNet	Blubber cortisol reflects conservation status in beluga whales of the Canadian Arctic	Trana†, Roth, Tomy, Anderson, Ferguson

### Conference Presentations – poster

(†denotes presenter when there is more than one author)

Month-Year	Location	Conference	Title	Authors
Jun-08	Portland, USA	ICBF	Acute stress response in juvenile lake sturgeon, <i>Acipenser fulvescens</i>	Zubair†, Allen and Anderson
Jun-08	Calgary, Canada	International Symposium on Fish Endocrinology (ISFE)	Functional evolution of the cardiovascular actions of bradykinin in vertebrates	Anderson† and Conlon
Jun-08	Calgary, Canada	ISFE	Reproductive-based changes in calcium regulation in a freshwater, cartilaginous fish.	Allen†, Guerreiro, Fuentes, Canario, Peake and Anderson
Jun-09	Glasgow, UK	SEB	Avoid the solvent abuse – An alternative method for the measurement of Trimethylamine oxide	Anderson†
Feb-10	Brandon, MB	PUBS	How does social environment affect stress and vigilance behaviour in Richardson's ground squirrels ( <i>Spermophilus richardsonii</i> )	Gardiner†, Hare & Anderson
Feb-12	U of M	PUBS	Friend or Foe: Do conspecifics lower the stress response in juvenile lake sturgeon?	Hare† and Anderson
May-13	Guelph, Canada	CSZ	Does HEA, alkaline environments or salinity stress trigger ureotelism in the freshwater ribbon leech <i>Nephelopsis obscura</i>	Quijada-Rodriguez†, Anderson & Weihrauch
May-13	Guelph, Canada	CSZ	Larval lake sturgeon inherit survivorship from maternal stores	Genz†, Khetoo, Arcinas and Anderson

## 4. TEACHING

### Philosophy

At the undergraduate level I have 4 principle objectives in teaching.

1. As a research scientist one learns to question and evaluate theories and principles presented in the primary and textbook literature. As a consequence I feel it is important to instill a level of critical thinking in students, a skill that is transferable to any future employment they may wish to pursue.
2. The development of techniques and methodology allow for integration of a broad knowledge base and application to ones personal area of interest. However, application requires continual learning and refining of personal skills and this is the second of my teaching objectives.
3. Continual learning of techniques and methodologies related to my research allow me to examine my research objectives from a variety of angles. This aspect basically



relates to problem solving at the level of the “big picture” and is the third of my teaching objectives.

4. The final objective I have whilst teaching is to determine the level of individual ability. Course work, although set, must also be fluid enough to encompass all the students.

These philosophies are not fixed, indeed it is important that they are fluid and respond to the changing horizons in how I teach and how material will likely be learned and delivered in the future. In my short time as a University Professor I have recognized an increasing reliance for internet and on-line based materials. These have been introduced to the lower level classes I teach in but I have yet to implement them in the more senior classes I teach in. However, I am constantly evaluating my teaching materials and how these are delivered in response to both self and student assessment to ensure that the material delivered is not ‘stale’ and is as up to date as possible. This last point is particularly relevant for the 4000 and graduate student course I am involved with.

### **Courses taught**

#### *BIOL 2410 – Human Physiology I*

This is a large class taught to >260 students in the fall term. I typically teach the endocrinology and reproductive sections in this class (13 lectures). Dr. M. Fry teaches the remainder of the course and typically administers the course. I have taught the course in its entirety when Dr. Fry was on sabbatical in the Fall term of 2011.

#### *BIOL 2420 – Human Physiology II*

This is the companion course to the above course with >220 students taught in the winter term. I typically have a small involvement in this course with teaching only the renal section (6 lectures). The course is co-taught usually with Dr. K. Campbell, Dr. K. Scott and Dr. D. Weihrauch and Dr. Campbell normally administers the course. I have taught Dr. Campbell’s section when he was on sabbatical in 2012.

We are largely restricted to the textbook for both these courses as it acts as a service course for the Faculty of Kinesiology and is largely populated by general science students. I do, however, strive to introduce non-human examples which allows for not only demonstration of physiology in the broader context but evolutionary principles at the same time.

#### *BIOL 3470 – Environmental physiology of animals I*

This is a third year course with a moderate enrollment of 35-45 students taught in the fall term. My role in this course is small as I teach only 5 classes in comparative cardiovascular physiology. The course is administered by Dr. K. Campbell.

#### *BIOL 3472 – Environmental physiology of animals II*

This course acts as the companion course to BIOL 3470 and is taught in the winter term. The enrollment is usually around 30 students and it is administered by Dr. D. Weihrauch. I do not normally teach in this class, however, I took over Dr. Weihrauch’s role when he was on sabbatical in the winter term of 2013.

Lectures in BIOL 3470 and 3472 are loosely based on a recommended textbook, however, this is a third year class and as a consequence lecture material will be drawn

from additional sources including the primary literature. There is a strong lab component to these courses so the combination of primary literature in the lecture material and the laboratory exercises instructs students in critical thinking and problem solving alongside hypothesis testing and presentation of scientific data.

*BIOL 4480 – Comparative Endocrinology*

I am the sole instructor for this 4<sup>th</sup> year course taught in the winter term. The class is on average 20 students. While the framework of my lecture notes are loosely based on a textbook that acts as suggested reading for the students the vast majority of content is drawn from the primary literature. I am in constant dialogue with the students in class and as the course progresses it moves away from the single unit approach in the 2000 level classes to the broader context. I incorporate methodology into the lectures so students learn not only the facts but how those facts are obtained. I see this 4<sup>th</sup> year class as an opportunity to test students on big picture ideas and concepts.

*BIOL 7220 – critical thinking in Biological Sciences*

In the former Department of Zoology I co-taught this course with Dr. M. Docker. When Zoology, Botany and the Biology unit merged the template for this course was used to develop a core PhD course in the Department of Biological Sciences. I teach this with Dr. Docker every second year (once with Dr. Piercey-Normore in 2010) and the course spans the fall and winter term. Enrollment varies but has been a maximum of 12 when we first taught the course to 6 students in 2012/13. Both Dr. Docker and myself developed the delivery and assessment methods used in the course. Students are required to write either a mini proposal or critique of a research area that they may not be familiar with.

## **5. ADMINISTRATION**

### **Philosophy**

I never expected when starting my academic post in 2004 that the administrative aspects of my job would be so important to my colleagues, the Department and the University community. As Associate Head for the last five years I have learned that acting on administrative issues quickly allows me to manage my time effectively and balance my research endeavours with the necessary administrative role that I play in the Department. Providing people a voice and avenue to discuss concerns or problems they may have is critical in the management of individuals.

### **Duties**

As associate department head I was primarily concerned with the organization, implementation and running of the Undergraduate programs in the Department of Biological Sciences. These duties include:

- In consultation with the Department Head timetabling of classes and appointment of teaching duties for all teaching instructors in the department
- Review of courses taken by students in other institutions for equivalency to courses in the Biological and Genetics programs
- Discipline matters associated with academic dishonesty, class disruption, etc associated with term papers as outlined in the Universities student discipline bylaw
- Conflict resolution between instructors and students under the University Respectful

- workplace and learning environment policy
- Advising students on course selection and program specific requirements in Biological Sciences and Genetics programs to ensure graduation requirements will be met
- Approval of students to register for courses in our programs in the absence of pre-requisites or appropriate grades
- Approval for students to use courses outside of the Biological Sciences or Genetics programs as part of their requirements in Biological Sciences or Genetics.
- Liaising between the Faculty of Science and the Department on proposed course and program changes made in the Department of Biological Sciences.
- Review of applications and appointment of sessional instructors for courses offered in the Department of Biological Sciences
- Regular meetings with the Department Head and Associate Head to discuss all aspects of running the largest Department in the Faculty of Science at the University of Manitoba
- Promoting the Department to high schools during ‘evening of excellence’, ‘Info days’ and Manitoba Science Teachers events.
- Monitoring impact of changes in instructional methods, eg: Supplemental Instruction in BIOL 1410 and 1412
- Act as Acting Head of the Department of Biological Sciences when required.

### **Standing Committee membership**

#### **University**

- Senate committee on Animal Care (member 2007-2010); Reviewed policies and procedures related to animal care at the University of Manitoba
- Protocol management review committee (member 2007-2009); Reviewed animal care protocols as required under the guidelines of the Canadian Council for Animal Care
- Elected member of University Senate from the Faculty of Science (2012-present); Recommend changes in university policies and procedures associated with academic matters. Senate reports to the University Board of Governors.
- Elected member of the Senate Committee on Admissions (2014- present); Recommends to senate matters related to admissions for undergraduate programs leading to a degree.

#### **Faculty**

- Faculty of Science Committee on Student Standing (member 2010-present). This committee reviews academic appeals for student standing in the Faculty of Science. The committee reports to the Faculty of Science, although students may also appeal to the University Discipline committee if denied at the Science committee.
- Committee on Course and Academic Programs Faculty of Science (member 2008-present). Represent the Department of Biological Sciences, regarding Faculty of Science course and program changes. This committee reports to the University Senate
- Faculty of Science Endowment fund committee three-year term (member 2010-2013). This committee is responsible for allocation of Faculty of Science Endowment funds based on applications submitted by each of the administrative units within the Faculty of Science
- Faculty of Science Local Animal Care Committee (Chair 2006-2009)

### **Department**

- Undergraduate curriculum committee (Chair 2008-present); this committee discusses proposed course and program changes and reports to the Department of Biological Sciences
- Recruitment and retention (member 2011-present); this committee coordinates the presence of Biological Sciences at recruitment events organised by the Faculty of Science and the University
- Graduate Studies committee (member 2009-present); this committee discusses admission to the graduate program and is responsible for recommending to department council any changes in graduate studies regulations and procedures
- Physiology teaching committee (Chair 2006-present); this committee discussing teaching responsibilities associated with the physiology theme courses in the Department of Biological Sciences and reports to the Undergraduate curriculum committee.

### **Ad Hoc committee membership**

- Faculty of Science Internationalisation committee (member 2012-present); This committee was established to determine the level of internationalization in the Faculty of Science and recommend strategies to improve international ties.
- Faculty of Science Local Disciplinary Committee (member on request 2008-present); I have been asked to attend these committee meetings irregularly based on my standing on the Faculty of Science committee on Student Standing.
- Search committee for the Department Head in the Physics Department (2014); Requested to serve on this committee by the Dean of the Faculty of Science
- Search committee for new faculty member in the Department of Statistics (2010); requested to serve on this committee as the external member to the Department by the Dean of the Faculty of Science
- Elected member from the Department of Biological Sciences for the promotion and tenure committees of Dr. Margaret Docker and Dana Schroeder and the promotion committee for Gail Davoren

### **Department**

- Elected member to be on the Search committee for two animal physiology positions in the Department of Zoology (2007) and for the search committee for the Departments equipment technician (2012)

### **6. Service to the community**

I am asked to review, on average 2 manuscripts a month by scientific journals. I have acted as a reviewer for National Science and Engineering Research Council Discovery, and Stacie research applications; National Science Foundation (USA) and Natural Environment Research Council (UK) research grants. I am a member of the Canadian Society of Zoologists (CSZ) and the Society for Experimental Biologists and served as the Comparative Physiology and Biochemistry section chair for the CSZ in 2012.

Dec 2014 – present: Associate Editor, Comparative Biochemistry and Physiology A

Anderson, W.G. Curriculum Vitae October 2014

June 2015 – present: Associate Editor, Canadian Journal of Fisheries and Aquatic Sciences



**Date Submitted:** 2015-09-30 13:02:07

**Confirmation Number:** 420576

**Template:** NSERC\_Researcher

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## **Dr. Judy E Anderson**

Previous Family Name: Ewen

Correspondence language: English

Sex: Female

## **Contact Information**

The primary information is denoted by (\*)

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#### Primary Affiliation (\*)

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Work (*)	204-4749730

### **Email**

Work (*)	Judith.anderson@umanitoba.ca
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Protected when completed

## Dr. Judy Anderson

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### Language Skills

Language	Read	Write	Speak	Understand	Peer Review
English	Yes	Yes	Yes	Yes	Yes
French	No	No	No	Yes	No

### Degrees

- 1985/8            Doctorate, Human Anatomy (Endocrinology), The University of Manitoba  
Supervisors: Dr. J.A. Thliveris, 1981/9 - 1985/8
- 1981/5            Bachelor's, Medicine (Endocrinology), The University of Manitoba  
Supervisors: Dr. J.A. Thliveris, 1977/6 - 1978/8
- 1974/5            Diploma, Electron Microscopy, Seneca College for Applied Arts and Technology  
Supervisors: Mr. Hugh Burton, 1973/9 - 1974/4
- 1973/5            Bachelor's, Zoology, University of British Columbia  
Supervisors: Dr. Dave Jones, Zoology, 1972/5 - 1972/8

### Recognitions

- 2012/5 - 2012/6    2012 Endeavour Executive Award  
Department of Education, Employment and Workplace Relations, Government of Australia  
Distinction  
Collaboration on research publication (muscle stem cells, aging and muscle regeneration), and professional development on departmental interactions, and graduate student training programs. Provided travel and living expenses for a term of 6 weeks as Visiting Professor at the University of New South Wales, Sydney, Australia.
- 2012/1 - 2012/2    Invited Fellowship Program for Research in Japan  
Japan Society for the Promotion of Science, Government of Japan  
Distinction  
I conducted research on Molecular dynamics regulating muscle hypertrophy & repair, mentored 12 HQP, gave 4 seminars and delivered a cross-faculty graduate-level credit course (Muscle Regeneration, 9 HQP). JSPS provided travel and living expenses for 4 weeks in Japan, at University of Kyushu (Fukuoka), University of Tokyo, National Center for Neurology and Psychiatry (Tokyo), and Kyoto University.

2009/7 - 2010/7 University of Manitoba - University of Manitoba Faculty Association: Merit Award for Service - 2,000  
The University of Manitoba  
Distinction  
This was awarded for extraordinary service to the University, after a nomination from the whole department (of which I am the Head). The nomination was in recognition of my initiatives over the previous year (2009-10) on behalf of the department, after the major fire in the Duff Roblin Building at the University of Manitoba. The fire caused complete evacuation of the building (20 faculty offices, 11 research labs, 8 teaching labs, ~27 grad students, and all departmental offices for staff, records and the Head). This was awarded jointly from the University of Manitoba and the University of Manitoba Faculty Association, and the nomination from department members was in itself, a huge honour. [Note: the fire was March 28 2009; reconstruction took until July 2012 for re-occupancy; in October 2014, still dealing with construction of controlled-claim signed off by University of Manitoba.]

## User Profile

Research Specialization Keywords: cell biology & microscopy, drug developmen/testing, functional regeneration and reinnervation, HGF/c-met, muscle repair & atrophy, muscle stem cells & activation in mammals & fish, muscular dystrophy, neuromuscular disease and rehabilitation, nitric oxide signaling, stretching fiber cultures

Research Disciplines: Cell Biology, Biology and Related Sciences, Neurosciences

Areas of Research: Musculoskeletal Lesions and Repair, Biological Behavior, Muscle, Aging Process

Fields of Application: Foundations and Knowledge Acquisition, Pathogenesis and Treatment of Diseases, Education

## Employment

2007/7 Professor  
Department of Biological Sciences, Faculty of Science, The University of Manitoba  
Full-time, Professor  
Tenure Status: Tenure  
Research, teaching and service (internal and external)

1998/7 Professor  
Department of Anatomy, Medicine, The University of Manitoba  
Full-time, Professor  
Tenure Status: Tenure  
Research, teaching and service (internal and external)

2007/10 - 2018/6 Head  
Biological Sciences, Science, The University of Manitoba  
Full-time, Term, Professor  
Tenure Status: Tenure  
Significant administrative role for the largest department in the Faculty of Science (40 faculty), with research and teaching labs spanning 4 buildings, and facilities for rearing and care of plants (2 greenhouses, plant-growth chambers) and animals (breeding and care facility for many species of vertebrates and invertebrates used in research).

2006/6 - 2009/5 Board of Governors, elected member from Senate  
Human Anatomy and Cell Science, Medicine, The University of Manitoba  
Part-time, Term, Professor  
Tenure Status: Tenure  
Represented Senate on the Board of Governors of the University of Manitoba



- 2004/12 - 2006/6  
Vice-Chair, Dean's Executive  
Human Anatomy and Cell Science, Medicine, The University of Manitoba  
Part-time, Term, Professor  
Tenure Status: Tenure  
Served as vice-chair for the Dean of Medicine administrative council (including Acting Dean in his absence).
- 2003/1 - 2006/6  
Associate Dean (Academic)  
Human Anatomy and Cell Science, Medicine, The University of Manitoba  
Part-time, Term, Professor  
Tenure Status: Tenure  
Chaired all promotion and tenure committees for the Faculty of Medicine, led revision of promotion and tenure document for the Faculty, led the accreditation process for the Undergraduate Medical Education program, dealt with academic, appointments, governance matters and strategic resource (budget) planning in the Faculty.
- 2005/2 - 2005/10  
Acting Head  
Department of Pathology, Medicine, The University of Manitoba  
Part-time, Term, Professor  
Tenure Status: Tenure  
Served as the academic acting head of the department after a failed search; roles included academic leadership, performance reviews, mentoring research fellows and clinical residents, handling personnel and budgetary matters, etc.
- 2004/7 - 2004/9  
Acting Dean  
Human Anatomy and Cell Science, Medicine, The University of Manitoba  
Full-time, Term, Professor  
Tenure Status: Tenure  
The position bridged a 4-month period between two deans, with responsibility for oversight and leadership in academic, personnel, budgetary, research, infrastructure and buildings, institutes and education programs in 29 departments, chairing the dean's administrative council, managing staffing, organizing records and preparing for transition to the new dean.
- 1993/7 - 1998/6  
Associate Professor  
Department of Anatomy, Medicine, The University of Manitoba  
Full-time, Associate Professor  
Tenure Status: Tenure  
Research, teaching and service
- 1988/8 - 1993/6  
Assistant Professor  
Department of Anatomy, Medicine, The University of Manitoba  
Full-time, Assistant Professor  
Tenure Status: Tenure Track  
Research, teaching and service
- 1989/7 - 1992/6  
Manitoba Health Research Council Research Scholar  
Department of Anatomy, Medicine, The University of Manitoba  
Full-time, Term, Assistant Professor  
Tenure Status: Tenure Track  
Research
- 1985/8 - 1988/7  
Postdoctoral Fellow  
Anatomy, Medicine, University of British Columbia  
Full-time  
Tenure Status: Non Tenure Track  
Research

## Leaves of Absence and Impact on Research

2014-03-15 - 2014-05-13	Medical, The University of Manitoba On March 14, 2014, I broke my leg badly, at work. I was admitted to hospital twice, had surgery March 28, and recuperated at home until returning to full responsibility (headship, research, teaching, service) on May 12/14. However, my level of function was impaired due to much-reduced mobility (still in a cast with crutches), and limited weight-bearing until June 6th, then multiple physiotherapy appointments all summer 2014. This delayed animal-surgery experiments, and interfered in my ability to navigate campus, get to the lab, and function with normal stamina (i.e., high-level stamina). For the 2 months of formal medical leave there was little to no research activity; and limited but improving/increasing research activity until September 2014. Essentially, the net disruption was regrettably about 4 months lost research time.
2009-03-28 - 2012-08-31	Other Circumstances, The University of Manitoba During this 3.5 year period, my ability to do research was significantly impacted by administrative duties that resulted from a serious, major fire in the Duff Roblin Building at the University of Manitoba (March 28 2009). More than half the departments research and teaching labs (see Merit Award 2010 under Recognitions) plus the offices of more than half the faculty and all the staff plus the department Head (me) had to be evacuated immediately. This led to a huge additional admin load involving significant leadership contributions to the University, in order that the response to the fire could be as expeditious and effective as possible in mitigating the impact of the devastating fire on students, staff, faculty, and research and teaching. As a result, this period was tantamount to a "leave" from my own research, in service to others (year 1 ~90%, year 2 ~60%, years 3-4 ~25%). This work continues (now ~5% of my research time). This explains my limited research productivity/papers.
2012-01-01 - 2012-06-30	Administrative, The University of Manitoba Administrative leave, away from the lab for January 2012 (in Japan as Invited Fellow) and May-June 2012 (in Australia on Endeavour Executive Award)

## Research Funding History

### Awarded [n=4]

2013/7 - 2106/6 Co-applicant	Exploring the Biologics of Rotator Cuff Injury - Part 2, Grant <b>Funding Sources:</b> 2012/7 - 2017/6 Pan Am Clinic Foundation Inc. Alexander Gibson Fund & Department of Surgery Total Funding - 36,000 Portion of Funding Received - 18,000 Funding Competitive?: Yes  Co-applicant : Dr. Peter MacDonald; Principal Applicant : Dr. Jeff Leiter
2015/4 - 2020/3 Principal Applicant	Satellite cell activation and its paracrine impact on fiber phenotype, Grant <b>Funding Sources:</b> 2015/4 - 2020/3 Natural Sciences and Engineering Research Council of Canada (NSERC) Discovery grant Total Funding - 225,000 Portion of Funding Received - 45,000 Funding Competitive?: Yes
2012/1 - 2018/6 Principal Applicant	Dean of Science Research Funding for Heads, Grant

**Funding Sources:**

2012/4 - 2018/6 University of Manitoba  
 Dean of Science Research Support to Heads  
 Total Funding - 42,000  
 Portion of Funding Received - 21,000  
 Funding Competitive?: No

2014/4 - 2015/3 Satellite cell activation and its paracrine impact on fiber phenotype, Grant  
 Principal Applicant

**Funding Sources:**

2014/4 - 2015/3 Natural Sciences and Engineering Research Council of Canada (NSERC)  
 Discovery Grant  
 Total Funding - 41,000  
 Portion of Funding Received - 39,000  
 Funding Competitive?: Yes

**Completed [n=6]**

2009/4 - 2014/3 Stem cell activation across taxa, Grant  
 Principal Investigator

**Funding Sources:**

2009/4 - 2014/3 Natural Sciences and Engineering Research Council of Canada (NSERC)  
 Discovery Grant  
 Total Funding - 125,000  
 Portion of Funding Received - 125,000  
 Funding Competitive?: Yes

Principal Investigator : Dr. Judy Anderson

2011/7 - 2012/6 Exploring the biologics of rotator cuff injury and advancing repair, Grant  
 Co-applicant

**Funding Sources:**

2011/7 - 2012/6 Canadian Orthopaedic Foundation  
 Research Legacy Award (CORL)  
 Total Funding - 20,000  
 Portion of Funding Received - 14,475  
 Funding Competitive?: Yes

Co-applicant : Dr. Peter MacDonald;

Principal Applicant : Dr. Jeff Leiter

2011/4 - 2012/3 Nitric oxide and exercise together as a potential treatment to build bone in aging, Grant  
 Principal Investigator

**Funding Sources:**

2011/4 - 2012/3 University of Manitoba  
 University Research Grants Program  
 Total Funding - 7,500  
 Portion of Funding Received - 5,600  
 Funding Competitive?: Yes

Principal Investigator : Dr. Judy Anderson

2011/1 - 2011/12 Advancing muscle stem cell research and drug development through collaboration on the single muscle fiber protocol, Grant  
 Principal Investigator

**Funding Sources:**

2011/4 - 2012/3 Shastri Indo-Canadian Institute (Alberta)  
Partnership Development Seed Grant  
Total Funding - 15,000  
Portion of Funding Received - 15,000  
Funding Competitive?: Yes

Co-applicant : Dr. Joytsna Dhawan, National Institute of Cell Biology, InStem, Bangalore India;

Principal Investigator : Dr. Judy Anderson

2009/7 - 2011/6  
Co-investigator

Cerebellar Pathophysiology associated with Duchenne Muscular Dystrophy, Grant

**Funding Sources:**

2009/7 - 2011/6 Manitoba Institute of Child Health (The)  
Operating Grants  
Total Funding - 38,247  
Portion of Funding Received - 8,000  
Funding Competitive?: Yes

Co-applicant : Dr. Judy Anderson; Dr. Mark Fry

2006/4 - 2010/9

Principal Investigator

Muscle satellite cell activation to prevent and treat muscle atrophy. (total amount was charged 65% overhead on personnel costs, due to Federal Contractors Program with UM), Contract

**Funding Sources:**

2006/4 - 2010/9 Canadian Space Agency (CSA)  
Space Life Sciences 2004 #3  
Total Funding - 340,000  
Portion of Funding Received - 255,000  
Funding Competitive?: Yes

Principal Investigator : Dr. Judy Anderson

## Student/Postdoctoral Supervision

### Bachelor's [n=26]

2015/9 - 2015/12

Principal Supervisor

Paige Craig (In Progress) , University of Manitoba

Student Degree Expected Date: 2017/5

Thesis/Project Title: research assistant in the lab, related to the histology of muscle in developing lamprey

Present Position: 2nd year undergraduate at UofManitoba

2015/5 - 2015/9

Principal Supervisor

Paige Craig (In Progress) , University of Manitoba

Student Degree Expected Date: 2017/5

Thesis/Project Title: Study of protein expression in unloaded hind limb or loaded fore limb muscles of mice in a study of nitric oxide as potential countermeasure to muscle disuse atrophy.

Present Position: 2nd year undergraduate student, Uof Manitoba

2015/5 - 2015/10

Principal Supervisor

Antonia Zhu (In Progress) , Queen's University

Student Degree Expected Date: 2016/5

Thesis/Project Title: Analysis of muscle fiber diameter and protein expression in a study to test whether nitric oxide delivery can attenuate muscle disuse atrophy due to hind limb suspension (student received an NSERC-USRA award for this work)

Present Position: 3rd year Science student at Queen's U

- 2015/5 - 2015/9  
Principal Supervisor Lucien Letourneau (In Progress) , University of Manitoba  
Student Degree Expected Date: 2018/5  
Thesis/Project Title: Effect of nitric oxide-based treatment on impact of muscle disuse on accumulation of fat in the liver and vascular density in mouse skeletal muscle.  
Present Position: 2nd year undergraduate student, Uof Manitoba
- 2014/9 - 2014/12  
Principal Supervisor Andre Cunha (In Progress) , University of Sao Paulo Brazil  
Student Degree Expected Date: 2016/4  
Thesis/Project Title: Tracking myogenic precursor cells during larval, metamorphosis and adult stages of lamprey development.  
Present Position: visiting student in Science Without Borders Brazil program
- 2014/9 - 2015/4  
Principal Supervisor Alix Nelson (In Progress) , University of Manitoba  
Student Degree Expected Date: 2015/5  
Thesis/Project Title: Testing the effectiveness of NO-based treatment as a way to prevent disuse atrophy after hindlimb suspension in mice.  
Present Position: Research Assistant during undergrad studies
- 2014/5 - 2014/8  
Principal Supervisor Alix Nelson (In Progress) , University of Manitoba  
Student Degree Expected Date: 2015/5  
Thesis/Project Title: Effect of treatment with a nitric oxide donor drug during hind limb unloading on expression of muscle regulatory and muscle-growth-related genes by satellite-stem cells  
Present Position: BSc year 4
- 2014/4 - 2014/9  
Principal Supervisor Antonia Zhu (In Progress) , Queen's University  
Student Degree Expected Date: 2017/5  
Thesis/Project Title: Effect of treatment with a nitric oxide donor drug on skeletal muscle atrophy and satellite cell activity during hindlimb unloading - NOTE: AZ worked on research during the summer at UManitoba, although not in her program at Queen's U.  
Present Position: BSc year 2 in progress at Queen's
- 2014/4 - 2014/9  
Principal Supervisor Andre Cunha (In Progress) , University of Manitoba  
Student Degree Expected Date: 2016/3  
Thesis/Project Title: Muscle development in parasitic and non-parasitic lampreys (before, during and after metamorphosis) using molecular and histological methods - part of internship for Science Without Borders - Brazil program at the University of Manitoba  
Present Position: BSc Biology yr 4 (in progress) at both UnB, Brasilia; Biomedical Science UniCEUB, Brasilia, Brazil
- 2013/9 - 2013/12  
Academic Advisor Rochelle Tabinga (In Progress) , University of Manitoba  
Student Degree Expected Date: 2015/5  
Thesis/Project Title: The impact of temperature on satellite cell activity on sturgeon fibers - mentorship during work on a literature review and research-proposal poster during the department's Honours preparatory course BIOL 3100.  
Present Position: completed BSc Honours in Biological Sciences
- 2013/9 - 2014/3  
Principal Supervisor Drielly Braitte (In Progress) , University of Manitoba  
Student Degree Expected Date: 2015/3  
Thesis/Project Title: Testing the biological activity of new MyoNovin NO-donor formulations on satellite cell activation on zebrafish fibers - research as part of internship under Science Without Borders - Brazil program at the University of Manitoba  
Present Position: entering MSc in Univ. Sao Paulo (home institution), Brazil
- 2013/5 - 2013/8  
Principal Supervisor Jeremiah Yarmie (In Progress) , University of Manitoba  
Student Degree Expected Date: 2016/5  
Thesis/Project Title: Exploration of the dose-depending regulation of in vivo satellite cell activation by nitric oxide in cultured muscle fibers from zebrafish and budgies, using NOS inhibitors.  
Present Position: completed research in 2014 summer, in BSc 3rd year

- 2013/5 - 2013/8  
Principal Supervisor Sarah Eloi (Completed) , University of Manitoba  
Thesis/Project Title: Synthesis, purification, characterization and transdermal testing of a new nitric oxide donor molecule, MyoNovin  
Present Position: Completed Pharmacy degree & practising in Brazil
- 2013/5 - 2013/8  
Principal Supervisor Drielly Braitte (Completed) , University of Manitoba  
Thesis/Project Title: Synthesis, purification, characterization and in vitro (muscle fiber culture) testing of a new nitric oxide donor molecule, MyoNovin  
Present Position: entering MSc, Univ. Sao Paulo, Brazil & entering graduate school
- 2011/9 - 2011/12  
Principal Supervisor Joshua Kaluzny (Completed) , University of Manitoba  
Thesis/Project Title: Mechanisms of nuclear positioning in development and regeneration - why do central nuclei persist in regenerated muscle fibers, but not in development - mentorship during work on a literature review and research-proposal poster during the department's Honours preparatory course BIOL 3100.  
Present Position: returned to improve Undergrad marks toward application to Dentistry
- 2011/5 - 2011/8  
Principal Supervisor Abdellah Bezzahou (Completed) , University of Manitoba  
Thesis/Project Title: Studies of the effects of steroid and nitric oxide-donor treatment on cardiac muscle gene expression and histopathology in dystrophic mdx mice.  
Present Position: BSc completed, applying for medical school
- 2011/5 - 2011/8  
Principal Supervisor Greg Chernomas (In Progress) , University of Manitoba  
Thesis/Project Title: Studies of the effects on differentiation and gene expression by satellite-derived muscle cells in culture after treatment with the nitric oxide donor drug, isosorbide dinitrate.  
Present Position: BSc in progress
- 2011/5 - 2011/8  
Principal Supervisor Jacqueline Richelle (Completed) , University of Manitoba  
Thesis/Project Title: The regulation of satellite cell activation on zebrafish muscle fibres in culture, by hepatocyte growth factor.  
Present Position: Medical School, University of Manitoba
- 2010/9 - 2010/12  
Principal Supervisor Jess Trent (Completed) , University of Manitoba  
Thesis/Project Title: The potential effect of NO-donor treatment on mice with muscular dystrophy - mentorship during work on a literature review and research-proposal poster during the department's Honours preparatory course BIOL 3100.  
Present Position: Medical School, Northern Ontario School of Medicine
- 2010/5 - 2010/8  
Principal Supervisor Jacqueline Richelle (Completed) , University of Manitoba  
Thesis/Project Title: Culturing single muscle fibers from zebrafish to develop the method as reliable  
Present Position: Medical Student, University of Manitoba
- 2010/5 - 2010/8  
Principal Supervisor Shannon Mohoric (Completed) , University of Manitoba  
Thesis/Project Title: Comparison of the levels of NOS-1 and beta-dystroglycan protein in two brain regions (cortex and cerebellum) from Embryonic Day 18 to Post-natal day 28, between wild-type control and dystrophin-deficient mdx mice.  
Present Position: Medical School, University of Manitoba
- 2009/9 - 2010/3  
Principal Supervisor Bryce Macek (Completed) , University of Manitoba  
Thesis/Project Title: Laboratory research assistant, doing Western blotting of skeletal muscle proteins and histological morphometry studies  
Present Position: Medical Student, University of Manitoba
- 2009/5 - 2009/8  
Principal Supervisor Colin Rumbolt (Completed) , University of Manitoba  
Thesis/Project Title: Studies of muscle protein levels (NOS-1, myostatin, muscle regulatory genes, beta-dystroglycan) in aging female mice, with and without exercise and/or treatment with a nitric oxide donor drug, isosorbide dinitrate  
Present Position: Medical School, University of Manitoba

- 2009/5 - 2009/8  
Principal Supervisor Alyssa Janke (Completed) , University of Manitoba  
Thesis/Project Title: Studies of muscle fiber growth and muscle histopathology in aging female mice, with and without exercise and/or treatment with a nitric oxide donor drug, isosorbide dinitrate  
Present Position: Medical School, University of Manitoba
- 2009/5 - 2009/8  
Principal Supervisor Melody Ong (Completed) , University of Manitoba  
Thesis/Project Title: Studies of the effects on mouse muscle gene expression and growth in aging female mice of voluntary exercise and/or treatment with a nitric oxide donor drug, isosorbide dinitrate  
Present Position: Medical Student, University of Ottawa
- 2009/5 - 2009/8  
Principal Supervisor Stephane Lenoski (Completed) , University of Manitoba  
Thesis/Project Title: Studies of the effects on mouse muscle gene expression and growth in aging female mice of voluntary exercise and/or treatment with a nitric oxide donor drug, isosorbide dinitrate  
Present Position: Medical School, Universite de Sherbrooke

**Bachelor's Equivalent [n=1]**

- 2013/6 - 2014/8  
Co-Supervisor Mark Xu (In Progress) , University of Manitoba  
Student Degree Expected Date: 2016/5  
Thesis/Project Title: Characterization of human supraspinatus muscle fiber typing, nitric oxide synthase activity, localization and expression, and histology after rotator cuff injury and comparison to the ipsilateral deltoid as a control. a BSc (Medicine) project.  
Present Position: Medical Student, U of Manitoba, year 3, completed BSc (Med) research project in my lab

**Bachelor's Honours [n=5]**

- 2014/9 - 2014/12  
Academic Advisor Rajas Tipnis (In Progress) , University of Manitoba  
Student Degree Expected Date: 2017/5  
Thesis/Project Title: Regeneration and Reinnervation of skeletal muscle following injury (was awarded a NSERC-USRA)  
Present Position: 4th year undergraduate at Uof Manitoba
- 2012/5 - 2013/4  
Principal Supervisor Deanna Gigliotti (Completed) , University of Manitoba  
Thesis/Project Title: Investigating muscle proteins and satellite cell activation in supraspinatus muscle after rotator cuff injury  
Present Position: in progress as a MSc student in my program
- 2011/9 - 2012/4  
Principal Supervisor Joshua Kaluzny (Completed) , University of Manitoba  
Thesis/Project Title: Nesprin-1G in nuclear localization: development vs. regeneration in muscle  
Present Position: returned to improve Undergrad marks toward application to Dentistry
- 2010/9 - 2011/4  
Principal Supervisor Jess Trent (Completed) , University of Manitoba  
Thesis/Project Title: Effect of NO-donor and Prednisone treatments on gene expression and dystrophy progression in mdx mouse quadriceps muscle  
Present Position: medical student, Northern Ontario School of Medicine
- 2010/5 - 2011/4  
Principal Supervisor Alyssa Janke (Completed) , University of Manitoba  
Thesis/Project Title: NOS-1 and beta-Dystroglycan localization in developing normal and mdx dystrophic muscle  
Present Position: medical student, University of Manitoba

**Master's Thesis [n=4]**

- 2016/1 - 2018/7  
Principal Supervisor Rutuja Raval, University of Manitoba  
Thesis/Project Title: pending arrival of student  
Present Position: Research Advisor, Maruti Pharma, Gujarat India

- 2013/9 - 2015/5  
Principal Supervisor Deanna Gigliotti (In Progress) , University of Manitoba  
Student Degree Expected Date: 2015/5  
Thesis/Project Title: Cell and molecular analysis of pre-operative supraspinatus muscle from patients with rotator cuff injury  
Present Position: MSc in progress in my lab
- 2013/3 - 2014/10  
Academic Advisor Siyan (Ivy) Wang (In Progress) , University of Manitoba  
Thesis/Project Title: Enhancing the water solubility of MyoNovin - a novel skeletal muscle regenerator  
Present Position: thesis defended successfully, Faculty of Pharmacy
- 2011/9 - 2013/7  
Principal Supervisor Helia (Haoyue) Zhang (Completed) , University of Manitoba  
Thesis/Project Title: Satellite cell activation in adult zebrafish (*Danio rerio*) single muscle fibre culture  
Present Position: research technician, Manitoba Institute of Child Health; doing Pharmacy qualifying exam part 1

**Doctorate [n=8]**

- 2015/1 - 2018/6  
Principal Supervisor Nasibeh Daneshvar (In Progress) , University of Manitoba  
Student Degree Expected Date: 2018/5  
Thesis/Project Title: Regulation of muscle growth in fish, including potential role of *Sema3A* in guiding fiber formation via satellite cell behaviour.  
Present Position: PhD student, University of Manitoba
- 2014/9 - 2018/5  
Academic Advisor Elizabeth Nagengast-Stevens (In Progress) , University of Manitoba  
Thesis/Project Title: Trauma analysis in older individuals in the Danish material through ABDOU  
Present Position: PhD student, Anthropology, UofManitoba
- 2013/9 - 2017/5  
Academic Advisor Alison Luong (In Progress) , University of Manitoba  
Student Degree Expected Date: 2017/5  
Thesis/Project Title: Anterior cruciate ligament pathology and repair in a pediatric population  
Present Position: PhD student, Human Anatomy & Cell Science, UofManitoba
- 2013/9 - 2018/5  
Academic Advisor Elaine Anjos (In Progress) , University of Manitoba  
Student Degree Expected Date: 2018/5  
Thesis/Project Title: Sperm competition and fertility in two species of ground squirrels  
Present Position: PhD student, Biological Sciences
- 2013/4 - 2017/5  
Academic Advisor Laura MacDonald (In Progress) , University of Manitoba  
Student Degree Expected Date: 2017/5  
Thesis/Project Title: Health and wellness as a result of participation in healthcare professional-education curricula and programs  
Present Position: Associate Professor, School of Dental Hygiene, University of Manitoba
- 2009/9 - 2012/9  
Co-Supervisor Wanda Snow (Completed) , University of Manitoba  
Thesis/Project Title: Cerebellar pathophysiology in a mouse model of Duchenne muscular dystrophy  
Present Position: PDF (MHRC PDFellowship) with Dr. Benedict Albeni, St Boniface Research Centre, Winnipeg
- 2009/5 - 2010/10  
Co-Supervisor Bader Tarek (Completed) , University of Manitoba  
Thesis/Project Title: Review: Sea Lamprey in the Great Lakes and the effectiveness of control (NOTE: my role began after the death of student's principal supervisor, Dr. G. Valdimarsson, in the department.)  
Present Position: PDF at CancerCare Manitoba



2005/9 - 2009/4      Jeff Leiter (Completed) , Pan Am Clinic-Wpg MB  
Principal Supervisor    Thesis/Project Title: Exercise, nitric oxide and satellite cell activation in age-related atrophy  
Present Position: Exec. Director & Albrechtsen Research Chair, Pan Am Clinic Fndn; Assist Prof Surgery, U Manitoba

### Post-doctorate [n=2]

2015/1 - 2015/6      Dr. Junio Dort (Completed) , Laval University (PhD)  
Principal Supervisor    Thesis/Project Title: Sema3A regulation of fiber-type development during growth and regeneration  
Present Position: not known

2008/5 - 2010/4      Wataru Mizunoya (Completed) , Kyushu University, Japan  
Principal Supervisor    Thesis/Project Title: two projects: 1. Contribution to developing the single muscle fiber culture model for zebrafish muscle. 2. Investigating effects on diaphragm muscle in a mouse model of muscular dystrophy of steroid treatment augmented with a novel nitric oxide-donor drug.  
Present Position: Assistant Professor, Kyushu University, Japan

### Event Administration

2014-05-01 -      Organizer & Host, A Meeting-of-Minds Muscle Symposium on Muscle Biology: Growth, Regeneration and Health (3 international + 2 regional speakers), Workshop, 2014-09-08 - 2014-09-09

2014-04-28 -      Facilitator, Research Strategic Planning Retreat for the DREAM research group (Diabetes Research Envisioned and Accomplished in Manitoba) at the Manitoba Institute of Child Health. Retreat held at Hecla Resort, Workshop, 2014-05-30 - 2014-06-01

2012-11-17 -      Society President, Annual meeting, Canadian Council of University Biology Chairs, Conference, 2013-11-15 - 2013-11-17

2011-02-01 -      Designer and Instructor, The technique of isolating single muscle fibers for culture, Workshop, 2011-04-26 - 2011-05-07

2010-10-01 -      Facilitator, Retreat on Strategic Research Planning, Faculty of Nursing, University of Manitoba, Workshop, 2010-12-09 - 2010-12-09

2010-02-01 -      Chair and Facilitator, Departmental Retreat on Research and Teaching Priorities, Biological Sciences, Workshop, 2010-04-04 - 2010-04-04

2008-05-01 -      Chief Judge, Life Sciences Division, Canada-Wide Science Fair, Conference, 2009-05-14 - 2009-05-18

### Editorial Activities

1995/11 - 2009/6      Associate Editor, Biochemistry and Cell Biology, Journal

### Organizational Review Activities

2015-10-01 -      committee member representing UofM Senate, The University of Manitoba  
2016-03-31      Search Committee for the Position of Vice-President (Academic) & Provost, University of Manitoba (chaired by Dr. David Barnard, President)

- 2015-08-04 - Chair, The University of Manitoba  
2016-02-27 Review of the status of the department of Pharmacology and Therapeutics - as established by the Dean and Vice-Provost, Faculty of Health Sciences, University of Manitoba (chair plus 2 members)
- 2015-03-21 - External Investigator, Memorial University of Newfoundland  
2015-09-09 Investigation of an allegation of academic misconduct, for the President of MUN (committee of 2)
- 2014-10-01 - External independent assessor, University of Kentucky  
2014-10-22 Evaluation of dossier for application for promotion to Full Professor
- 1997-09-01 - Grant reviewer - external, Association Francaise de Myologie  
2014-08-23 Ad hoc reviewer of grant and/or fellowship applications (usually 1-2 per year)
- 2014-06-11 - External independent assessor, University of New South Wales  
2014-06-16 Evaluation of application for promotion to associate professor
- 2013-10-01 - External reviewer, Saint Mary's University  
2014-02-28 Undergraduate Program Review, for Department of Biology
- 2013-09-16 - External independent assessor, University of Victoria  
2013-11-14 Evaluation of application for promotion to Associate Professor
- 2013-08-22 - External independent assessor, University of Illinois at Chicago  
2013-09-04 Evaluation of application for promotion to Associate Research Professor
- 2013-07-07 - External independent assessor, University of Kansas  
2013-08-01 Evaluation of application for promotion to Research Associate Professor Without Tenure
- 2010-08-03 - Grant-review panel member, Canadian Institutes of Health Research  
2013-05-31 Review grant applications submitted within my area of expertise, to the Movement & Exercise (MOV) panel; 8-12 per competition
- 2013-04-04 - External reviewer, Laurentian University of Sudbury  
2013-04-05 Chaired the review committee (3 faculty members, 3 students) during the 2-day itinerary of meetings for the Review of the Undergraduate Program in Biology, reviewed 3 volumes of documents and department and institutional websites, toured relevant parts of Laurentian University, chaired debriefing with review team to provide on-site highlights of the review findings, drafted the report, corresponded with review team members regarding various items/details, and prepared and submitted the final report (16 pages) for the Vice-President (Academic) and Provost.
- 2013-02-18 - Assessor of nomination, University of Minnesota  
2013-03-04 Evaluation of merit for nomination of a professor to the distinction of "Regents Professorship"
- 2006-08-01 - Grant reviewer - external, Natural Sciences and Engineering Research Council of  
2013-02-01 Canada (NSERC)  
Ad hoc reviewer (typically 1-3 grants per year)
- 2012-05-15 - External reviewer, University of New South Wales, Anatomy Department  
2012-06-02 External reviewer of approaches to teaching, staffing and curriculum in the Anatomy Department program in undergraduate medicine
- 2012-01-16 - Evaluator of Decanal Candidate, The University of Manitoba  
2012-01-22 Invited assessment of applicant for the position of Dean of Nursing
- 2010-04-20 - External (off-site) reviewer, Shantou University Medical School  
2010-06-11 External (off-site) reviewer of plans for expansion of medical education program at Shantou University Medical School to include a new 4-year "All-English" program for non-Chinese students, on invitation from Dean Dr. Jiang Gu.

## Knowledge and Technology Translation

2013/4 - 2013/11      Presenter, Community Engagement  
 Group/Organization/Business Serviced: Good Neighbors Active Living Centre  
 Target Stakeholder: General Public  
 Outcome / Deliverable: two-hour presentation on Muscle Growth, Regeneration, Disease and Aging  
 Evidence of Uptake/Impact: attendance (35) and a second invitation for fall 2013  
 References / Citations / Web Sites: UM Extended Education Website  
 Activity Description: preparation of a 2 hour powerpoint presentation integrating basic information on human anatomy, muscle structure and function, research on muscle, and basic pathology of muscle and bone; presentation to community centre as part of a 3-part series offered by Extended Education at UM.

## International Collaboration Activities

2012-02-02      Collaborator and Research mentor Brazil  
 Initially, this interaction was a request for information on research plans and methods for use in a project on idiopathic scoliosis in adolescents, at the Hospital SARAH Network of Rehabilitation Hospitals in Brazil. Dr. Aloysio Campos de Paz contacted me, and we developed a correspondence, interacted on a manuscript (now submitted), and I was invited to Brasilia in July 2013, to present at a research symposium with my MSc (former BSc Hons) student, D. Gigliotti. Together we gave 4 invited presentations, toured the extensive rehabilitation facilities at 2 locations, and interacted with patients and professional staff (surgeons, neurologists, physical and occupational therapists, computer engineers, pathologists), the SARAH network Board President, and the Director of the Board of SARAH Network. We spent 3 full days discussing research plans, drafting hypotheses, sharing our protocols, and I helped to finalize drafts of 2 papers from their work (now stalled by their clinical work).

2010-05-01      Collaborator and Mentor, Japan  
 Initially a long-standing research collaboration led to my supervising a Post-doctoral fellow, Dr. W. Mizunoya, from Kyushu University (May 2010-April 2012). This now has resulted in ongoing collaborations on methods and manuscripts, research design and writing, with him and his students. He is now an Assistant Professor at Kyushu University.

2010-04-01      Collaborator, India  
 This began with discussions at conferences with Dr. J. Dhawan, led to an application for Seed Partnership development (to Shastri Indo-Canadian Fndn), and travel with an undergraduate student (Jacqueline Richelle) to Bangalore India in summer 2011. I presented a seminar at InStem (Institute for Regenerative Medicine) at the National Centre for Biological Sciences) and delivered a hands-on workshop with the student to 15 students, postdocs and researchers on single muscle fiber isolation and culture. We continue to correspond on techniques, research design, and training, by email and at conferences.

2005-08-01      Collaborator, Japan  
 This interaction with Dr. R. Tatsumi, Kyushu University, Fukuoka Japan, began as a long-distance interaction, as we shared ideas at conferences, developed research questions, and interacted over experimental methods and results. This has resulted in a number of publications, most recently on Semaphorin3A secretion by activated satellite cells. We now share plans for experiments while at conferences, collaborate on research design and contribute experiments and results to joint publications. This is a well-developed two-way collaboration.

- 1997-02-01 Intellectual collaboration, United States  
This collaboration with Dr. Ron Allen at the University of Arizona (Tucson) began from conference interactions, and developed into fully shared research planning and experimentation. It has resulted in collaborative manuscripts, but most importantly, access to external perspectives on regulation of muscle satellite cell activities and the impact of disease and injury on muscle structure and behaviour. Dr. Allen is now associate dean in a very large faculty of agriculture, and has major administrative duties that have all but closed his laboratory research. We now interact on an intellectual level about muscle satellite cell research. Dr. Allen and I together, envisioned, designed, coordinated and funded ourselves, the first international meeting on muscle satellite-stem cells which took place in Boston MA in July 1998. The meeting is held now every 2-3 years by FASEB Summer Research Conferences (7X); it has established and significantly advanced the field of muscle stem cell biology
- 2014-08-31 - Collaborator and Host, Canada  
2014-09-14 Hosted symposium with 3 international guest speakers (Sept 9, 2014), Dr. R. Tatsumi, Univ. Kyushu (Japan), Dr. L. McLoon, Univ. Minnesota, and Dr. R. Allen, Univ. Arizona) plus regional colleagues and students, and 2 weeks of experiments with Dr. Tatsumi on muscle regeneration and our fiber-isolation protocol.
- 2013-08-15 - Collaborator, Canada  
2014-03-30 Support and collaboration to Dr. Francis Amara, Associate Professor, Biochemistry & Medical Genetics, Univ. of Manitoba and collaboration with Univ. Oxford UK, for "Implementing the Bioscience Teaching Fellows Program and investigating its impact on departmental teaching practices, curricular change and student learning". A proposal to SSHRC submitted October 2013, was not funded. I was invited as a collaborator, based on my experience in curricular development, teaching, accreditations, program and department reviews, and publications and previous funding for research on interprofessional education.
- 2006-10-01 - Collaborator, Australia  
2013-08-01 This interaction began through conference discussions with Dr. Edna Hardeman and Dr. Peter Gunning, now located at the University of New South Wales (Sydney). The initial invitation to present my research to the Muscle Biology Group at Children's Hospital, Westmead (their location in 2006) led to interaction in teaching the crush-injury approach to trainees in the research group, particularly postdoc Dr. Anthony Lee. The group initiated a series of experiments to explore the basis of observations that muscle regeneration capacity declines with age. Our collaboration was extensive in viewing findings and drafting the manuscript, finally accepted in Bioarchitecture in 2013. Findings demonstrate that satellite-stem cells in senescent (28mo-old) mice have quite excellent capacity to support regeneration, as long as the nerve and vascular supplies are maintained during the injury; that is, the mode of injury makes the difference, not age. This is a well-documented but controversial finding.

## Committee Memberships

- 2014/8 - 2014/9 Chair, Space Life Sciences - Musculoskeletal Panel, Canadian Space Agency  
Chairing panel to evaluate 29 proposals submitted in response to an international announcement of opportunity to 4 space agencies (European, NASA, Canadian, Japanese). Proposals are for scientific studies in space life sciences to be conducted onboard the International Space Station (ISS) between 2017 and 2020. (30 proposals related to research to be conducted onboard the International Space Station). NASA manages an integrated peer-review process for all the proposals.

- 2009/4 - 2014/4      Committee Member, CIHR Movement & Exercise Grant Review Panel, Canadian Institutes of Health Research  
Panel members review operating grant applications and meet to rank applications for two competitions per year (May, November) until Fall 2014 (except in years when they also submit a proposal to CIHR).
- 2009/11 - 2009/12      Committee Member, Review Panel - Integrative Physiology, European Space Agency  
An international grant peer-review panel to select projects for further development toward testing in a long-term bed-rest study and eventual application to the International Space Station.

## Other Memberships

- 2001-09-01 -              Member, Winnipeg Society for Neuroscience  
2015-09-01              Regional chapter of the Canadian Society for Neuroscience, to support collaboration, networking and professional development among students and PIs
- 2001-11-01 -              Member, American Association for the Advancement of Science  
2015-05-31
- 2009-01-01 -              Member, American Society of Cell Biology  
2015-04-30
- 1988-06-01 -              Member, American Association of Anatomists  
2015-04-30              In 2013, I chaired the Basmajian Award Committee that receives nominations and applications for this junior professor career award for excellence in teaching and research in anatomical sciences.
- 2010-06-01 -              Member, The American Physiological Society  
2014-12-31              member

## Presentations

- (2014). Differential impact of nitric oxide on satellite cell activation in human and zebrafish muscle – possible implications to the regulation of fiber number. FASEB Summer Research Conference on Skeletal Muscle Satellite & Stem Cells, Steamboat Springs, United States  
Main Audience: Researcher  
Invited?: No, Keynote?: No
- Wang S, Braite DC, Eloi SMG, Zhang H, Anderson J, Burczynski F. (2014). MyoNovin synthesis, purification, analysis and bioactivity on muscle fibers from zebrafish. Canadian Society of Pharmaceutical Sciences meeting, Montreal, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
- Zhang H, Anderson J. (2014). Satellite cell activation and populations on single muscle-fiber cultures from adult zebrafish (*Danio rerio*). Experimental Biology 2014, San Diego, United States  
Main Audience: Researcher  
Invited?: No, Keynote?: No
- (2012). A new look at cytoskeletal changes related to sarcolemmal stability and nuclear position in development and mdx mouse muscular dystrophy. FASEB Summer Conference on Skeletal Muscle Satellite and Stem Cells, Lucca, Italy  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No

5. (2010). NO treatment – an interesting option; Nitric oxide donors reduce prednisone side effects in mdx diaphragm & promote exercise-induced muscle growth and cytoskeletal modifications in aged mice. FASEB Summer Research Conference on Skeletal muscle satellite and stem cells, Carefree Resort, Tucson, United States  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No

## Text Interviews

- 2010-06-01                      Research on building muscle - Launching muscle into space!, ResearchLife at University of Manitoba

## Publications

### Journal Articles

1. Gigliotti D, Leiter JR, Macek B, Davidson MJ, MacDonald PB, Anderson JE. (2015). Atrophy, inducible satellite cell activation and possible denervation of supraspinatus in injured human rotator-cuff muscle. *American Journal of Physiology; Cell Physiology*. 309: 383-391.  
Published  
Refereed?: Yes
2. Mizunoya W, Okamoto S, Miyahara H, Akahoshi M, Suzuki T, Do M-KQ, Ohtsubo H, Komiya Y, Mulan, Waga T, Iwata A, Nakazato K, Ikeuchi Y, Anderson JE, Tatsumi R. (2015). Fast-to-Slow Fiber-Type Shift by Dietary Apple Polyphenols in Rats: Impact of the Low-Dose Supplementation. *PLoS ONE* - revision submitted September 2015.  
Revision Requested  
Refereed?: Yes, Open Access?: Yes
3. Do M-KQ, Shimizu N, Suzuki T, Ohtsubo H, Mizunoya W, Nakamura M, Sawano S, Furuse M, Ikeuchi Y, Anderson JE, Tatsumi R. (2015). Transmembrane proteoglycans syndecan-2, 4, plausible receptor candidates for the impact of HGF and FGF2 on Semaphorin 3A expression in early-differentiated myoblasts. *Physiological Reports*. 3(9): pii: e12553. doi: 10.  
Published  
Refereed?: Yes, Open Access?: Yes
4. D'Souza DM, Trajcevski KE, Al-Sajee D, Wang DC, Thomas MM, Anderson JE, Hawke TJ. (2015). Altered Satellite Cell Activation and Delayed Muscle Repair in a Diet-Induced Obesity (DIO) Mouse Model. *Physiological Reports*. 3(8): pii: e12506.  
Published  
Refereed?: Yes
5. Mizunoya W, Miyahara H, Okamoto S, Akahoshi M, Suzuki T, Do M-KQ, Ohtsubo H, Komiya Y, Mulan, Waga T, Iwata A, Nakazato K, Ikeuchi Y, Anderson JE, Tatsumi R. (2015). Improvement of Endurance Capacity Based on Muscle Fiber-Type Composition by Treatment with Dietary Apple Polyphenols in Rats. *PLoS ONE*. 10(7): e0134303.  
Published  
Refereed?: Yes, Open Access?: Yes
6. Komiya Y, Anderson JE, Akahoshi M, Nakamura M, Tatsumi R, Ikeuchi Y, Mizunoya W. (2015). Protocol for rat single muscle-fiber isolation and culture. *Analytical Biochem*. 482: 22-24.  
Published  
Refereed?: Yes
7. P Sharma, S Basu, RW Mitchell, GL Stelmack, JE Anderson, AJ Halayko. (2014). Role of Dystrophin in Airway Smooth Muscle Phenotype, Contraction and Lung Function. *PLOS ONE* doi: 10.1371/journal.pone.0102737. 9(July 23): e102737.  
Published  
Refereed?: Yes, Open Access?: Yes

8. Sakaguchi S, Shono J-i, Suzuki T, Do M-KQ, Mizunoya W, Nakamura M, Sato Y, Furuse M, Yamada K, Ikeuchi Y, Anderson JE, Tatsumi R. (2014). Anti-inflammatory Macrophages may Promote Myoblast Migration and Neural Chemorepellent Semaphorin 3A Expression at the Early-Differentiation Phase of Muscle Regeneration. *Int J Biochem Cell Biol* doi: 10.1016/j.biocel.2014.05.032. PMID: 24886696. 54: 272-285.  
Published  
Refereed?: Yes
9. Snow WM, Stoesz BM, Anderson JE. (2014). The cerebellum in emotional processing: evidence from human and non-human animals. *AIMS Neuroscience* [http://aimspress.com/aims/ch/reader/issue\\_list.aspx?year\\_id=2014&quarter\\_id=1](http://aimspress.com/aims/ch/reader/issue_list.aspx?year_id=2014&quarter_id=1). 1: 96-119.  
Published  
Refereed?: Yes, Open Access?: Yes
10. Thomas MM, Wang DC, D'Souza DM, Krause MP, Layne AS, Criswell DS, O'Neill HM, Connor MK, Anderson JE, Kemp BE, Steinberg GR, Hawke TJ. (2014). Muscle-specific AMPK  $\beta 1\beta 2$ -null mice display a myopathy due to loss of capillary density in nonpostural muscles. *FASEB journal : official publication of the Federation of American Societies for Experimental Biology* doi: 10.1096/fj.13-238972. 28(5): 2098-2107.  
Published  
Refereed?: Yes
11. Zhang H, Anderson JE. (2014). Satellite cell activation and populations on single muscle-fiber cultures from adult zebrafish (*Danio rerio*). *The Journal of Experimental Biology* doi: 10.1242/jeb.102210 PMID: 24577448. 217 (part 11): 1910-1917.  
Published  
Refereed?: Yes, Open Access?: No
12. Snow WM, Anderson JE, Fry M. (2014). Regional and genotypic differences in intrinsic electrophysiological properties of cerebellar Purkinje neurons from wild-type and dystrophin-deficient mdx mice. *Neurobiology of learning and memory*. 107: 19-31.  
Published  
Refereed?: Yes
13. Janke A, Upadhaya R, Snow WM, Anderson JE. (2013). A new look at cytoskeletal NOS-1 and  $\beta$ -dystroglycan changes in developing muscle and brain in control and mdx dystrophic mice. *Developmental dynamics : an official publication of the American Association of Anatomists*. 242: 1369-81.  
Published  
Refereed?: Yes
14. Snow WM, Anderson JE, Jakobson LS. (2013). Neuropsychological and neurobehavioral functioning in Duchenne muscular dystrophy: A review. *Neuroscience and Biobehavioral Reviews*. 37(5): 743-752.  
Published  
Refereed?: Yes
15. Snow WM, Fry M, Anderson JE. (2013). Increased density of dystrophin protein in the lateral versus the vermal mouse cerebellum. *Cellular and molecular neurobiology*. 33(4): 513-520.  
Published  
Refereed?: Yes
16. Lee AS, Anderson JE, Joya JE, Head SI, Pather N, Kee AJ, Gunning PW, Hardeman EC. (2013). Aged skeletal muscle retains the ability to fully regenerate functional architecture. *Bioarchitecture*. 3(2): 25-37.  
Published  
Refereed?: Yes, Open Access?: No
17. Suzuki T, Do MK, Sato Y, Ojima K, Hara M, Mizunoya W, Nakamura M, Furuse M, Ikeuchi Y, Anderson JE, Tatsumi R. (2013). Comparative analysis of semaphorin 3A in soleus and EDL muscle satellite cells in vitro toward understanding its role in modulating myogenin expression. *The International Journal of Biochemistry & Cell Biology*. 45(2): 476-482.  
Published  
Refereed?: Yes, Open Access?: No



18. Takacs J, Anderson JE, Leiter JR, MacDonald PB, Peeler JD. (2013). Lower body positive pressure: an emerging technology in the battle against knee osteoarthritis?. *Clinical Interventions in Aging* doi: 10.2147/CIA.S46951. 8: 983-991.  
Published  
Refereed?: Yes
19. Do MK, Suzuki T, Gerelt B, Sato Y, Mizunoya W, Nakamura M, Ikeuchi Y, Anderson JE, Tatsumi R. (2012). Time-coordinated prevalence of extracellular HGF, FGF2 and TGF- $\beta$ 3 in crush-injured skeletal muscle. *Animal Science Journal* doi: 10.1111/j.1740-0929.2012.01057.x. 83(10): 712-717.  
Published  
Refereed?: Yes, Open Access?: No
20. Hara M, Tabata K, Suzuki T, Do MK, Mizunoya W, Nakamura M, Nishimura S, Tabata S, Ikeuchi Y, Sunagawa K, Anderson JE, Allen RE, Tatsumi R. (2012). Calcium influx through a possible coupling of cation channels impacts skeletal muscle satellite cell activation in response to mechanical stretch. *American journal of physiology. Cell physiology*. 302(12): C1741-C1750.  
Published  
Refereed?: Yes
21. Leiter JR, Upadhaya R, Anderson JE. (2012). Nitric oxide and voluntary exercise together promote quadriceps hypertrophy and increase vascular density in female 18-mo-old mice. *American journal of physiology. Cell physiology*. 302(9): C1306-C1315.  
Published  
Refereed?: Yes
22. Anderson JE, Wozniak AC, Mizunoya W. (2012). Single muscle-fiber isolation and culture for cellular, molecular, pharmacological, and evolutionary studies. *Methods in molecular biology. Myogenesis Methods & Protocols* (Clifton, N.J.). 798(n/a): 85-102.  
Published  
Refereed?: Yes
23. Upadhaya R, Mizunoya W, Anderson JE. (2011). Detecting multiple proteins by Western blotting using same-species primary antibodies, precomplexed serum, and hydrogen peroxide. *Analytical biochemistry*. 419(2): 342-344.  
Published  
Refereed?: Yes
24. Do MK, Sato Y, Shimizu N, Suzuki T, Shono J, Mizunoya W, Nakamura M, Ikeuchi Y, Anderson JE, Tatsumi R. (2011). Growth factor regulation of neural chemorepellent Sema3A expression in satellite cell cultures. *American journal of physiology. Cell physiology*. 301(5): C1270-C1279.  
Published  
Refereed?: Yes
25. Anderson JE, Ateah C, Wener P, Snow W, Metge C, MacDonald L, Fricke M, Ludwig S, Davis P. (2011). Differences in Pre-licensure Interprofessional Learning: Classroom Versus Practice Settings. *Journal of Research on Interprofessional Education*. 2(1): <http://jrpe.org/jri>.  
Published  
Refereed?: Yes, Open Access?: Yes
26. Leiter JR, Peeler J, Anderson JE. (2011). Exercise-induced muscle growth is muscle-specific and age-dependent. *Muscle & Nerve*. 43(6): 828-838.  
Published  
Refereed?: Yes
27. Mizunoya W, Upadhaya R, Burczynski FJ, Wang G, Anderson JE. (2011). Nitric oxide donors improve prednisone effects on muscular dystrophy in the mdx mouse diaphragm. *American journal of physiology. Cell physiology*. 300(5): C1065-C1077.  
Published  
Refereed?: Yes



28. Snow W, Wener P, MacDonald L, Ateah C, Davis P, Fricke M, Metge C, Ludwig S, Anderson J. (2011). Student-identified participation barriers to interprofessional education. *Interdisc Studies J.* 1: 19-27.  
Published  
Refereed?: Yes
29. Anderson JE, Ateah C, Metge C, Wener P, Snow W, Fricke M, Davis P, MacDonald L, Ludwig S. (2011). Evaluation of interprofessional learning opportunities in educational exposure and practice-site immersion: a remote and urban Canadian perspective. *JRIPE* 2: 2011. [www.jripe.org/index.php/journal/article/view/54](http://www.jripe.org/index.php/journal/article/view/54). 2: online.  
Published  
Refereed?: Yes, Open Access?: Yes
30. Ateah CA, Snow W, Wener P, MacDonald L, Metge C, Davis P, Fricke M, Ludwig S, Anderson J. (2011). Stereotyping as a barrier to collaboration: Does interprofessional education make a difference?. *Nurse education today.* 31(2): 208-213.  
Published  
Refereed?: Yes

## Book Chapters

1. Anderson JE. (2014). Hepatocyte Growth Factor and Satellite Cell Activation. JD White and G Smythe, co-editors. *The Role of Growth Factors and Cytokines in Skeletal Muscle Development, Growth, Regeneration and Disease.* : not yet known.  
In Press, Springer Special Series, *Advances in Experimental Medicine and Biology*  
Refereed?: Yes
2. Anderson JE, Wozniak AC, Mizunoya W. (2012). Single muscle-fiber isolation and culture for cellular, molecular, pharmacological, and evolutionary studies. Joseph X. DiMario, Dept of Cell Biology and Anatomy, Chicago Medical School, Rosalind Franklin University of Medicine and Science, North Chicago, IL, USA. *Myogenesis: Methods and Protocols*, edited by J. DiMario. (798): 85-102.  
Published, Springer Protocols by Humana Press (in the series *Methods in Molecular Biology*, ed:John Walker  
Refereed?: Yes

## Intellectual Property

### Patents

1. Compositions and methods for enhancing nitric oxide delivery - part 2. Canada. Canadian Patent Application # 2820200. 2011-02-01.  
Patent Status: In Progress  
MyoNovin is a novel skeletal muscle "regenerator" formulation. There are no other chemical moieties on the market. MyoNovin (guaifenesin dinitrate) donates nitric oxide (NO) moieties to skeletal muscle, the impact of which releases hepatocyte growth factor from the extracellular matrix so it can bind to its receptor c-met on satellite cells and to stimulate myogenesis. Current research suggests that it possesses a wide therapeutic window. The drug would have a large market in rehabilitation, regenerative and geriatric medicine involving muscle atrophy (in humans and in other mammals that are raised for meat production or are pet-companion/veterinary animals). (Patent examination allowed July 2013.) NOTE: this is additional to the recent USA Patent (award 2012 but filed 2007) and the Cdn application (#2611140) as revised to claim a new class of NO-donors formulated as muscle relaxants.

2. Compositions and Methods for Enhancing Nitric Oxide Delivery. Canada. Canadian Patent Application # 2611140. 2011-02-01.

Patent Status: In Progress

MyoNovin is a novel skeletal muscle "regenerator" formulation. There are no other chemical moieties on the market. MyoNovin (guaifenesin dinitrate) donates nitric oxide (NO) moieties to skeletal muscle, the impact of which releases hepatocyte growth factor from the extracellular matrix so it can bind to its receptor c-met on satellite cells and to stimulate myogenesis. Current research suggests that it possesses a wide therapeutic window. The drug would have a large market in rehabilitation, regenerative and geriatric medicine involving muscle atrophy (in humans and in other mammals that are raised for meat production or are pet-companion/veterinary animals). (Patent examination allowed July 2013.) NOTE that while this is essentially the same invention as the recently awarded USA Patent, the patenting process has changed considerably since filing, and necessitated multiple revisions and responses in the filing and examination processes, specifically for Canadian consideration.

## CURRICULUM VITAE

### Mark Findlay Belmonte

Department of Biological Sciences  
University of Manitoba  
Winnipeg, MB, Canada R3T 2N2  
Telephone: 204-474-8556  
Email: [mark.belmonte@umanitoba.ca](mailto:mark.belmonte@umanitoba.ca)

Citizenship: Canadian

Date of Birth: September 21, 1978

### POST-SECONDARY EDUCATION

2008	Ph.D. Plant Science	University of Manitoba
2003	M.Sc. Plant Biology	University of Calgary
2001	B.Sc. Biology	University of Calgary

### EMPLOYMENT HISTORY

2015-present	Associate Professor, University of Manitoba (Tenured July 1, 2015)
2009-2015	Assistant Professor, University of Manitoba
2007-2009	Post Doctoral Researcher, University of California, Davis (Supervisor: Dr. John J. Harada, Professor)

### AWARDS AND HONOURS

2015	Manitoba Future 40 Nominee and Finalist (Canadian Broadcasting Corporation)
2010	American Society of Plant Biologists Fellowship
2007-2009	NSERC Post Doctoral Fellowship
2006-2007	Manitoba Graduate Fellowship
2005	Taylor A. Steeves best published paper (Canadian Botanical Association)
2004-2006	NSERC Post Graduate Scholarship
2002-2003	Alberta Graduate Scholarship

### FUNDING (\$1.9M operating, \$423K equipment since 2010)

#### Operating Grants

2015-2019	Developmental programming of the <i>Brassica napus</i> seed. NSERC Discovery Grant. \$165,000.
2015-2017	Developmental programming of the <i>Brassica napus</i> seed. NSERC Accelerator. \$120,000
2015-2018	Control of Sclerotinia in canola using RNA interference technologies. Growing Forward Application to Agriculture and Rural Development Initiatives, Province of Manitoba. Drs. Whyard and Fernando, co-applicants. \$210,000.
2015-2018	RNA interference technologies to protect crop plants. NSERC – Collaborative Research and Development Grant. Drs. Whyard and Fernando, co-applicants. \$992,307.
2014	Examining dsRNA pesticide durability on crop plants. NSERC – Engage. \$25,000.
2013-2016	Biocontrol of Sclerotinia in Canola: global and tissue-specific identification of defense molecules to manage the disease. Growing Forward Application to the Canola Council of Canada and Agriculture Manitoba. Drs. Fernando and de Kievit co-applicants. \$180,000.

- 2012-2015 Blackleg in Canola: Site-specific identification of defense molecules to manage the disease. Growing Forward Application to Agriculture and Rural Development Initiatives, Province of Manitoba. Dr. Fernando co-applicant. \$50,000.
- 2012 RNA profiling of canola seed parts. Funded by the University of Manitoba. \$7,500.
- 2010-2015 Compartment specific gene regulatory networks in seeds of the Brassicaceae. NSERC Discovery Grant. \$160,000.

#### Equipment Grants

- 2012 Mapping the seed: RNA profiling of canola to improve seed quality. Canada Foundation for Innovation. \$396,577.
- 2010 Microtome and knife maker for structure and function analysis of Arabidopsis and canola seed coats. NSERC-RTI. \$32,039.

#### Other Grants

- 2012 Canada Summer Jobs - Funds for Undergraduate research. Service Canada. \$2,500.
- 2011 Canada Summer Jobs - Funds for Undergraduate research. Service Canada. \$1,000.
- 2011 Manitoba Mentorship Program. \$1,000.
- 2010 Manitoba Mentorship Program. \$950.

#### TEACHING EXPERIENCE (2010 – PRESENT)

##### University of Manitoba Credit Courses:

- 2014-2015 Special topics: Characterization of host pathogen interactions in canola (BIOL 4890)
- 2014 Plant Anatomy (BIOL 3550)
- 2013-2015 Molecular Techniques for Eukaryotes – DNA (BIOL 4554 / 7554)
- 2013-2014 Special topics in biology: Funiculus development (BIOL 4890)
- 2012 Special topics: Developmental programming of maternal seed compartment (BIOL 4890)
- 2011-2012 Molecular Techniques for Eukaryotes (BIOL 4552 / 7530)
- 2011-2013 Cell Biology (BIOL 2520)

##### Graduate Students Supervised, Thesis Titles and Major Scholarships.

(7 Total; 5 Current, 1 PhD, 4 MSc; 2 MSc graduated; total financial graduate support ~\$290,000 over 5 years)

1. Austein McGloughlin, MSc. 2015-present. Control of *Sclerotinia* using dsRNA technology.
2. Ian Girard, MSc. 2014-present. Cell-specific global RNA profiling of the *Brassica napus* – *Sclerotinia sclerotiorum* pathosystem directly at the site of infection. Faculty of Science Graduate Scholarship; Manitoba Association of Plant Biologists Scholarship.
3. Deirdre Khan, MSc. 2014-present. RNA profiling of endosperm development in *Brassica napus*. UMGF, Eugene Reimer Fellowship, Donald Vernon Snider Fellowship.
4. Jenna Millar, MSc. 2014-present. RNA profiling of maternal seed structures in *Brassica napus*. NSERC CGS-M.
5. Michael Becker, PhD. 2013-present. Cell specific activation of the plant defense response in *Brassica napus* to *L. maculans*. Manitoba Association of Pant Biologists Scholarship, NSERC-CGS-D.
6. Ainsley Chan, MSc. *Defended 2014*. Tissue-specific gene activity in the canola seed – genomic dissection of the canola funiculus. Manitoba Association of Plant Biologists Scholarship.  
\*Winner, best graduate student seminar, UofM Crackerjack series and best poster CSPB 2014.
7. Xingyu Mao, MSc. *Defended 2014*. Biological Sciences. Identification of novel resistance genes against *Sclerotinia* in *Brassica napus*. Department of Biological Sciences Graduate Scholarship.

##### Senior Undergraduate Students Supervised and Thesis Titles

Deirdre Khan, BSc honours. 2013. Characterization of the *AT3G11280* gene in the reproductive development of *Arabidopsis thaliana*.

Jenna Millar, BSc honours. 2013. Anatomical and genetic analysis of the chalazal seed coat in four developmental seed stages of *Brassica napus*.

Jake Cavers, BSc honours, 2013. Genetic analysis of the initial defense response following infection of *Brassica napus* with Blackleg (*Leptosphaeria maculans*).

Michael Becker, BSc honours. 2012. Microbiology. Cell-specific gene expression profiling of canola before, during and after Blackleg fungal infection.

Ainsley Chan, BSc honors. 2012. Biological Sciences. Structure and function of the funiculus in *Brassica napus*.  
\*Faculty of Science Award for Excellence in Teaching Assistance 2011-2012

### Undergraduate Students Supervised

Kat Kratzer	Undergraduate research assistant (2015-present)
Nina Huynh	Undergraduate research assistant (2015-present)
Matthew Granger	Undergraduate research assistant (2015-present)
Parker Lachance	Undergraduate research assistant (2014-present)
David Liu	Undergraduate research assistant (2014)
Ian Girard	Undergraduate research assistant (2010-2014)
Oiza Atta	Undergraduate research assistant (2012-2013)
Samantha Lee	Undergraduate research assistant (2010-2014)
David Sytnik	Undergraduate research assistant (2011-2013)
Sara Kost	Undergraduate research assistant (2010)
Shaun McLean	Undergraduate research assistant (2010)

Undergraduate research assistants – most held NSERC-USRA or other University scholarships.

### Outreach

Dennis Drewnik - High School Student. 2011- present. Gene regulatory networks underlying host pathogen interactions. Sonofi BioGeneius Biotechnology Challenge and Canada Wide Science Fair.

2015: SBC Regional Champion; SBC 4<sup>th</sup> place Nationals; Winnipeg School Division Champion; Silver Medal CWSF; Best Plant Science Award; 4H Sustainable Agriculture Award.

### Thesis Committees (UofM)

<u>Student (Degree)</u>	<u>Years</u>	<u>Department</u>
Rasanie Padmathilake (PhD)	2014-present	Plant Science
Cunchun Yang (PhD)	2014-present	Plant Science
Chad Koscielny (PhD)	2014-present	Plant Science
Hanna Dendena (PhD)	2014-present	Plant Science
Sakaria Liban (MSc)	2012-present	Plant Science
Kelly Duke (MSc)	2014-present	Microbiology
Justin Hawkings (PhD)	2013-present	Microbiology
Lori Reimer (MSc)	2013-present	Microbiology
Mun Mun Nandi (PhD)	2012-present	Microbiology
John Liu (PhD)	2012-present	Plant Science
Xuehua Xhang (PhD)	2012-present	Plant Science
Triparna Lahari (PhD)	2011-present	Biological Sciences
Dilukshi Fernando (PhD)	2011-present	Biological Sciences
Hamza Safi (MSc)	2011-2013	Biological Sciences
Darcy Child (MSc)	2011-2013	Biological Sciences
Aaron Chan (MSc)	2011-2013	Plant Science
Jodi Larkin (MSc)	2010-2012	Plant Science

### COMMITTEE AND ADMINISTRATIVE DUTIES

Hiring Committee, Molecular Plant Physiology, Department of Biological Sciences (2015)

University of Manitoba research theme group of Safe, Healthy, Just, and Sustainable Food Systems (2015)  
Undergraduate Curriculum Committee (2014-present)  
Faculty of Science Decanal Search Committee (alternate, 2014)  
Hiring Committee, Plant Secondary Products, Department of Biological Sciences (2012)  
Hiring Committee, Biological Sciences Equipment Technician, Department of Biological Sciences (2011)  
Student Recruitment and Retention Committee (2010-present)  
Greenhouse Committee (2010-present)  
Microscopy Committee (2011- present)

**Editorial Board:** Plants (2011-present)

#### **Peer Review**

**Journals:** Plant Science, Journal of Integrative Biology, Plant Journal, PLoS Genetics, PLoS One, Plant Physiology and Biochemistry, Plant Cell Reports

**Research Grants:** NSERC, Agriculture and AgriFood Canada, Alberta Innovates, ERA-NET Coordinating Action in Plant Sciences (Europe), Polish National Science Centre (Poland)

#### **Professional Committees**

Canadian Society of Plant Biologists Western Regional Director (2015-2018); CD Nelson Award Committee (2014-2015)

Vice-chair, UC Davis Postdoctoral Scholars Association (2008-2009)

President, University of Manitoba Plant Science Graduate Student Association (2005-2006)

#### **QUOTATIONS AND PROFILES IN NEWS DIGESTS**

2015 16-year-old science wiz headed to national competition. CBC Manitoba.  
2015 Sanofi Biogeneius Challenge with winner Dennis Drewnik, CJOB radio.  
2015 CTV Winnipeg – A messy strawberry experiment with Dennis Drewnik  
2015 Dr. Mark Belmonte nominated for CBC Manitoba’s Future 40. UM Today.  
2015 Manitoba Future 40 Finalist. CBC Manitoba, Metro News.  
2014 Sanofi BioGeneius Challenge, CJOB radio.  
2014 Sunflowers move to internal rhythm, Heidi Ledford. Nature News.  
2013 Israeli research intrigues global investors, John Dietz. The AgAdvance.  
2013 Kudos – Dr. Belmonte mentors Sonofi-BioGeneius prize recipient. UM Today.

#### **PUBLICATIONS**

(22 in last 6 years (2010-15); h-index = 14; i-10 index = 20)

##### ***Accepted and in press:***

1. Khan D, Millar JL, Girard IJ, Chan A, Becker MG, Kost S, Yeung EC, Kirkbride R, Stasolla C, Goldberg RB, Harada JJ, **Belmonte MF**. 2015. Transcriptome atlas of the Arabidopsis funiculus – a study of maternal seed subregions. *Plant J* 82: 41-53.
2. Nandi M, Selin C, Brassinga AK, **Belmonte MF**, Fernando WGD, Loewen PC, de Kievit TR. 2015. Pyrrolnitrin and hydrogen cyanide production by *Pseudomonas chlororaphis* strain PA23 exhibits potent nematocidal and repellent activity against *Caenorhabditis elegans*. *PLoS ONE*, 10(4): e0123184.
3. Millar JL, Becker MG **Belmonte MF**. 2015. Laser Microdissection of Plant Tissues *in Plant Microtechniques*. Springer Publishing. M. Sumner, C. Stasolla, and E. Yeung, Eds. *In final production*.
4. Becker MG, Chan A, Mao X, Girard IJ, Lee S, Elhiti M, Stasolla C, **Belmonte MF**. 2014. Vitamin C deficiency improves somatic embryo production in Arabidopsis through distinct gene regulatory networks. *J Exp Bot* 65: 5903-18.

5. Klaponski N, Selin C, Duke K, Fernando WGD, **Belmonte MF**, de Kievit TR. 2014. Proteomic analysis of a *Pseudomonas chlororaphis* PA23 LysR-type regulator, PtrA, required for biocontrol. *BMC Microbiol* 14: 94.
6. Khan D, Millar JL, Girard IJ, **Belmonte MF**. 2014. Transcriptional circuitry underlying seed coat development in *Arabidopsis*. *Plant Sci* 219: 51-60.
7. Ly V, Hatherrell A, Kim E, Chan A, **Belmonte MF**, Schroeder DF. 2013. Interactions between *Arabidopsis* UVH6, DDB1A, and DDB2 during abiotic stress tolerance and floral development. *Plant Sci* 213: 88-97.
8. Chan A, **Belmonte MF**. 2013. Histological and ultrastructural changes in canola (*Brassica napus*) funicular anatomy during the seed lifecycle. *Botany* 91: 671-679.
9. **Belmonte MF**, Kirkbride R, Stone SL, Pelletier JM, Bui AQ, Yeung EC, Fei J, Hashimoto M, Harada CM, Munoz MD, Le BH, Cheng C, Lu XH, Drews GN, Brady SM, Goldberg RB, Harada JJ. 2013. Mapping the seed: comprehensive developmental profiling of gene activity in *Arabidopsis* seed compartments. *Proc Natl Acad Sci USA*, 110: E435-E444.
10. Elhiti M, Wally OSD, **Belmonte MF**, Chan A, Cao Y, Xiang D, Datla R, Stasolla C. 2012. Gene expression analysis in microdissected shoot meristems of *Brassica napus* microspore derived embryos with altered *SHOOTMERISTEMLESS* levels. *Planta*, 237:1065-1082.
11. Elhiti M, Yang C, Chan A, Durnin D, **Belmonte M**, Ayele B, Tahir M, Stasolla C. 2012. Altered seed oil production by *Brassica SHOOTMERISTEMLESS*. *J Exp Bot* 63:4447-61.
12. Elhiti M, Yang C, **Belmonte MF**, Gulden R, Stasolla C. 2012. Transcriptional changes of antioxidant responses, hormone signalling and developmental processes evoked by the *Brassica napus SHOOTMERISTEMLESS* during in vitro embryogenesis. *Plant Physiol Biochem* 58: 297-311.
13. Bassil E, Tajima H, Liang Y-C, Ohto M, Ushijima K, Nakano R, Esumi T, Coku A, **Belmonte M**, Blumwald E. 2011. The *Arabidopsis* Na<sup>+</sup>/H<sup>+</sup> antiporters NHX1 and NHX2 control vacuolar pH and K<sup>+</sup> homeostasis to regulate growth, flower development, and reproduction. *Plant Cell* 23: 3087-3088.
14. Bassil E, Ohto M, Esumi T, Tjima H, Zhu Z, Cognac O, **Belmonte M**, Peleg Z, Yamaguchi T, Blumwald E. 2011. The *Arabidopsis* intracellular Na<sup>+</sup>/H<sup>+</sup> antiporters NHX5 and NHX6 are endosome associated and necessary for plant growth and development. *Plant Cell* 23: 224-239.
15. Belmonte MF, Elhiti M, Ashihara H, Stasolla C. 2011. Brassinolide-improved development of *Brassica napus* microspore-derived embryos is associated to increased activities of purine and pyrimidine salvage pathways. *Planta* 233: 95-107.
16. Hsu SC, **Belmonte MF**, Harada JJ, Inoue K. 2010. Indispensable roles of plastids in *Arabidopsis thaliana* embryogenesis. *Curr Genomics* 5: 338-349.
17. **Belmonte MF**. 2010. Gene Programming: How many genes does it take to program a seed? *In* S. Gilles and S. Hedwitt (Eds.), *Biology on the Cutting Edge* (pp. 101-105); *Teaching Notes* (pp. 69-71). Pearson Prentice Hall, Toronto, ON, Canada.
18. Harada JJ, **Belmonte MF**, Kwong R. 2010. Plant Embryogenesis (Zygotic and Somatic). *In* Encyclopedia of Life Sciences. John Wiley & Sons, Inc Chichester <http://www.els.net/> [doi:10.1038/npg.els.0006101]
19. **Belmonte M**, Elhiti M, Waldner B, Stasolla C. 2010. Depletion of cellular brassinolide decreases embryo production and disrupts the architecture of the apical meristems in *Brassica napus* microspore-derived embryos. *J Exp Bot* 61: 2779-2794.
20. Le BH, Bui A Q, Wagmaister JA, Cheng C, Henry KF, Pelletier J, Kwong L, **Belmonte MF**, Kirkbride RC, Horvath S, Drews GN, Fischer R, Okamura JK, Harada JJ, Goldberg RB. 2010. Identification of seed-specific transcription factors from a global analysis of gene activity during the *Arabidopsis* life cycle. *Proc Natl Acad Sci USA* 107: 8063-8070.

21. **Belmonte MF**, Stasolla C. 2009. Altered *HBK3* expression affects glutathione and ascorbate metabolism during the early phases of Norway spruce (*Picea abies*) somatic embryogenesis. *Plant Physiol Biochem* 47: 904-911.
22. Murphy TM, **Belmonte MF**, Shu S, Britt AB, Hatteroth J. 2009. Requirement for abasic endonuclease gene homologues in Arabidopsis seed development. *PLoS ONE* 4: e4297.
23. Stasolla C, **Belmonte MF**, Tahir M, Elhiti M, Flood H. 2008. Identification and characterization of *PgHZ1*, a novel homeodomain leucine-zipper gene isolated from white spruce (*Picea glauca*) tissue. *Plant Physiol and Biochem* 46: 1031-1039.
24. Ashihara H, Luit B, **Belmonte M**, Stasolla C. 2008. Metabolism of nicotinamide, adenine and inosine in developing microspore-derived canola (*Brassica napus*) embryos. *Plant Physiol Biochem* 46: 752-759.
25. Stasolla C, **Belmonte MF**, Tahir M, Elhiti M, Khamiss K, Joosen R, Maliepaard C, Sharpe A, Gjetvaj B, Boutilier K. 2008. Buthionine sulfoximine (BSO) -mediated improvement in cultured embryo quality in vitro entails changes in ascorbate metabolism, meristem development and embryo maturation. *Planta* 228: 255-272.
26. Loukanina N, Stasolla C, **Belmonte MF**, Yeung EC, TA Thorpe. 2008. Changes in the de novo, salvage, and degradation pathways of pyrimidine nucleotides during tobacco shoot organogenesis. *Plant Physiol Biochem* 46: 665-672.
27. **Belmonte MF**, Tahir M, Stasolla C. 2007. Over-expression of *HBK3*, a class I KNOX homeobox gene, improves the development of Norway spruce (*Picea abies*) somatic embryos. *J Exp Bot* 58: 2851-2861.
28. **Belmonte MF**, Yeung EC, Stasolla C. 2006. Glutathione depletion improves white spruce (*Picea glauca*) somatic embryo development. *Plant Cell Rep* 26: 517-523.
29. **Belmonte MF**, Ambrose SJ, Ross ARS, Abrams SR, Stasolla C. 2006. Improved development of microspore derived embryo cultures of *Brassica Napus* cv Topaz following changes in glutathione metabolism. *Physiol Plant* 127: 690-700.
30. **Belmonte MF**, Donald G, Reid DM, Yeung EC, Stasolla C. 2005. Alterations of the glutathione redox state improve apical meristem structure and somatic embryo quality in white spruce (*Picea glauca*). *J Exp Bot* 56: 2355-2364.  
\*Awarded the Taylor A. Steeves best published paper by a student at a Canadian university presented by the Canadian Botanical Association
31. **Belmonte M**, Stasolla C, Loukanina N, Yeung EC, Thorpe TA. 2005. Glutathione-induced growth of embryogenic tissue of white spruce correlates with changes in pyrimidine nucleotide metabolism. *Plant Sci* 168, 803-812.
32. **Belmonte MF**, Macey J, Yeung EC, Stasolla C. 2005. The effect of osmoticum on ascorbate and glutathione metabolism during white spruce (*Picea glauca*) somatic embryo development. *Plant Physiol Biochem* 43: 337-346.
34. **Belmonte MF**, Yeung EC. 2004. The effects of reduced and oxidized glutathione on white spruce somatic embryogenesis. *In Vitro Cell Dev Biol – Plant* 40, 61-66.
35. Stasolla C, **Belmonte MF**, van Zyl L, Craig D, Liu W, Yeung EC, Sederoff R. 2004. The effect of reduced glutathione on morphology and gene expression of white spruce (*Picea glauca*) somatic embryos. *J Exp Bot* 55: 695-709.
36. **Belmonte M**, Stasolla C, Loukanina N, Yeung EC, TA Thorpe. 2003. Effects of reduced and oxidized glutathione on purine nucleotide metabolism of white spruce embryogenic tissue. *Plant Sci* 165, 1377-1385.



### **Invited Reviews:**

37. Becker MG, Shu S, Harada JJ, **Belmonte MF**. 2014. Invited review: Genomic dissection of the seed. *Front Plant Sci* 5: 464.
38. Khan D, Chan A, Millar J, Girard I, **Belmonte MF**. 2014. Invited review: Predicting transcriptional circuitry underlying seed coat development. *Plant Sci* 223: 146-152.
39. **Belmonte MF**, Tahir M, Stasolla C. 2007. Invited review: Developmental and molecular studies of spruce embryogenesis in-vitro. *International Journal of Plant Developmental Biology* 1: 12-21.
40. Yeung EC, **Belmonte MF**, Tu LTT, Stasolla S. 2005. Invited review: Glutathione modulation of in vitro development. *In Vitro Cell Dev Biol – Plant* 41, 584-590.

### **ABSTRACTS AND PRESENTATIONS**

(28 in last 6 years (2010-2015), including 18 invited talks)

**Belmonte MF**. 2015. Development and implementation of Next Generation RNA sequencing technologies to dissect plant pathogen interactions. University of Manitoba. **Invited speaker**

**Belmonte MF**. 2015. Arabidopsis Seed Genomics. Eckerd College, St. Petersburg, Fl. USA. **Invited speaker**

**Belmonte MF**. 2015. Getting to the point: Laser microdissection and RNA sequencing of host pathogen interactions in canola. University of British Columbia Seminar Series. Vancouver, BC. **Invited speaker**

Becker MG, Girard IJ, Fernando WDG, **Belmonte MF**. 2014 How low can we go? Optimization of RNA sequencing libraries to study the *Brassica napus* – *Leptosphaeria maculans* pathosystem. Canadian Phytopathological Society Manitoba Regional Meeting. Morden, MB.

\*M Becker won first place oral presentation

**Belmonte MF**, Becker, MG, Zhang X, Fernando WDG. 2014. Comprehensive RNA profiling of the *Leptosphaeria maculans* – *Brassica napus* cotyledon pathosystem. Canadian Phytopathological Society Manitoba Regional Meeting. Morden, MB. **Selected speaker**.

**Belmonte MF**. 2014. Cutting to the chase: Global RNA profiling and laser microdissection of host pathogen interactions in canola. University of Winnipeg Seminar Series. **Invited speaker**.

Girard IJ, Fernando WDG, Becker MG, **Belmonte MF**. 2014. Bull's-eye: tissue processing improvements for isolating high quality RNA from laser microdissected pathogen infected cells and tissues. Joint American and Canadian Phytopathological Societies Annual Meeting. Minneapolis, Minnesota.

\*I Girard was selected to give an oral presentation

Zhang X, **Belmonte MF**, Becker, MG, Fernando WDG. 2014. Transcriptome analysis to understand host defense mechanisms in *Brassica napus*. Joint American and Canadian Phytopathological Societies Annual Meeting. Minneapolis, Minnesota.

\*X Zhang was selected to give an oral presentation

Mao S, **Belmonte MF**, Fernando WDG, de Kievit T. 2014. RNAseq and histological analysis of the canola – *Sclerotinia* pathosystem. Joint American and Canadian Phytopathological Societies Annual Meeting. Minneapolis, Minnesota.

\*S Mao was selected to give an oral presentation

Becker MG, Girard IJ, de Kievit T, Fernando WDG, **Belmonte MF**. 2014. Fighting back against blackleg: Utilization of high throughput RNA-seq to characterize the blackleg-canola pathosystem. Joint American and Canadian Phytopathological Societies Annual Meeting. Minneapolis, Minnesota.

\*M Becker was selected to give an oral presentation

**Belmonte MF**, Khan D, Millar JL, Girard IJ. 2014. Transcriptional circuitry underlying seed coat development in Arabidopsis. Joint American and Canadian Societies of Plant Biologists Annual Meeting. Portland, Oregon.

\*Chan A, Becker MG, **Belmonte MF**. 2014. A tale of three tissues: laser microdissection and RNA sequencing of the canola funiculus. Joint American and Canadian Societies of Plant Biologists Annual Meeting. Portland, Oregon.

\*A Chan was selected to give an oral presentation and winner of the CSPB best student poster

**Belmonte MF**. 2013. Mapping the plant: cell-specific mRNA profiling reveals a goldmine of information! BUGS Annual Speaker Series, University of Manitoba. **Invited speaker.**

**Belmonte MF**. 2013. Dissecting the seed: understanding seed development using the Arabidopsis model system. Department of Biological Sciences, Eckerd College, St. Petersburg, USA. **Invited speaker.**

**Belmonte MF**, Becker MG, Fernando DWG. Isolation of quality RNA from laser microdissected tissues of canola infected with *Leptosphaeria maculans*. Canadian Phytopathological Society Manitoba Regional Meeting. Carman, MB, Canada. **Selected speaker.**

Fernando DWG, **Belmonte MF**, Becker MG, Zhang X, Liban S. Canada's response to the Blackleg attack – what have we done to prevent the spread of the disease? 20<sup>th</sup> International Congress of Plant Pathology. Beijing, China. **Invited speaker.**

**Belmonte MF**, Fernando DWG, Mao X, de Kievit. 2013. Laser microdissection of Sclerotinia-infected leaf tissue. 15<sup>th</sup> International Sclerotinia Workshop. Huazhong Agricultural University, Wuhan, China. **Selected speaker.**

**Belmonte MF**, Chan A, Kost S, Yeung EC, Kirkbride R, Stasolla C, Goldberg RB, Harada JJ. 2013. Gene regulatory networks controlling seed development in Arabidopsis. Plant Breeding Working Group. Huazhong Agricultural University, Wuhan, China. **Invited speaker.**

**Belmonte MF**, Fernando DWG, Mao X, de Kievit. 2013. Cellular and molecular dissection of the Sclerotinia-Pseudomonas – Brassica tripartite system. Biocontrol Working Group. Huazhong Agricultural University, Wuhan, China. **Invited speaker.**

**Belmonte MF**. 2013. Vitamin C deficiency improves somatic embryogenesis in Arabidopsis through distinct gene regulatory networks. Canadian Society of Plant Biologists. Quebec City, PQ, Canada. **Selected speaker.**

**Belmonte MF**, Chan A, Kost S, Yeung EC, Kirkbride R, Stasolla C, Goldberg RB, Harada JJ. 2012. FUN, FUN, FUN now that daddy took the embryo and endosperm away. Biological Sciences Seminar series. San Jose State University, San Jose, USA. **Invited speaker.**

**Belmonte MF**. 2011. Gene regulatory networks controlling seed development. Biological Sciences Seminar series. University of Manitoba, Winnipeg. **Invited speaker.**

**Belmonte MF**. 2011. *Biological Understanding of plant Growth using Systems biology*. Biological Sciences Undergraduate Students Association Speaker Series. University of Manitoba, Winnipeg. **Invited speaker.**

**Belmonte MF**, Kirkbride RC, Yeung EC, Pelletier J, Bui AQ, Le BH, Goldberg RB, Brady S, Harada JJ. 2011. Fun is Where It's At: RNA profiling of the Arabidopsis FUNiculus. 21<sup>st</sup> International Conference on Arabidopsis Research. Madison, WI, USA.

**Belmonte MF**. 2011. Dissection of Arabidopsis Seed Development. Biochemistry and Medical Genetics Seminar Series. Bannatyne Campus - University of Manitoba, Winnipeg. **Invited speaker.**

**Belmonte MF**. 2011. Dissection of Arabidopsis Seed Development. Microbiology Seminar Series. University of Manitoba, Winnipeg. **Invited speaker.**

**Belmonte MF**, Kirkbride RC, Pelletier J, Bui AQ, Le BH, Brady S, Goldberg RB, Harada JJ. 2010. Dissection of Arabidopsis Seed Development. Plant Biotechnology Institute Seminar Series 2010. Saskatoon, Canada. *Invited speaker.*

**Belmonte MF**, Kirkbride RC, Pelletier J, Bui AQ, Le BH, Goldberg RB, Harada JJ. 2010. Laser capture microdissection of Arabidopsis seed compartments reveals dynamic changes in gene activity within and between seed compartments over time. Brassica 2010, Saskatoon, Canada. *Invited speaker.*

**Belmonte MF**, Kirkbride RC, Pelletier J, Bui AQ, Le BH, Goldberg RB, Harada JJ. 2010. Laser capture microdissection of Arabidopsis seed compartments reveals dynamic changes in gene activity within and between seed compartments over time. Canadian Society of Plant Physiologists Annual Meeting 2010, Montreal, Canada.

**Curriculum Vitae**  
**J. Thomas Booth, Ph.D.**  
**January 2015**

**General Information:**

**Personal**

*Professional address:* 404 Biological Sciences Bldg., Department of Biological Sciences, University of Manitoba, Winnipeg, MB, R3T 2N2, Canada  
*Home address:* 43 Morningside Dr., Winnipeg, MB, R3T 4A2, Canada  
*Phone:* 474-6588 (office), 474-7588 (facsimile), 918-3616 (cell), 415-5939 (home)  
*Electronic mail:* booth @cc.umanitoba.ca  
*Date and Place of Birth:* 18.04.41 Midland, Mich., U.S.A.  
*Citizenship:* Canadian

**Post-Secondary Education**

<i>Year</i>	<i>Degree</i>	<i>Institution</i>	<i>Discipline</i>
1994	Cert.	Asian Institute of Technology (Bangkok, Thai)	Disaster Research
1971	Ph.D.	Univ. of British Columbia (Vancouver, B.C.)	Botany
1966	M.Sc.	Ohio Univ. (Athens, Ohio)	Botany
1964	A.B.	Eastern Univ. (Philadelphia, Pennsylvania)	Biology

**Employment History (including leave appointments)**

<i>Dates</i>	<i>Position</i>	<i>Employer/Sponsor</i>
2011- 15	Professor	UM, Dept. of Biological Sciences
2011	Visiting Professor	Univ. of Salzburg, Austria
2009 – 11	Professor	UM, Dept. of Biological Sciences
2007-09	Associate Head	UM, Dept. of Biological Sciences
2002-07	Prof. & Head	UM, Botany Dept.
1998	Assistant Head	UM, Botany Dept.
1995-96	Acting Director	UM, Disaster Research Institute
1994-95	Professor	UM, Botany Dept.
1994-95	Visiting Professor	Federal University of Paraíba, Brazil
1993-94	Acting Coordinator	UM, Disaster Research Institute
1989-93	Professor	UM, Botany Dept
1985-89	Associate Professor	UM, Botany Dept.
1984-85	Visiting Professor	Instituto de Botanica, São Paulo, Brazil
1979-80	Acting Director	UM Field Station
1977-85	Associate Professor	UM, Botany Dept.
1977-78	Visiting Professor	Instituto de Botanica, São Paulo, Brazil
1971-76	Assistant Professor	UM, Botany Dept.
1971	Postdoctoral Fellow	Univ. of Calgary, Biology Dept.
1967-68	Lecturer	Univ. of British Columbia, Botany Dept.

## Awards/Honors

<i>Dates</i>	<i>Position/Award</i>	<i>Institution/Entity</i>
2010	Roy Vogt	UM Faculty Association
2009	Dedicated Service	UM Board of Governors
2008	Dedicated Service	Canadian Association of Univ. Teachers
1990	Weresub Lecturer	Canadian Botanical Association

## Current Scholarly Interests

### *Mycological*

- i) The role of pollen rain, fungi & soil flora & fauna in boreal forest nutrition
- ii) Distribution & autecology of micro- & macro-fungi in Manitoba's forests, streams & lakes
- iii) Lichens & fungi for bio-monitoring & classifying boreal Manitoba micro-environments

### *Environmental Conservation*

- i) Preservation of heritage lands & watersheds in boreal Manitoba
- ii) Rehabilitation of human impacted boreal sites
- iii) Sustainable living in boreal forests in Manitoba

## Research:

### Journal Publications, Book Chapters, Abstracts, Proceedings, Reviews, Symposia & Reports

#### *Journal Publication*

- Fontaine, K., Booth, T., Deduke, C., & Piercey-Normore, M. D. 2014. Notes on the species assemblage of the lichen *Dermatocarpon luridum* northwestern in Manitoba, Canada. *Evansia* 31(2): 69-74.
- Deduke, C., Booth, T., & Piercey-Normore, M. D. 2014. Lichen fecundity on the Precambrian Shield: an alternative approach to life history strategies. *Botany* 92 (10): 723-735.
- Doering, J., Doering, M., Mottier, Y., & Booth, T. 2013. Mycological diversity on jack pine & spruce bark by Payuk Lake, Manitoba. *PMUSER (Proceedings of Manitoba's Undergraduate Science & Engineering Research* 1(1): 28-34.
- Fontaine, K., Stocker-Wörgötter, E., Booth, T., & Piercey-Normore, M. D. 2013. Genetic diversity of the lichen-forming alga, *Diplosphaera chodatii*, in North America & Europe. *Lichenologist* 45(6): 799- 813.
- Lee, E.J. and T. Booth. 2003. Macronutrient input from pollen in two regenerating pine stands in southeast Korea. *Ecological Research* 18: 423-430.
- Lee, Y-K., K. Yong-Ok, T. Booth, and E. J. Lee. 2002. In vitro pollen performance of *Pinus densiflora* and *P. rigida*: Temperature and medium nutrient effects. *Korean J. Ecol. Sci.* 1: 165-169.
- Johnson-Green, P., N. C. Kenkel and T. Booth. 2001. Soil salinity and arbuscular mycorrhizal colonization of *Puccinellia nuttalliana*. *Mycol. Res.* 105:1094-1110.
- Booth, T. 1997. Las sequías no son desastres? *Desastres & Sociedad (LARED/ Lima)* N° 5 Año 4: 56-67.

### *Journal Publication (con't)*

- Lee, E.J., N. C. Kenkel and T. Booth 1996a. Pollen deposition in the boreal forest of west-central Canada. *Can. J. Bot.* 74: 1265-1272.
- Lee, E.J., N. C. Kenkel and T. Booth 1996b. Atmospheric deposition of micronutrients by pollen in the boreal forest. *Ecoscience* 3: 304-309.
- Johnson-Green, P., N. C. Kenkel and T. Booth. 1995. The distribution and phenology of arbuscular mycorrhizae along an inland salinity gradient. *Can. J. Bot.* 73: 1318-1327.
- Booth, T., S. Gorrie, and T. Mushin. 1988. Life strategies among fungal assemblages on *Salicornia europaea* agg. *Mycologia* 80: 176-191.
- Kenkel, N. C., and T. Booth. 1987. A comparison of presence - absence resemblance coefficients for use in biogeographical studies. *Coenoses* 2: 25-30.
- Mushin, T., and T. Booth. 1987. Fungi associated with halophytes in an inland salt marsh (Manitoba, Canada). *Can.J.Bot.* 65: 1137-1151.
- Booth, T. 1983. Lignicolous marine fungi from Sao Paulo, Brazil. *Can.J.Bot.* 61: 488-506.
- Booth, T. 1982. Taxonomic notes on coprophilous fungi of the Canadian Arctic: Churchill, Resolute Bay and Devon Island. *Can.J. Bot.* 60: 1115-1125.
- Booth, T. 1981. Lignicolous and zoosporic fungi in marine environments of Hudson Bay. *Can.J.Bot.* 59: 1867-1881.
- Booth, T. 1979. Strategies for study of fungi in marine and marine-influenced ecosystems. *Rev.Microbiol. (S. Paulo)* 10: 123-138.
- Booth, T., and P. Barrett. 1976. Taxonomic and ecologic observation of zoosporic fungi in soils of a high arctic ecosystem. *Can.J.Bot.* 54: 533-538.
- Booth, T., and P. Barrett. 1971. Occurrence and distribution of zoosporic fungi from Devon Island, Canadian Eastern Arctic. *Can.J.Bot.* 49: 359-369.
- Booth, T. 1971a. Ecotypic responses of chytrid and chytridiaceous species to various salinity and temperature combinations. *Can.J.Bot.* 49: 1757-1767.
- Booth, T. 1971b Distribution of certain soil inhibiting chytrid and chytridiaceous species related to some physical and chemical factors. *Can.J.Bot.* 49: 1743-1755.
- Booth, T. 1971c Occurrence and distribution of chytrids, chytridiaceous fungi and some Actinomycetales from soils of Oregon, California and Nevada. *Can.J.Bot.* 49: 939-949.
- Booth, T. 1971d. Occurrence and distribution of zoosporic fungi and some Actinomycetales in coastal soils of southwestern British Columbia and the San Juan Islands. *Syesis* 4: 197-208.
- Booth, T. 1971e. Occurrence and distribution of some zoosporic fungi from soils of Hibben and Moresby Island, Queen Charlotte Islands. *Can.J.Bot.* 49: 951-965.
- Booth, T. 1971f. Problematic taxonomic criteria in the Chytridiales. *Can.J.Bot.* 49: 971-987.
- Booth, T. 1969. Marine fungi from British Columbia. Monocentric chytrids and chytridiaceous species from costal and interior halomorphic soils. *Syesis* 2: 141-161.

### ***Journal Publication (con't)***

- Booth, T., and C.E. Miller. 1969. Morphological development of an isolate of *Schizochytrium aggregatum*. *Can.J.Bot.* 47: 2051-205.
- Booth, T., and C.E. Miller. 1968. Comparative morphological and taxonomic studies in the genus *Thraustochytrium*. *Mycologia* 60: 480-495.

### ***Edited Books***

- Booth, T. and M. Barbosa (eds.). 2000. *Women of the Drought: Struggle and Visibility in a Disaster Situation*. (A. Branco auth.) Federal University of Paraíba Press (João Pessoa, Brazil). 203 pp.

### ***Book Chapters***

- Barbosa, M. and T. Booth. 1996. El Urbano, La Degradación Ambiental Y Los Desastres - Una Cuestión Polémica. in *Degradación Ambiental En Los Riesgos Urbanos* (edited by Lavell et al.): LARED, Lima. (in press)
- Kenkel, N. C., and T. Booth. 1992. Multivariate analyses in fungal ecology. In "The Fungal Community" (edited by G.C. Carroll and D.T. Wicklow): Marcel Dekker New York. Pp. 209-227.
- Booth, T., and N. C. Kenkel. 1986. Ecological studies of lignicolous marine fungi: A distribution model based on ordination and classification. In "Biology of Marine Fungi" (edited by S.T. Moss): Cambridge Univ. Press. Cambridge. Pp. 297-310.
- Booth, T. 1977. Muskox dung: its turnover rate and possible role on Truelove Lowland. Pp. 531-545 in: "Truelove Lowland, Devon Island, Canada: A High Arctic Ecosystem" (L.C. Bliss, ed.). University of Alberta Press, Edmonton.
- Booth, T., and P. Widden. 1977. Fungi of Truelove Lowland. Pp. 691-692 in *Truelove Lowland, Devon Island, Canada: A High Arctic Ecosystem* (edited by L.C. Bliss). University of Alberta Press, Edmonton.

### ***Abstracts***

- Booth, T. 1987. Life strategies among fungal assemblages on *Salicornia europaea* agg. along a conductivity gradient. Mycological Society of America 52nd Annual Meeting, Carlton, Ontario.
- Booth, T. 1986. Observacoes ecologicas sobre fungos marinhos lignicolous da Ilha do Cardoso (Sao Paulo). XXXVII National Botanical Congress, Ouro Preto, Brazil.
- Booth, T. 1985a. Modelo de distribuicao de fungos marinhos, baseado na ordenacao de factores ecologicos. XXXVI National Botanical Congress, Curitiba, Brazil.
- Booth, T. 1985b. Ecological studies of lignicolous marine fungi. A model for distribution based on presence and absence, ordination and classification. Fourth International Marine Mycology Symposium, Portsmouth, U.K.
- Booth, T. 1985c. Cauloplane and rhizoplane fungi of inland salt marsh halophytes. The interaction of plant ionic levels and fungal population dynamics. Fourth International Marine Mycology Symposium, Portsmouth, U.K.
- Booth, T. 1983b. Additional lignicolous marine fungi from Hudson Bay. Northern Studies Committee Symposium, Winnipeg, Manitoba.

### ***Abstracts (con't)***

- Booth, T. 1983a. Distribution of lignicolous marine fungi. Site and species patterns. International Marine Mycological Congress, Tokyo, Japan.
- Booth, T. 1982. Cauloplane and rhizoplane fungi of *Salicornia rubra*. A. Nels. Environmental effects. Mycological Society of America, University Park, Pennsylvania, U.S.A.
- Booth, T. 1979. Lignicolous marine fungi from Hudson Bay with a note on mycogeographical implications. Third International Marine Mycology Symposium, Morehead City, North Carolina, U.S.A.
- Booth, T. 1977. Distribution of lignicolous marine fungi in South America. III Marine Biology Congress, Sao Sebastiao, Brazil.
- Booth, T. 1974. Microbial population adaptations to habitat differences of above-ground tundra substrates. I.B.P. Tundra Biome Final Synthesis Symposium, Abiskio, Sweden.
- Booth, T. 1971b. Problematical taxonomic criteria in *Entophylctis* Fischer. Mycological Society of America, Edmonton, Alberta.
- Booth, T. 1971a. Ecological factors controlling the distribution of Chytridiales in saline soils. Mycological Society of America, Edmonton, Alberta.
- Booth, T. 1966. Comparative studies in the Thraustochytriaceae Sparrow. Ohio Academy of Science, Columbus, Ohio, U.S.A.

### ***Proceedings***

- Booth, T., J. Rogge, J. Mocellin, and G.P. Sevenhuysen. 1993. "Vulnerability Assessment. Measures Acting on Potential/Realized Disaster Continua in Situational Contexts". Incorporated into the report of the Canadian National Committee on Natural Disaster Reduction Activities published by the Royal Society of Canada. United Nations IDNDR (International Decade for Natural Disaster Reduction) Conference, Yokohama, Japan (May 1994).

### ***Reviews***

- Booth, T., and R. Grandi. 1985. The fungal community: its role and organization in the ecosystem. A review. (in Portuguese) Revista de Microbiologia (São Paulo) 16: pp. 334-335.
- Booth, T. 1983. Arctic and Alpine Mycology: The First International Symposium on Arctic-Alpine Mycology. A review. Mycologia 75: 934-935.

### ***Symposia***

- Booth, T. 1995. Degradação ambiental em áreas de manguezal e sua significância econômica. VI General Reunion of LA RED. Quito, Ecuador
- Booth, T. 1995. Disaster research in the Life Sciences. Tenth Annual Reunion of the Zoological Society of North East Brazil. João Pessoa, Paraíba, Brazil.
- Booth, T. 1985. Ecological studies of lignicolous marine fungi. A model for distribution based on presence and absence, ordination and classification. Fourth International Marine Mycology Symposium, Portsmouth, U.K.
- Booth, T. 1979. Lignicolous marine fungi from Hudson Bay with a note on mycogeographical implications. Third International Marine Mycology Symposium, Morehead City, North Carolina.



### ***Symposia (con't)***

- Booth, T. 1977. A conspectus of marine fungi reported from South America with a note on species new to its mycota. International Marine Biology Symposium, São Sebastiao, Brazil.
- Booth, T. 1974. Microbial population adaptations to habitat differences of above-ground tundra substrates. IBP Tundra Biome Final Synthesis Symposium, Abisko, Sweden..

### ***Project Reports***

- Booth, T. 1997. CIDA/IDRC Disaster Preparedness Research Network Project Report. 15pp. (Year III).
- Booth, T. and R. Tait. 1997. Disaster Management in Northeastern Brazil: Project report for fiscal years III & IV. Drought in NE Brazil CIDA Project. 88pp.
- Booth, T. 1996. CIDA/IDRC Disaster Preparedness Research Network Project Report . 121pp (Year II).
- Booth, T and J. Mocellin. 1994. Disaster management in Northeast Brazil: Project report for fiscal year II. Drought in NE Brazil CIDA Project. 11pp.
- Booth, T. 1994. Brazil Project 93/11/28 to 93/12/28 Mission report. Drought in NE Brazil CIDA Project. 19 pp.
- Booth, T and J. Mocellin. 1993. Disaster management in Northeast Brazil: Project report for fiscal year I. Drought in NE Brazil CIDA Project. 8 pp.
- Booth, T. 1981. Lignicolous marine fungi from oil spill beaches. Baffin Island Oil Spill Project. 6 pp.
- Booth, T., and B.A. Hubert. 1974. Muskox dung decomposition rates and total accumulation on Truelove Lowland. Devon Island I.B.P. Project 11 pp.
- Booth, T. 1974. Microbial population adaptations to habitat differences of above-ground tundra substrates. Devon Island I.B.P. Project. 24 pp.
- Booth, T. 1973. Muskox dung decomposition. 1972 field and laboratory studies. Devon Island I.B.P. Project. 7 pp.
- Booth, T. 1971. Studies on dung decomposition. Devon Island I.B.P. Project. 14 pp.

### **Grants/Contracts/Agreements**

<i>Years</i>	<i>Source</i>	<i>Purpose/Title</i>	<i>Amount</i>
99 - 02	I.D.R.C.	Globalization: & Environ. Deg.	\$400,000
94	IOHE	Institute for Sustainable Development	\$5000
93 - 99	I.D.R.C.	Drought in NE Brazil	\$400,000
92 - 98	C.I.D.A.	Disaster Management in NE Brazil	\$800,000
91 - 92	MB Hydro	Right-of-way mycorrhizae	\$19,600
90 - 91	MB Hydro	Right-of-way mycorrhizae	\$15,500
72 - 88	NRC A6682 NSERC	Studies on aquatic fungi	~\$18,000/yr
71 -74	CCIBP Polar Shelf	Decomposition on Arctic Tundra	~\$10,000/yr

## Research (con't):

### PDF's, Research Associates & Visiting Scientists

- 1. Name and Status:** Dr. Mark Barbosa Professor and Head, Remote Sensing Laboratory, University of Paraíba, Brazil  
**Dates:** January to April, 1994  
**Purpose of Stay:** Visiting Professor in the Disaster Research Institute (DRI) and Invited Seminar and Workshop Presenter in the Department of Botany  
**Source of Funding:** CIDA Contract with Disaster Research Institute
- 2. Name and Status:** Dr. Celso Matins Professor, Department of Systematics and Ecology Graduate Program Coordinator, University of Paraíba, Brazil  
**Dates:** September to December, 1995  
**Purpose of Stay:** Visiting Professor in the DRI and the Department of Botany  
**Source of Funding:** CIDA Contract with DRI
- 3. Name and Status:** Mr Walter Santa Cruz, Professor of Civil Engineering Department, Federal University of Paraíba, Brazil  
**Dates:** November to February, 1996/97  
**Purpose of Stay:** Visiting GIS Technition in the DRI and Geographical Information Systems (GIS) training

## Teaching:

### Graduate & Honours Students Supervised, Course Instruction & Course & Program Development

#### *Graduate Students Supervised*

Name	Degree	Years	Thesis Title
Robertson, Jason	M.Sc.	02-04	<i>Molecular Ecology of Fungi Resident in Boreal Forest Lichen Mats</i>
Bakke, Olaf	Ph.D.	95-99	<i>Jack Pine Pollen Affects on Jack Pine and Black Spruce Seed Germination and Seedling Growth</i>
Lee, Eun Ju	Ph.D.	91-96	<i>Environmental and Mycological Aspects of Pollen Rain in Boreal Manitoba</i>
Johnson-Green, P	Ph.D.	90-94	<i>Ecology of Arbuscular Mycorrhizae in Saline Habitats of Northern Manitoba</i>
Diamond, Suzanne	M.Sc.	90-93	<i>The Effects of Picloram and Line Maintenance on Ectomycorrhizal Fungi Associated with Spruce, Jack Pine and Tamarack within Hydro Transmission Corridors of Manitoba</i>
Muhsin, Tawfik	Ph.D.	82-85	<i>Studies on Fungi Associated with Halophytes from Delta Marsh, Manitoba</i>
Konrad, Sandra	M.Sc.	83-87	<i>Aquatic Decomposition of Leaves by Terrestrial Fungi: Response of the Unit Community to Various Treatments</i>

## Graduate & Honours Students Supervised, Course Instruction & Course & Program Development (con't)

### *Honours Students Supervised*

Name	Degree	Years	Thesis Title
Loch, John	B.Sc.	13-14	<i>Fungi Associated with Herbivore Dung</i>
Robertson, Jason	B.Sc.	01-02	<i>Some Conditions of Pine pollen degradation by Chytrids</i>
Fan, Keith	B.Sc.	96-97	<i>Some Pollen Infesting Chytrids from Needle and Broad Leaf Litter Collected Near Flin Flon (Lake Athapapuskow)</i>
Wood, Mardith	B.Sc.	78-79	<i>A Comparison of Fungi Isolated from the Soil of Two Crop Covers - Barley and Flax</i>

### *Course Instruction (2010-2015)*

Year/Term	Number	Title
2014 - 2015	BIOL1000	Foundations of Life
	BIOL2260	Biology of Fungi and Lichens
	BIOL3340	Primitive Fungi and Their Allies
	BIOL4800	Modular Field Ecology
	BIOL4890	Fungal Genetics
2013 - 2014	BIOL2260	Biol. Fungi & Lichens
	BIOL 3340	Primitive Fungi and Their Allies
	BIOL4890	Fungal Straminipila
2012-2013	BIOL1010	Biological Diversity and Interactions
	BIOL2260	Biology of Fungi and Lichens
	BIOL3340	Primitive Fungi and Their Allies
	BIOL4890	Zygomycetes

### *Courss Instruction (2010-2015)*

Year/Term	Number	Title
2011-2012	BIOL1000	Foundations of Life
	BIOL1010	Biological Diversity and Interactions
	BIOL2260	Biology of Fungi and Lichens
	BIOL3340	Primitive Fungi and Their Allies
2010-2011	BIOL1000	Foundations of Life
	BIOL1010	Biological Diversity and Interactions
	BIOL2260	Biology of Fungi and Lichens
	BIOL3330	Fungal Ecology

### *Course Instruction (1971-2009)*

- 71.123 General Biology (non-majors) = BIOL1000 Foundations of Life; BIOL 1010 Biological Diversity and Interaction
- 71.125 General Biology (majors); = BIOL1020 Biology1: Principles and Themes; BIOL1030 Biological Diversity, Functions and Interactions
- 1.220 Plant Kingdom
- 1.228 Introductory Ecology
- 1.237 Principles of Ecology

### ***Course Instruction (1971-2009 (con't)***

- 1.316 Plant Anatomy
- 1.321 Introductory Mycology = BIOL2260 & BIOL3340
- 1.325 Fungal Ecology
- 1.342 Field Ecology = BIOL4800 (in part)
- 1.355 Environmental Conservation Issues
- 1.414 Communicating in Plant Biology
- 1.416 Advanced Mycology
- 1.466 Topics in Botany = BIOL4890
- 1.468 Conservation Strategies
- 1.741 Advanced Topics in Botany
- 53.464 Disaster Management

### ***New Courses Developed***

- BIOL3340 Primitive Fungi & Their Allies
- 1.325 Fungal Ecology
- 1.355 Environmental Conservation Issues
- 1.414 Communicating in Plant Biology
- 1.468 Conservation Strategies

### ***New Programs Developed***

- Faculty of Science (UM) Environmental Science Program
- Program of workshops for promotion of disaster research strategies in drought stricken NE Brazil
- Disasters, Environment & Sustainable Living (Federal University of Paraíba, Brazil & the Federal Ministry of Defense, Brasilia)

## **Institutional (UM) Service:**

### ***Headships, Directorships & Coordinating Positions***

- Head of Department of Botany
- Assistant head Department of Botany
- Acting Director of University of Manitoba Field Station, Delta Marsh
- Acting Coordinator of Disaster Research Institute (Faculty of Arts)
- Acting Director of Disaster Research Institute (Faculty of Arts)
- Coordinator CIDA/IDRC Brazil Project (UM/UFPb)
- Coordinator of IDRC Disaster Management Research Network in Brazil

### ***University Committees & Bodies***

- Senate Libraries Committee (2013-\_\_\_)
- Workplace Health and Safety Committee (OSHAC) (2002-2014)
- Senate (1997-2000; 2003-2008; 2013-\_\_\_)
- Board of Governors (UMFA Assessor) (1997-1999; 2007-2009)
- Senate Executive (1997 – 2000)
- Employee Assistance Program Advisory Committee (2002-2009)
- Senate Academic Freedom and Tenure Committee (1999-2002)
- Ad hoc Staff Development Committee
- Environmental Sciences Graduate Programs Development Committee
- Staff Benefits Committee

## **Institutional (UM) Service (con't):**

### ***Faculty of Science Committees***

Faculty of Science Biology Teaching Unit Head Selection Committee  
Faculty of Science Botany Department Head Review Committee  
Faculty of Science Botany Department Head Selection Committee  
Faculty of Science Course Changes Committee  
Faculty of Science Endowment Drive  
Faculty of Science Merit Awards Committee (elected)  
Faculty of Science Environmental Science Program Advisory Committee  
Science Faculty Council Executive (elected)

### ***Faculty of Arts Committees***

Disaster Research Institute Executive and Council  
CIDA/IDRC Brazil Project Steering Committees  
Native Studies Graduate Faculty

### ***Division of Biology Committees***

Joint Ecology Program Committee (Representative of Botany Department)  
University Field Station, Delta Marsh Editorial Committee  
University Field Station, Delta Marsh Biologist Selection Committee  
University Field Station, Delta Marsh Users Committee

### ***Departmental Committees***

Biology Teaching Unit Extension Teaching Committee  
Biology Teaching Unit Representative to Delta Field Station, Steering Committee  
Biology Teaching Unit Staff Selection Committees (four in total)  
Botany Department Botany Prize Committee  
Botany Department Cooperative Program Review Committee  
Botany Department Curriculum Review Committee  
Botany Department Future Directions Committee  
Botany Department Herbarium Committee  
Botany Department Promotion Committee  
Botany Department Seminar Committee  
Botany Department Social Committee  
Botany Department Space Committee  
Botany Department Greenhouse Committee  
Botany Department Staff Selection Committee

### ***University of Manitoba Faculty Association (UMFA) Service***

UMFA President (elected)  
UMFA Vice-President (elected)  
UMFA Executive Secretary (elected)  
UMFA Board of Representatives (elected)  
UMFA Senate Assessor  
UMFA Board of Governors Assessor  
UMFA Executive Council  
UMFA Bargaining Team  
UMFA Collective Agreement Committee  
UMFA Job Action Coordinating Committee

### ***University of Manitoba Faculty Association (UMFA) Service (con't)***

UMFA Strike Coordinator

UMFA Workplace Safety Committee (Chair)

UMFA Communications Committee

Manitoba Organization of Faculty Associations (MOFA) President (elected)

### ***Campus Service Activities***

Non-user member of the Ft. Garry Campus Animal Care Committee

Member of the Joint Administration/UMFA Merit Awards Committee for Life Sciences, Natural Sciences & Engineering

Member St Paul's College Assembly

Academics at Risk

## **Winnipeg & Provincial Academic Service:**

### ***Lectures & Courses***

Delivery of credit courses in rural Manitoba (Ashern, Cranberry Portage, Gimli, Headingly Jail & Morden)

Delivery & participation in non-credit courses including: *Canoe, Camera & Microscope; Mammalian Adaptations to Cold Climates; Outdoor Education; & Winter Survival*

Public lectures including: *Fungal Indicators of Manitoba's Ancient Sea; Zoospores & Swales; Mushroom Misfits; Development, Sustainability & Environmental Research; Muskox, Bison, Deer, A Behavioral Consideration; & Mycological Studies on Truelove Lowland, Devon Island, N.W.T.*

### ***Educational Lobby & Legislative Submissions***

*Access, Learning and Quality. Quality Access for Quality Education. A*

Manitoba Organization of Faculty Associations Submission to the University Education Review Commission. Roblin Commission Hearings, 3 November 1992. The Pas, Manitoba.

Response to Proposals in Bill 22. Historical Context and Reality. Legislative Assembly of Manitoba (Fourth Session of the Thirty-fifth Legislature).

Standing Committee on Economic Development, Winnipeg, Manitoba, 29 June 1993.

Response in Proposals in Bill 32. Educational Diversity and Institutional Pre-adaptation. Legislative Assembly of Manitoba (Second Session of the Thirty-sixth Legislature). Standing Committee on Law Amendments, Winnipeg, Manitoba, 30 November 1996.

## **Canadian Association of University Teachers (CAUT) Service:**

### ***Organizational Activities & Positions***

CAUT Defence Fund President (elected)

NUCAUT Treasurer (National Union of the CAUT) (elected)

J.H. Stewart Reid Memorial Fellowship Trustee

CAUT Defence Fund Policy & Planning Committee (elected)

CAUT Defence Fund Trustee (elected)

CAUT Past-President

CAUT President (elected)

CAUT Publications Committee Chair

## CAUT Service (con't):

### *Organizational Activities & Positions*

CAUT Vice-President (elected)  
CAUT Executive Committee Member-at Large (elected)  
CAUT Collective Bargaining COOP Board of Directors (elected)  
CAUT Collective Bargaining COOP Executive Member (elected)  
CAUT Collective Bargaining COOP Clause Drafting Committee. Chair  
CAUT Collective Bargaining COOP Bargaining Conferences Organizer  
CAUT Staff Development Committee  
CAUT Nominating Committee. Chair (elected)  
CAUT Elections and Resolutions Committee (elected)

### *News Articles*

*United We Stand.* CAUT/ACPPU Bulletin, Vol. 49 N<sup>o</sup>5, May 2002.  
*Choosing the Right Path.* CAUT/ACPPU Bulletin, Vol. 49 N<sup>o</sup>4, April 2002.  
*Funding Crunch Sends University Tuition Soaring.* CAUT/ACPPU Bulletin, Vol. 49 N<sup>o</sup>1, January 2002.  
*Everyone Benefits From Public Hearings.* CAUT/ACPPU Bulletin, Vol. 48 N<sup>o</sup>10, January 2001.  
*Canada's New Anti-Terrorism Bill is a Misguided Assault on Basic Freedoms.* CAUT/ACPPU Bulletin, Vol. 48 N<sup>o</sup>9, November 2001.  
*Now's the Time for Rational Response.* CAUT/ACPPU Bulletin, Vol. 48 N<sup>o</sup>8, October 2001.  
*A Different Americas Is Possible.* CAUT/ACPPU Bulletin, Vol. 48 N<sup>o</sup>5, May 2001.  
*The Evolution of University Governance.* CAUT/ACPPU Bulletin, Vol. 48 N<sup>o</sup>2, February 2001.  
*Slow Death of Tenure Promises Quick Burial for Academic Freedom.* CAUT/ACPPU Bulletin, Vol. 48 N<sup>o</sup>1, January 2001.  
*International Coalition Builds Strong Ties.* CAUT/ACPPU Bulletin, Vol. 47 N<sup>o</sup>10, December 2000.  
*Political Will Needed to Sustain Education.* CAUT/ACPPU Bulletin, Vol. 47 N<sup>o</sup>9, November 2000.  
*Learning Requires Team Work & Respect.* CAUT/ACPPU Bulletin, Vol. 47 N<sup>o</sup>8, October 2000.  
*Academic Freedom as Just Another Commodity.* CAUT/ACPPU Bulletin, Vol. 47 N<sup>o</sup>7, September 2000.  
*Fiscal, Political Pressures Threaten Academy on All Points. PSE in General and the Bargaining Process in particular Are Under Attack.* CAUT/ACPPU Bulletin, Vol. 41 N<sup>o</sup>5, May 1994.  
*Manitoba Coalition Tests Its Mettle in Rollback Rejection.* CAUT/ACPPU Bulletin, Vol. 39 N<sup>o</sup>10, December 1992.

## **International Service:**

### ***Institutional Team Project Reports***

Disaster Research Institute (University of Manitoba) and Natural Hazards Center (University of Colorado). 1999 (May). An Assessment of Recovery Assistance Provided After The 1997 Floods in the Red River Basin: Impacts of Basin - Wide Resilience. (submitted to the International Red River Task Force of the International Joint Commission 203 - 100 Metcalfe Street, Ottawa ON K1P 5M1 CANADA) vi + 66pp & 4 appendicies.

### ***Invited Lectures, Seminars and Interviews***

Booth T. 1999. International Cooperation in Disaster Research. Inaugural meeting of the Brazilian Disaster Research Network, Areia, Paraíba, Brazil.

Booth, T. 1995. Cooperação Internacional No Desenvolvimento Do Semi-árido. PEASA/UFPb (Programa de Estudos e Ações para o Semi-árido, Campina Grande, Paraíba, Brazil.

Booth, T. 1995 Un meio para prever calamidades. O Norte, João Pessoa, Brazil (a published interview).



**Gail Kathleen DAVOREN**

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**EDUCATION**

<u>Date of Completion</u>	<u>Institution</u>	<u>Degree</u>
December 2001	Memorial University of Newfoundland	<b>Ph.D.</b> (Interdisciplinary Programme in Biology and Psychology)
September 1997	University of Victoria	<b>M.Sc.</b> (Biology)
May 1994	University of Victoria	<b>B.Sc.</b> (Biology, Co-op Program)
(Summer 1993)	Bamfield Marine Station	Courses for Biology Major

**WORK/RESEARCH EXPERIENCE**

<u>Dates</u>	<u>Position</u>	<u>Employer</u>
2011/04-present	Associate Professor (tenure)	University of Manitoba Department of Biological Sciences
2013/01-2015/12	Committee Member/ Grant Reviewer	University of Manitoba Faculty of Science Field Work Support Program
2010/09-2013/08	Committee Member	University of Manitoba Faculty of Science Promotion Committee
2010/09-2012/08	Committee Member / Grant Reviewer	Natural Science and Engineering Research Council of Canada (NSERC) Ship Time Allocation Committee
2010/09-2013/08	Committee Member / Grant Reviewer	University of Manitoba University Research Grants Committee
2003/09-2011/04	Assistant Professor (tenure-track)	University of Manitoba Department of Zoology/Biological Sciences
2002/01-2003/08	NSERC Postdoctoral Fellow	Memorial Univ. of Nfld Departments of Biology & Psychology
2003/01-2003/02	Consultant: Bird Distribution and Abundance	World Wildlife Fund Canada
2003/01-2003/04	Lecturer: 4 <sup>th</sup> year Conservation Biology	Memorial Univ. of Nfld Department of Biology
2001/06-2001/07	Consultant: Quantitative Analysis of Bird Distributions	Nestucca Trust Fund
2000/01-2003/08	Consultant: Historical Trends in Seabird Populations (Coasts Under Stress Project)	Memorial Univ. of Nfld & Univ. of British Columbia
2000/01-2000/04	Laboratory Instructor: 1 <sup>st</sup> year Biology	Memorial Univ. of Nfld Department of Biology
1999/05-1999/10	Consultant: Impact of Oil on Seabirds	Canadian Association of Petroleum Producers

1999/01-2001/12	Graduate Student Representative	Memorial Univ. of Nfld Departments of Biology & Psychology
1996/01-1996/12	Laboratory Instructor: 3 <sup>rd</sup> year Vertebrate Ecology	Univ. of Victoria Department of Biology
1995/09-1995/12	Laboratory Instructor: 2 <sup>nd</sup> year Ecology	Univ. of Victoria Department of Biology
1994/01-1994/10	Wildlife Habitat Ecologist	British Columbia Ministry of Forests Research Branch
1993/05-1993/09	Wildlife Ecologist	British Columbia Ministry of Environment Wildlife Branch
1992/05-1992/09	Entomology Ecologist	British Columbia Ministry of Forests Pest Management Branch
1991/05-1991/12	Water & Air Quality Biologist	British Columbia Ministry of Environment Waste Management
1990/05-1990/09	Radioactive Chemical Technician	Nordion International Inc. Chemical Recovery

**AWARDS / RECOGNITION****(A) ACADEMIC SCHOLARSHIPS – NATIONAL**

<u>Name of Award</u>	<u>Value</u>	<u>Location of Tenure</u>	<u>Period of Tenure</u>
Department of Fisheries and Oceans Postdoctoral Fellowship Supplement	\$7,500	Memorial University	2002
NSERC Postdoctoral Fellowship	\$70,000	Memorial University	2002-2003
IODE War Memorial Schl.	\$12,000	Memorial University	2001
Royal Bank Schl. in Marine Studies	\$5,000	Memorial University	2000
Orville Erickson Memorial Schl.	\$1,000	Memorial University	1999-2000
Dr. Marion Elder Grant Fellowship	\$8,000	Memorial University	1999-2000
NSERC Post Graduate Scholarship B	\$35,000	Memorial University	1998-1999
NSERC Post Graduate Scholarship A	\$31,320	University of Victoria	1995-1997
Ellis Bird Farm Ltd. Schl.	\$1,000	(declined)	1994

**(B) ACADEMIC SCHOLARSHIPS – INSTITUTIONAL**

<u>Name of Award</u>	<u>Value</u>	<u>Location of Tenure</u>	<u>Period of Tenure</u>
Memorial University Schl.	\$6,000	Memorial University	1998-2000
University of Glasgow Fellowship	\$41,000	(declined)	1997
Memorial University Fellowship	\$30,000	(declined)	1997
Bamfield Marine Station Graduate Schl.	\$250	Bamfield Marine Station	1997
King-Platt Memorial Award	\$3,000	University of Victoria	1996-1997
BMS Graduate Schl.	\$1,000	Bamfield Marine Station	1996
King-Platt Memorial Award	\$3,000	University of Victoria	1995-1996

UVIC President's Research Schl.	\$1,500	University of Victoria	1995
University of Victoria Fellowship	\$13,000	(declined)	1995
Province of Alberta Schl.	\$6,000	(declined)	1994
Victoria Men's Garden Club Schl.	\$300	University of Victoria	1994
BMS Undergraduate Schl.	\$1,000	Bamfield Marine Station	1993

(C) OTHER AWARDS

<u>Name of Award</u>	<u>Value</u>	<u>Location of Tenure</u>	<u>Period of Tenure</u>
Best Student Oral Presentation	2 Books	Pacific Seabird Group Conference	1997

PUBLICATIONS

- **FUNDING SOURCES INDICATED:** NSERC Discovery–**ND**; NSERC Strategic–**NS**; NSERC **PDF, PhD, MSc**; International Polar Year– **IPY**; **OTHER**
- **GRADUATE AND UNDERGRADUATE STUDENT CO-AUTHORS UNDERLINED**

(A) PEER-REVIEWED JOURNAL PUBLICATIONS (PUBLISHED OR IN PRESS)

- 51–Sheppard K, Davoren GK, Hann B (Accepted 02/15) Diet of walleye and sauger and morphological characteristics of their prey in Lake Winnipeg. *J Great Lakes Res* (OTHER)
- 50–Bairos-Novak K, Crook K, Davoren GK (Accepted 02/15) Relative importance of local enhancement as a search strategy for breeding seabirds: an experimental approach. *Anim Behav* (ND)
- 49–**Davoren GK, Woloschiniwsky C, Halden NM, Wang F** (2015) Can otolith chemistry indicate natal habitat of capelin *Mallotus villosus*? *J Exp Mar Biol Ecol* 464: 88-95 (ND)
- 48–**Davoren GK, Halden NM** (2014) Connectivity of capelin (*Mallotus villosus*) between regions and spawning habitats in Newfoundland inferred from otolith chemistry. *Fish Res* 159: 95-104 (ND)
- 47–Penton P, McFarlane C, Spice EK, Docker M, Davoren GK (2014) Lack of genetic divergence in capelin (*Mallotus villosus* - Osmeridae) spawning at beach versus subtidal habitats in coastal embayments of Newfoundland. *Can J Zool* 92: 377–382 (ND)
- 46–Crook K, Davoren GK (2014) Underwater foraging behaviour of common murres on capelin: influences of prey density and antipredator behaviour. *Mar Ecol Prog Ser* 501: 279–290 (ND)
- 45–**Davoren GK** (2013) Distribution of marine predator hotspots explained by persistent areas of prey. *Mar Biol* 160: 3043–3058 (ND)
- 44–Elliott KH, Ricklefs RE, Gaston AJ, Hatch SA, Speakman JR, Davoren GK (2013) High flight costs, but low dive costs, in auks support the biomechanical hypothesis for flightlessness in penguins. *Proc Natl Acad Sci* 110: 9380-9384 (ND)
- 43–Harter BB, Elliott KH, Divoky GJ, Gaston AJ, Davoren GK (2013) Arctic cod (*Boreogadus saida*) as prey: fish length-energetics relationships in Beaufort Sea and Hudson Bay. *Arctic* 66: 191-196 (ND)
- 42–Penton P, Davoren GK (2013) Capelin (*Mallotus villosus*) fecundity in post-1990s coastal Newfoundland. *Mar Biol* 160: 1625-1632 (ND)
- 41–Penton P, Davoren GK (2013) A common garden experiment on capelin (*Mallotus villosus*) early life history stages to examine use of beach and deep-water spawning habitats. *J Exp Mar Biol Ecol* 439: 54–60 (ND)
- 40–**Davoren GK** (2013) Divergent use of spawning habitat by male capelin (*Mallotus villosus*) in a warm and cold year. *Behav Ecol* 24: 152-161 (ND)
- 39–**Montevecchi WA, Hedd A, McFarlane Tranquilla L, Fifield DA, Burke CM, Regular PM, Davoren GK, Garthe S, Gaston AJ, Robertson GJ, Phillips RA** (2012) Tracking seabirds to identify ecologically important and high risk marine areas. *Biol Conserv* 156: 62-71 (IPY, ND)

- 38-Davoren GK, Penton P, Burke C, Montevecchi WA (2012) Water temperature and timing of capelin spawning determine seabird diets. *ICES J Mar Sci* 69: 1234-1241 (NS, ND)
- 37-Sheppard K, Olynyk A, **Davoren** GK, Hann BJ (2012) Summer diet analysis of the invasive rainbow smelt (*Osmerus mordax*) in Lake Winnipeg, Manitoba. *J Great Lakes Res* 38 (3): 66-71 (other)
- 36-Penton P, **Davoren** GK (2012) Physical characteristics of persistent deep-water spawning sites of capelin: importance for delimiting critical marine habitats. *Mar Biol Res* 8: 778-783 (NS, ND)
- 35-Penton P, **Davoren** GK, Andrews D, Montevecchi WA (2012) A comparison of egg developmental and survival rates in capelin (*Mallotus villosus*) on beach and demersal spawning sites in Newfoundland. *Can J Zool* 90: 248-256 (NS)
- 34-Garthe S, Montevecchi WA, **Davoren** GK (2011) Inter-annual changes in prey fields trigger different foraging tactics in a large marine predator. *Limnol Oceanogr* 56: 802–812 (PDF, NS)
- 33-Regular P, **Davoren** GK, Hedd A, Montevecchi WA (2010) Crepuscular foraging by a pursuit-diving seabird: Tactics of common murre in response to the diel vertical migration of capelin. *Mar Ecol Prog Ser* 415: 295-304 (NS, IPY)
- 32-**Davoren** GK, Garthe S, Montevecchi WA, Benvenuti S (2010) Influence of prey behaviour and other predators on the foraging activities of a marine avian predator in a Low Arctic ecosystem. *Mar Ecol Prog Ser* 404: 275–287 (PDF, NS)
- 31-Gaston AJ, Bertram DF, Boyne AW, Chardine JW, **Davoren** GK, Diamon AW, Hedd A, Montevecchi WA, Hipfner JM, Lemon MJF, Mallory MJ, Rail J-F, Robertson GJ (2009) Changes in Canadian seabird populations and ecology since 1970 in relation to changes in oceanography and food webs. *Environ Rev* 17: 267-286 (other)
- 30-Elliott KH, Bull RD, Gaston AJ, **Davoren** GK (2009) Underwater and above-water search patterns of an Arctic seabird: reduced searching at small spatiotemporal scales. *Behav Ecol Sociobiol* 63: 1773-1785 (ND)
- 29-Elliott KH, Woo K, Gaston AJ, Benvenuti S, Dall'Antonia L, **Davoren** GK (2009) Central-place foraging in an arctic seabird provides evidence for Storer-Ashmole's halo. *Auk* 126:613–625 (ND)
- 28-Hedd A, Montevecchi WA, **Davoren** GK, Fifield DA (2009) Diets and distributions of Leach's storm-petrel (*Oceanodroma leucorhoa*) before and after an ecosystem shift in the Northwest Atlantic. *Can J Zool* 87:787-801 (PhD, PDF)
- 27-Montevecchi WA, Benvenuti S, Garthe S, **Davoren** GK, Fifield D (2009) Flexible foraging tactics by a large opportunistic seabird preying on forage- and large pelagic fishes. *Mar Ecol Prog Ser* 385: 295-306 (PDF, ND)
- 26-Elliott KH, Gaston AJ, **Davoren** GK (2008) Bias in murre feeding watches. *J Field Ornith* 79: 298-307 (ND)
- 25-Woo KJ, Elliott KH, Davidson M, Gaston AJ, **Davoren** GK (2008) Individual specialization in diet by a generalist marine predator reflects specialization in foraging behaviour. *J Anim Ecol* 77:1082-1091 (ND)
- 24-Elliott **KH**, Gaston AJ, **Davoren** GK (2008) Is mass loss in Brünnich Guillemots an adaptation for improved dive performance or improve flight performance? *J Avian Biol* 39:1-10 (ND)
- 23-Elliott KH, Woo K, Gaston AJ, Benvenuti S, Dall'Antonia L, **Davoren** GK (2008) Seabird foraging behaviour indicates prey type. *Mar Ecol Prog Ser* 354: 289-303 (ND)
- 22-Elliott **KH**, **Davoren** GK, Gaston AJ (2008) Time allocation by a deep-diving bird reflects prey type and energy gain. *Anim Behav* 75: 1301-1310 (ND)
- 21-Elliott **KH**, **Davoren** GK, Gaston AJ (2008) Increasing energy expenditure for a deep-diving bird alters time allocation during the dive cycle. *Anim Behav* 75: 1311-1317 (ND)
- 20-Burger AE, Hitchcock CL, Stewart A, **Davoren** GK (2008) Coexistence and spatial distributions of Marbled Murrelets and other alcids off southwest Vancouver Island, British Columbia. *Auk* 125: 192-204 (other)

- 19-Penton P, **Davoren** GK (2008) Patterns of larval emergence of capelin (*Mallotus villosus*) and environmental cues at demersal spawning sites on the northeastern coast of Newfoundland. *Can J Fish Aquat Sci* 65: 1135-1143 (NS)
- 18-**Davoren** GK, Buren A, Burke C, May C, Penton P, Record N, Rose-Taylor C, Andrews D, Reinfort B, Anderson JT, Bell T, deYoung B, Garthe S, Koen-Alonso M, Montevecchi WA (2008) An ecosystem-based research program for capelin (*Mallotus villosus*) in the Northwest Atlantic: overview and results. *J Northw Atl Fish Sci* 39: 35-48 (NS)
- 17-Garthe S, Montevecchi WA, **Davoren** GK (2007) Flight destinations and foraging behaviour of northern gannets (*Sula bassana*) preying on a small foraging fish in a Low Arctic ecosystem. *Deep-Sea Res II* 54: 311-320 (PDF)
- 16-Elliott KH, **Davoren** GK, Gaston AJ (2007) Influence of drag and buoyancy on dive behaviour of an arctic seabird, the thick-billed murre. *Can J Zool* 85:352-371 (ND)
- 15-**Davoren** GK (2007) Effects of gill-net fishing on marine birds in a biological hotspot in the Northwest Atlantic. *Conserv Biol* 21: 1032-1045 (PDF)
- 14-**Davoren** GK, Anderson JT, Montevecchi WA (2006) Shoal behaviour and maturity relations of spawning capelin (*Mallotus villosus*) off Newfoundland: demersal spawning and diel vertical movement patterns. *Can J Fish Aquat Sci* 63: 268-284 (PhD)
- 13-**Davoren** GK, Montevecchi WA (2005) Did signals from seabirds indicate changes in capelin biology during the 1990s? A reply to Carscadden (2004). *Mar Ecol Prog Ser* 285:299-309 (PhD)
- 12-Burger AE, Hitchcock CL, **Davoren** GK (2004) Spatial aggregations of seabirds and their prey on the continental shelf off southwest Vancouver Island. *Mar Ecol Prog Ser* 283:279-292 (other)
- 11-**Davoren** GK, Montevecchi WA, Anderson JT (2004) The influence of fish behaviour on search strategies of common murres *Uria aalge* in the Northwest Atlantic. *Mar Ornith* 31:123-131 (PhD)
- 10-**Davoren** GK, Montevecchi WA, Anderson JT (2003) Search strategies of a pursuit-diving marine bird and the persistence of prey patches. *Ecol Monogr* 73: 463-481 (PhD)
- 9-**Davoren** GK, Montevecchi WA, Anderson JT (2003) Distribution patterns of a marine bird and its prey: habitat selection based on prey and conspecific behaviour. *Mar Ecol Prog Ser* 256: 229-242 (PhD)
- 8-**Davoren** GK, Montevecchi WA (2003) Consequences of foraging trip duration on provisioning behaviour and fledging condition of common murres. *J Avian Biol* 34: 44-53 (PhD)
- 7-**Davoren** GK, Montevecchi WA (2003) Signals from seabirds indicate changing fish stocks. *Mar Ecol Prog Ser* 258: 253-261 (PhD)
- 6-**Davoren** GK, Montevecchi WA, Anderson JT (2002) Scale-dependent associations of predators and prey: constraints imposed by flightlessness of common murres. *Mar Ecol Prog Ser* 245: 259-272 (PhD)
- 5-Carscadden JE, Montevecchi WA, **Davoren** GK, Nakashima BS (2002) Trophic relationships among capelin (*Mallotus villosus*) and marine birds in a changing ecosystem. *ICES J Mar Sci* 59: 1027-1033 (PhD)
- 4-Bertram DF, Golumbia T, **Davoren** GK, Harfenist A, Brown J (2002) Short visits reveal consistent patterns of interyear and intercolony variation in seabird nestling diet and performance. *C J Zool* 80: 2190-2199 (MSc)
- 3-Wiese FK, Montevecchi WA, **Davoren** GK, Huettmann F, Diamond AW, Linke J (2001) Seabirds at risk around oil platforms in the Northwest Atlantic. *Mar Poll Bull* 42: 1285-1290 (PhD)
- 2-**Davoren** GK (2000) Foraging variability in response to changing prey distribution in rhinoceros auklets. *Mar Ecol Prog Ser* 198: 283-291 (MSc)
- 1-**Davoren** GK, Burger AE (1999) Differences in prey selection and behavior during self-feeding and chick provisioning in rhinoceros auklets. *Anim Behav* 58: 853-863 (MSc)

REFEREED PUBLICATIONS – SUBMITTED, IN REVISION

- Downs K, **Davoren GK** (Submitted 09/13, MS# 14485) Relationships between the densities of multiple marine predators and capelin (*Mallotus villosus*). *Mar Ecol Prog Ser* (ND)
- Penton P, **Davoren GK** (Submitted 10/13, MS# cjas-2013-0567) Body shape and condition related to spawning habitat use by capelin (*Mallotus villosus*) in Trinity Bay, Newfoundland. *Can J Fish Aquat Sci* (ND)

(C) PEER-REVIEWED BOOK CHAPTERS

- Montevecchi WA, Garthe S, **Davoren GK** (2005) Chapter 5: Biophysical influences on seabird trophic assessments. *In* Top Predators in Marine Ecosystems (eds IL Boyd, S Wanless, CJ Camphuysen), pp. 118-130. Cambridge University Press, UK
- Burke CM, **Davoren GK**, Montevecchi WA, Wiese FK (2004) Chapter IV: Seasonal and spatial trends of marine birds along support vessel transects and at oil platforms on the Grand Banks. *In* Proceedings of the Environment Effects Monitoring Conference 2003. Halifax, Nova Scotia

(D) NON- REFEREED CONTRIBUTIONS – SPECIALIZED PUBLICATIONS, TECHNICAL REPORTS

- Buren AD, Koen-Alonso M, Montevecchi WA, Anderson JT, deYoung B, **Davoren GK** (2006) Modeling trophic interactions between parental common murres and capelin off the northeast Newfoundland coast. *International Council for the Exploration of the Sea* CM 2006/L:05 (15 pgs) (NS)
- Davoren GK**, Montevecchi WA, Anderson JT (2002) Hot spots of predators and prey on multiple spatial and temporal scales in the marine ecosystem of the Northwest Atlantic. *International Council for the Exploration of the Sea* CM 2002/n:11 (21 pgs) (PDF)
- Burke C, **Davoren GK**, Montevecchi WA, Stenhouse IJ (2002) Winging back to the future: an historic reconstruction of seabird diversity, distribution and abundance in the Northwest Atlantic, 1500-2000. Pages 27-37 in: Information Supporting Past and Present Ecosystem Models of Northern British Columbia and the Newfoundland Shelf (T. Pitcher, M. Vasconcellos, S. Heymans, C. Brignall and N. Haggan, editors). *Fisheries Centre Research Reports*, volume 10 (116 pgs) (other)
- Anker-Nilssen T, Barrett R, Becker PH, Camphuysen K, Chapdelaine G, **Davoren G**, Furness B, Garthe S, Huppopp O, Montevecchi WA, Tasker M (2000) Report of working group on seabird ecology, Oceanography Committee. *International Council for the Exploration of the Sea* CM 2000/c:04 (70 pgs) (other)
- Montevecchi WA, **Davoren GK**, Wiese FK, Diamond AW, Huettman F, Linke J (1999) Seabird attraction to offshore platforms and seabird monitoring from offshore support vessels and other ships: literature review and monitoring designs. *Canadian Association of Petroleum Producers*, St. John's, NL. Internal Technical Report (54 pgs) (other)

Popular Press Articles (based on my research)

- February 1, 2008: Gill nets and Murres - News and Notes, Birding Magazine.
- September 4, 2009: Fishing Down a Halo - Science Magazine, Editor's Choice, Ecology
- May 20, 2013: Why penguins don't fly - Science NOW
- May 20, 2013: Why penguins cannot fly - Nature News

(E) NON- REFEREED CONTRIBUTIONS – CONFERENCE PRESENTATIONS, POSTERS

- Calabria Carvalho P, Ronconi R, **Davoren GK** (2015) Coastal moulting region for great and sooty shearwaters – an important area for protection. 42<sup>nd</sup> Pacific Seabird Group Conference (PSG; San Jose, CA)
- Bairos-Novak K, Crook K, **Davoren GK** (2015) Birds of a feather feed together: experimental evidence of interspecific differences among three breeding seabird species in the use of local enhancement to

locate prey. *Oral*; PSG

- Davoren GK, Garthe S, Montevecchi WA (2015)** Influence of prey behaviour on the foraging behaviour of northern gannets in coastal Newfoundland, Canada. *Oral*; PSG
- McNicholl DG, Walkusz W, Davoren GK, Reist JD (2014)** Dietary characteristics of sympatric Arctic Cod and Capelin in the Canadian Arctic, Darnley Bay. *Poster*; Arctic Change Conference (ACC; Ottawa, Canada)
- Davoren GK, McNicholl D, Imrie K, Etuangat J, Reist J, Tallman R (2014)** Spawning ecology of a sub-Arctic forage fish, capelin (*Mallotus villosus*), in the eastern and western Canadian Arctic. *Poster*; ACC
- Crook K, Davoren GK (2014)** Abundance and distribution of green sea urchins at forage fish spawning sites. *Oral*; 7<sup>th</sup> North American Echinoderm Conference (Pensacola, USA)
- Crook K, Maxner E, Downs K, Davoren GK (2014)** Temperature-based spawning site selection by Newfoundland capelin (*Mallotus villosus*). *Poster*; Canadian Council for Fisheries Research (Yellowknife, Canada) (ND).
- Davoren GK, Halden NM (2014)** Population structure of Newfoundland capelin inferred from otolith chemistry. *Oral*; Canadian Council for Fisheries Research (Yellowknife, Canada) (ND).
- Maxner E, Davoren GK (2014)** Intrinsic factors that affect the timing of arrival of capelin (*Mallotus villosus*) to spawning grounds. *Oral*; Canadian Council for Fisheries Research (Yellowknife, Canada) (ND).
- Crook K, Davoren GK (2014)** Influence of fish density and predator behaviour on antipredator responses of capelin (*Mallotus villosus*). *Oral*; Canadian Council for Fisheries Research (Yellowknife, Canada) (ND).
- Downs K, Davoren GK (2014)** Functional relationships between multiple predators and capelin densities in coastal Newfoundland. *Oral*; Canadian Council for Fisheries Research (Yellowknife, Canada) (ND).
- Mai M, Davoren GK (2013)** A whale tail: foraging site fidelity and fluke temporal variability of humpback whales (*Megaptera novaeangliae*). *Poster*; Undergraduate Poster Competition, Univ. of Manitoba (ND).
- Bairos-Novak K, Davoren GK (2013)** How do seabirds find fish in the ocean? An experimental study using seabird decoys. *Poster*; Undergraduate Poster Competition, Univ. of Manitoba (ND, IPY).
- Downs K, Davoren GK (2013)** Functional relationships between predator and fish densities of multiple marine birds and whales in coastal Newfoundland. *Oral*; Society of Canadian Ornithologists Meeting (Winnipeg, Canada) (ND).
- Woloschiniwsky C, Davoren GK (2013)** Do capelin (*Mallotus villosus*) in Newfoundland exhibit natal philopatry? *Poster*; Prairie University Biological Symposium (Winnipeg, Canada) (ND).
- Crook K, Davoren GK (2013)** Underwater foraging behaviour and search strategies of common murre (*Uria aalge*) and the influences of capelin (*Mallotus villosus*) density and antipredator behaviour. *Oral*; Prairie University Biological Symposium (Winnipeg, Canada) (ND, IPY).
- Wild K, Davoren GK (2013)** The functional relationship between predator and fish density of multiple marine species in coastal Newfoundland. *Oral*; Prairie University Biological Symposium (Winnipeg, Canada) (ND, IPY).
- Maxner E, Davoren GK (2013)** Intrinsic factors that effect the timing of arrival of capelin (*Mallotus villosus*) to the spawning grounds. *Oral*; Prairie University Biological Symposium (Winnipeg, Canada) (ND).
- Olynyk A, Hann B, Davoren GK (2012)** Seasonality of diet selectivity of an invasive population of rainbow smelt (*Osmerus mordax*) in Lake Winnipeg, Manitoba, Canada. *Oral*; 32<sup>nd</sup> North American Lake Management Society Meeting (Madison, USA) (other).
- Sheppard K, Hann B, Davoren GK (2012)** Spatial variation in growth and condition of commercially important walleye (*Sander vitreus*) and sauger (*Sander canadensis*) in Lake Winnipeg, Manitoba. *Oral*; 32<sup>nd</sup> North American Lake Management Society Meeting (Madison, USA) (other).
- Wild K, Davoren GK (2012)** A whale of a tale: foraging site fidelity and foraging behaviour of

- humpback whales. *Poster*; Undergraduate Poster Competition, Univ. of Manitoba (ND, IPY).
- Crook K, **Davoren GK** (2012) Attraction of the green urchin and Atlantic rock crab to chemical cues emitted by spawning capelin. *Poster*; Undergraduate Poster Competition, Univ. of Manitoba (ND, IPY).
- Sheppard K, Hann B, **Davoren GK** (2012) Food web related spatial variation in growth of commercially important walleye (*Sander vitreus*) and sauger (*Sander canadensis*) in Lake Winnipeg, Manitoba: The impact of an invasive species, rainbow smelt (*Osmerus Mordax*). *Poster*; 97<sup>th</sup> Annual Ecological Society of America Meeting (Portland, USA) (other).
- Olynyk A, Hann B, **Davoren GK** (2012) Seasonality of diet selectivity of an invasive population of rainbow smelt (*Osmerus mordax*) in Lake Winnipeg, Manitoba, Canada. *Poster*; 97<sup>th</sup> Annual Ecological Society of America Meeting (Portland, USA) (other).
- Davoren GK**, Penton P, Allen J, Burke C, Montevecchi WA (2011) The influence of forage fish ecology in delimiting marine biological hotspots in eastern Canada. *Invited Oral*; 141<sup>st</sup> Annual American Fisheries Society Meeting (Seattle, USA) (NS, ND).
- Davoren GK**, Penton P, Allen J, Burke C, Montevecchi WA (2011) Influence of the biology and behaviour of forage fish on top predators in northeastern Newfoundland. *Invited Poster*; 2<sup>nd</sup> Open Science Meeting - Ecosystem Studies of Subarctic Seas (Seattle, USA) (IPY, ND).
- Hedd A, Montevecchi WA, McFarlane Tranquilla L, Burke C, Regular PM, Garthe S, Fifield D, Wilson E, **Davoren GK**, Gaston AJ, Smith P, Robertson G, Phillips R (2011) Tracking seabirds in the Northwest Atlantic Ocean: identifying key habitats, assessing risks and implementing conservation strategies. *Oral*; 2<sup>nd</sup> International Marine Conservation Congress (Victoria, Canada) (IPY, ND).
- Montevecchi WA, **Davoren GK**, Hedd A, McFarlane Tranquilla L, Gaston AJ, Burke C, Regular PM, Gilchrist G, Robertson G, Smith P, Fifield D, Phillips R (2011) Seabirds respond to arctic ecosystem change and identify risk. *Oral*; 2<sup>nd</sup> Open Science Meeting - Ecosystem Studies of Subarctic Seas (Seattle, USA) (IPY, ND).
- Montevecchi WA, Burke CM, Buren A, Regular PM, Hedd A, **Davoren GK** (2010) Capelin and seabird interactions in the Northwest Atlantic Ecosystem. *Oral*; Capelin Stock Assessment Subarea 2J3KL (St. John's, Canada) (IPY, ND).
- Davoren GK**, Penton P, Allen J (2010) The importance of prey biology and behavior in identifying and delimiting marine biological hotspots in eastern Canada. *Oral*; 1<sup>st</sup> World Seabird Conference (Victoria, Canada) (IPY, ND).
- Davoren GK**, Penton P, Allen J, Burke C, Montevecchi WA (2010) The importance of biological hotspots to chick-rearing seabirds in the northeastern Newfoundland. *Poster*; 1<sup>st</sup> World Seabird Conference (Victoria, Canada) (IPY, ND). *Showcased as an important poster.*
- Montevecchi WA, Hedd A, McFarlane-Tranquilla L, Burke C, Regular P, Garthe S, Fifield D, Wilson E, **Davoren GK**, Gaston A, Smith P, Robertson G, Phillips R (2010) Tracking seabirds in the Northwest Atlantic to identify important marine habitats, assess risks and implement conservation strategies. *Invited Oral*; 1<sup>st</sup> World Seabird Conference (Victoria, Canada) (IPY).
- Montevecchi WA, Gaston AJ, **Davoren GK**, Gilchrist GH, Hedd A, Mallory ML, McFarlane-Tranquilla J, Burke C, Allen J, Regular PM, Provencher J, Robertson GJ, Fifield DA, Elliott K, Phillips JF (2010) Seabirds help detect Arctic ecosystem change. *Oral*; International Polar Year, Oslo Science Conference (Oslo, Norway) (IPY).
- Davoren GK**, Montevecchi WA, Burke C, Allen J, Penton P (2010) Influence of temperature on capelin (*Mallotus villosus*) spawning and impacts on top predators in northeastern Newfoundland. *Poster*; International Polar Year, Oslo Science Conference (Oslo, Norway) (IPY, ND).
- Sheppard K, Hann BJ, **Davoren GK** (2010) Contribution of invasive rainbow smelt (*Osmerus mordax*) to the diet of native walleye (*Sander vitreus*) in Lake Winnipeg. *Oral*; International Association for Great Lakes Research (Toronto, Canada) (ND).



- Olynyk AJ, Hann B, **Davoren** GK (2010) Spatial variation in summer diet of invasive rainbow smelt (*Osmerus mordax*) in Lake Winnipeg. *Oral*; International Association for Great Lakes Research (Toronto, Canada) (ND).
- Regular P, Hedd A, Montevecchi WA, **Davoren** GK, Buren A, Burke C, Fifield D (2010) Chasing capelin in stratified water: foraging strategies of common murre indicate vertical distribution and behaviour of diel prey. *Oral*; International Polar Year Canada – Early Results Workshop (Ottawa, Canada) (IPY).
- Allen J, **Davoren** GK (2010) Costs and benefits of foraging within biological hotspots: seabird-capelin interactions on the northeast Newfoundland coast. *Oral*; International Polar Year Canada – Early Results Workshop (Ottawa, Canada) (IPY).
- Montevecchi WA, Gaston AJ, **Davoren** GK, Gilchrist GH, Hedd A, Mallory ML, McFarlane-Tranquilla J, Burke C, Allen J, Regular PM, Provencher J, Robertson GJ, Fifield DA, Elliott K, Phillips JF (2010) Seabirds help detect Arctic ecosystem change: early results and ongoing analyses. *Oral*; International Polar Year Canada – Early Results Workshop (Ottawa, Canada) (IPY).
- Davoren** GK, Penton P, Allen J, Burke C, Montevecchi WA (2010) Influence of temperature on capelin (*Mallotus villosus*) spawning and impacts on top predators in northeastern Newfoundland. *Oral*; International Polar Year Canada – Early Results Workshop (Ottawa, Canada) (ND, IPY).
- Davoren** GK (2010) Diel vertical movement and foraging patterns of capelin (*Mallotus villosus*) off the northeast Newfoundland coast. *Invited Oral*; Canadian Council for Fisheries Research (Winnipeg, Canada) (NS).
- Davoren** GK, Penton P (2010) Spawning habitat selection and stock structure of capelin (*Mallotus villosus*) off the northeast Newfoundland coast. *Poster*; Canadian Council for Fisheries Research (Winnipeg, Canada) (ND).
- Sheppard K, Hann BJ, **Davoren** GK (2010) Contribution of invasive rainbow smelt (*Osmerus mordax*) to the diet of native walleye (*Sander vitreus*) in Lake Winnipeg. *Poster*; Canadian Council for Fisheries Research (Winnipeg, Canada) (ND).
- Penton P and **Davoren** GK (2010) Common garden experiment shows differences in early life history traits in beach and demersal spawning populations of capelin. *Oral*; Canadian Council for Fisheries Research (Winnipeg, Canada) (ND).
- Allen J, **Davoren** GK (2010) Functional response and group dynamics of top predators foraging on capelin. *Oral*; Canadian Council for Fisheries Research (Winnipeg, Canada) (IPY).
- Olynyk AJ, Hann B, **Davoren** GK (2010) Spatial variation in summer diet of invasive rainbow smelt (*Osmerus mordax*) in Lake Winnipeg. *Oral*; Canadian Council for Fisheries Research (Winnipeg, Canada) (ND).
- Regular PM, **Davoren** GK, Hedd A, Montevecchi WA, Burke CM (2009) A diving seabird's fine-scale vertical pursuit of diel prey. *Oral*; Waterbirds 33<sup>rd</sup> Annual Meeting (New Jersey, USA) (IPY).
- Olynyk A, **Davoren** GK, Hann B (2009) Rainbow smelt in Lake Winnipeg: summer diet electivity. *Oral*; Lake Winnipeg Research Consortium Science Workshop (Winnipeg, Canada) (ND).
- Elliott KH, **Davoren** GK, Gaston AJ, Speakman J (2009) Activity-specific metabolic rates for murre: short wings mean high costs. *Oral*; Pacific Seabird Group Conference (Hakodate, Hokkaido, Japan) (ND).
- Montevecchi WA, Gaston AJ, **Davoren** GK, Allen J, Burke C, Elliott KH, Fifield DA, Garthe S, Gilchrist GH, Hedd A, Hobson K, Mallory ML, McFarlane-Tranquilla L, Phillips R, Provencher J, Rail JF, Regular PM, Robertson GJ, Smith P (2008) Seabirds help detect Arctic ecosystem change: a Canadian IPY initiative (Part II). *Poster*; Arctic Change Conference (Quebec City, Canada) (IPY).
- Elliott KH, **Davoren** GK, Gaston AJ (2008) Specialization by a generalist: what do individual changes in diet tell us about changing arctic ecosystems? *Poster*; Arctic Change Conference (Quebec City, Canada) (ND).

- Divoky GJ, Harter BB, **Davoren** GK (2008) Annual and seasonal variation in nearshore fish availability associated with the record arctic pack ice minimum of 2007. *Poster*; Arctic Change Conference (Quebec City, Canada) (ND).
- Harter BB, Walker DJ, Divoky GJ, **Davoren** GK (2008) Smarter than satellites: small ice floes as key seabird foraging habitat. *Poster*; Arctic Change Conference (Quebec City, Canada) (ND).
- Penton P, **Davoren** GK (2008) Capelin spawning biology off the coast of Newfoundland: a comparison between two reproductive tactics. *Oral*; Canadian Council for Fisheries Research (Montreal, Canada) (NS).
- Hedd A, Montevecchi WA, **Davoren** GK, Fifield DA (2007) Diets and distributions of leach's storm-petrels before and after an ecosystem shift in the Northwest Atlantic. *Oral*; Canadian Council for Fisheries Research (Montreal, Canada) (PhD).
- Montevecchi WA, Gaston AJ, **Davoren** GK, Burke C, Fifield DA, Garthe S, Gilchrist GH, Hedd A, Hobson K, Mallory ML, Rail JF, Regular PM, Robertson GJ (2007) Seabirds help detect arctic ecosystem change: a Canadian IPY initiative (Part I). *Poster*; International Polar Year Symposium (Gatineau, Canada) (IPY).
- Harter BB, Walker DJ, Divoky GJ, **Davoren** GK (2007) A new method for detecting critical habitat for Arctic top predators. *Poster*; 37<sup>th</sup> International Arctic Workshop (Skaftafell, Iceland) (ND).
- Elliott KH, Gaston AJ, **Davoren** GK (2007) The relationship between seabird behaviour and prey type. *Oral*; 37<sup>th</sup> International Arctic Workshop (Skaftafell, Iceland) (ND).
- Elliott KH, **Davoren** GK (2007) Time allocation and surface pauses in an arctic seabird. *Poster*; 37<sup>th</sup> International Arctic Workshop (Skaftafell, Iceland) (ND).
- Penton P, **Davoren** GK, Montevecchi WA, Andrews DW (2007) Patterns of larval emergence of capelin and environmental cues at beach and demersal spawning sites off Newfoundland. *Oral*; 31<sup>st</sup> Annual Larval Fish Conference (St. John's, Canada) (NS).
- Elliott KH, **Davoren** GK (2007) Surface pause intervals in an arctic seabird reflect energy gain and expenditure. *Poster*; 3<sup>rd</sup> Annual Arctic Net Scientific Meeting (Victoria, Canada) (ND).
- Elliott KH, Gaston AJ, **Davoren** GK (2007) Seabird foraging behaviour indicates prey type. *Oral*; Pacific Seabird Group Conference (Asilomar, USA) (ND).
- Elliott KH, **Davoren** GK (2007) Energy gain and expenditure influence surface pause intervals in an arctic seabird. *Poster*; Pacific Seabird Group Conference (Asilomar, USA) (ND).
- Hedd A, Montevecchi WA, **Davoren** GK, Fifield DA (2007) Diets and distributions of leach's storm-petrels before and after an ecosystem shift in the Northwest Atlantic. *Oral*; Pacific Seabird Group Conference (Asilomar, USA) (PhD).
- Harter BB, Divoky GJ, **Davoren** GK (2007) Post-linear growth phase chicks as indicators of seasonal changes in provisioning in Black Guillemots. *Oral*; Pacific Seabird Group Conference (Asilomar, USA) (ND).
- Harter BB, Divoky GJ, **Davoren** GK (2007) Internal metabolism and external daylight regimes effect chick mass of the Black Guillemot (*Cephus grylle*). *Poster*; Pacific Seabird Group Conference (Asilomar, USA) (ND).
- Montevecchi WA, Burke C, **Davoren** GK, Koen-Alonso (2007) Notes on condition of two auk species, Atlantic Puffin and Common Murre, at Funk Island, Newfoundland. *Oral*; Fisheries Oceanography Committee Annual Meeting (Dartmouth, Canada) (NS).
- Elliott KH, Gaston AJ, **Davoren** GK (2006) Central place foraging in thick-billed murre: bathymetry or Ashmole's Halo? *Oral*; North American Ornithological Conf (Veracruz, Mexico) (ND).
- Buren AD, Koen-Alonso M, Montevecchi WA, Anderson JT, deYoung B, **Davoren** GK (2006) Modeling trophic interactions between parental common murre and capelin off the northeast Newfoundland coast. *Oral*; ICES Annual Science Conference (Maastricht, the Netherlands) (NS).

- Davoren** GK, May C, Penton P, Record N, deYoung B, Burke CB, Montevecchi WA, Andrews D, Buren A, Rose-Taylor C, Bell T, Koen-Alonso M, Anderson JT, Garthe S (2006) Importance of capelin biology in sustaining trophic interactions in the Northwest Atlantic (Part II). *Poster*; Northwest Atlantic Fisheries Organization Symposium (Dartmouth, Canada) (NS).
- Penton P, **Davoren** GK (2006) Capelin spawning biology on the northeast coast of Newfoundland: a comparison between two reproductive tactics. *Oral*; Northwest Atlantic Fisheries Organization Symposium (Dartmouth, Canada) (NS).
- Buren AD, Koen-Alonso M, Montevecchi WA, Anderson JT, deYoung B, **Davoren** GK (2006) Modeling trophic interactions between parental common murre and capelin off the northeast Newfoundland coast. *Oral*; Fisheries and Marine Ecosystems Conference (Vancouver, Canada) (NS).
- Elliott KH, **Davoren** GK (2006) What a drag! A biomechanical approach to thick-billed murre underwater locomotion. *Oral*; Pacific Seabird Group Conference (Anchorage, USA) (ND).
- Harter BB, **Davoren** GK, Divoky GJ (2006) Hungry chick frozen dinners: chick mass sensitivity to daily variation in sea ice proximity and prey type in the black guillemot. *Oral*; Pacific Seabird Group Conference (Anchorage, USA) (ND).
- Davoren** GK, Montevecchi WA, Garthe S (2006) Do seabird foraging patterns indicate diel vertical migratory behaviour of forage fish? *Oral*; Pacific Seabird Group Conference (Anchorage, USA) (PDF).
- Burke C, Montevecchi WA, **Davoren** GK (2006) Linking the diets of two avian predators to capelin availability. *Oral*; Pacific Seabird Group Conference (Anchorage, USA) (NS).
- Garthe S, Montevecchi WA, **Davoren** GK (2005) Foraging habitat selection by Northern Gannets preying on cold-water fish in the Low Arctic. *Oral*; 2<sup>nd</sup> International Bio-logging Science Symposium (St. Andrew's, Scotland) (PDF).
- Gaston AJ, Woo K, **Davoren** GK (2005) Foraging behaviour of thick-billed murre (*Uria lomvia*) in relation to prey type. *Oral*; Pacific Seabird Group Conference Conference (Portland, USA) (ND).
- May C, **Davoren** GK, Burke C, Record N, Anderson JT (2005) Vertical distribution patterns of capelin (*Mallotus villosus*) in the Northwest Atlantic. *Oral*; Canadian Council for Fisheries Research (Windsor, Canada) (NS).
- Montevecchi WA, Burke CB, **Davoren** GK, Garthe S, Benvenuti S (2005) Foraging tactics of a large opportunistic seabird during years of different availability of inshore capelin. *Oral*; Canadian Council for Fisheries Research (Windsor, Canada) (NS).
- Penton P, **Davoren** GK, Andrews D, Montevecchi WA (2005) A comparison of beach and demersal spawning in capelin on the northeast coast of Newfoundland. *Oral*; Canadian Council for Fisheries Research (Windsor, Canada) (NS).
- Burke CB, Montevecchi WA, May C, **Davoren** GK (2005) Assessing forage fish availability from the diets of puffin chicks at in- and off-shore colonies in northeastern Newfoundland. *Oral*; Canadian Council for Fisheries Research (Windsor, Canada) (NS).
- Davoren** GK, May C, Penton P, Record N, deYoung B, Burke CB, Montevecchi WA, Andrews D, Buren A, Rose-Taylor C, Bell T, Koen-Alonso M, Anderson JT (2005) Importance of capelin (*Mallotus villosus*) biology in sustaining trophic interactions in the Northwest Atlantic (Part I). *Poster*; Canadian Council for Fisheries Research (Windsor, Canada) (NS).
- Montevecchi WA, Burke CM, **Davoren** GK, Wiese FK (2004) Type 2 errors on the Grand Banks: failure of environmental monitoring of marine birds and mammals at offshore oil platforms. *Oral*; Coastal Zone Management Conference (St. John's, Canada) (other).
- Davoren** GK, Montevecchi WA, Anderson JT (2004) The influence of prey density and behaviour on the foraging patterns of seabirds on the Northeast Coast of Newfoundland Canada. *Oral*; Pacific Seabird Group Conference (La Paz, Mexico) (PDF).

- Montevecchi WA, **Davoren** GK, Veit R (2004) Shifting regimes in the Northwest Atlantic – multi-species signals from seabirds. *Oral*; Canadian Council for Fisheries Research (St John's, Canada) (PDF).
- Davoren** GK, Montevecchi WA, Anderson JT (2003) Interactions of commercial fishing activities marine birds mammals and fish at vertebrate hotspots in Newfoundland. *Oral*; Society of Canadian Ornithologists Conference (Saskatoon, Canada) (PDF).
- Burke CM, **Davoren** GK, Montevecchi WA, Wiese FK (2003) Mismanagement of environmental monitoring of seabirds and marine mammals at offshore oil platforms on the Grand Banks. *Oral*; Ocean Management Research Network National Conference (Ottawa, Canada) (other).
- Burke CM, **Davoren** GK, Montevecchi WA, Wiese FK (2003) Marine bird and mammal surveys from offshore support vessels and ships of opportunity on the Grand Banks. *Poster*; Environment Effects Monitoring Conference (Halifax, Canada) (other).
- Montevecchi WA, Burke C, **Davoren** GK, Wiese FK (2003) Seasonal and spatial patterns of marine birds and mammals from offshore support vessels on the Grand Banks. *Oral*; Environment Effects Monitoring Conference (Halifax, Canada) (other).
- Davoren** GK, Burke CM, Stenhouse IJ, Montevecchi WA (2002) Capelin ecology – interactions among forage fish, predators, fishers and managers. *Oral*; Ocean Management Research Network National Conference (Ottawa, Canada) (PDF).
- Burke CM, Stenhouse IJ, **Davoren** GK, Montevecchi WA (2002) What can the past tell us about the present: Part I. Historical reconstruction of coastal settlements and interactions with marine resources, 1500-2000. *Poster*; Ocean Management Research Network National Conference (Ottawa, Canada) (other).
- Stenhouse IJ, Burke C, **Davoren** GK, Montevecchi WA (2002) What the past can tell us about the present: Part II. Historical reconstruction of seabird populations, 1500-2000. *Poster*; Ocean Management Research Network National Conference (Ottawa, Canada) (other).
- Davoren** GK, Montevecchi WA, Anderson JT (2002) Hot spots of predators and prey on multiple spatial and temporal scales in the marine ecosystem of the Northwest Atlantic. *Oral*; International Council for the Exploration of the Sea, Annual Science Conference (Copenhagen, Denmark) (PhD).
- Davoren** GK, Montevecchi WA, Anderson, JT (2001) Patch selection decisions of common murre: capelin behaviour influences on the foraging behaviour of murre. *Oral*; Waterbird Society Conference (Niagara Falls, Canada) (PhD).
- Montevecchi WA, Benvenuti S, **Davoren** GK, Garthe S (2001) When opportunity knocks, gannets make opportunistic decisions. *Oral Plenary*; Waterbird Society Conference (Niagara Falls, Canada) (PhD).
- Davoren** GK, Montevecchi WA, Anderson JT (2001) Predator-prey interactions in the Northwest Atlantic: capelin behaviour influences on the foraging behaviour of common murre. *Oral*; International Council for the Exploration of the Sea, Capelin Symposium (Reykjavik, Iceland) (PhD).
- Carscadden JE, Montevecchi WA, **Davoren** GK (2001) Interactions between capelin (*Mallotus villosus*) and seabirds in a changing ecosystem. *Oral*; Symposium on Fish and Bird Interactions: Implication for Management (Hull, United Kingdom) (PhD).
- Montevecchi WA, **Davoren** GK, Carscadden JE (2001) Regime shift in the Northwest Atlantic - information from marine birds. *Oral*; Symposium on Fish and Bird Interactions: Implication for Management (Hull, United Kingdom) (PhD).
- Davoren** GK, Montevecchi WA, Anderson JT (2001) Capelin under stress in the Northwest Atlantic? Information from seabirds. *Oral*; Symposium on Fish and Bird Interactions: Implication for Management (Hull, United Kingdom) (PhD).
- Montevecchi WA, **Davoren** GK (2000) Prey selectivity, capelin and inter-annual variation in the diets of common murre chicks in the Northwest Atlantic. *Oral*; International Council for the Exploration of the Sea, Annual Science Conference (Brugge, Belgium) (PhD).

- Wiese FK, Montevecchi WA, **Davoren G**, Huettmann F, Diamond AW, Linke J (2000) The necessity to monitor the impacts of offshore oil platforms on seabirds. *Oral*; Annual Aquatic Toxicology Workshop (St. John's, Canada) (other).
- Davoren GK** (2000) Food-finding mechanisms of breeding common murre. *Oral*; Joint Conference: American, British and Canadian Ornithologists' Unions (St. John's, Canada) (PhD).
- Davoren GK**, Montevecchi WA (2000) Common murre harvests of capelin in Newfoundland: interannual variation in capelin characteristics and ocean climate change. *Oral*; Joint Conference: American, British and Canadian Ornithologists' Unions (St. John's, Canada) (PhD).
- Davoren GK**, Montevecchi WA (2000) A comparison of common murre time budgets and food habits at inshore and offshore colonies in Newfoundland, Canada. *Oral*; International Seabird Group Conference (Wilhelmshaven, Germany) (PhD).
- Montevecchi WA, **Davoren GK** (2000) Diets of common murre chicks in Newfoundland: inter-annual variation in capelin characteristics and parental selectivity. *Oral*; International Seabird Group Conference (Wilhelmshaven, Germany) (PhD).
- Davoren GK** (1999) Inclusion of oceanographic variables and spatial and temporal scales in research designs. *Oral*; Canadian Association of Petroleum Producers Workshop (St. John's, Canada) (other).
- Burger AE, **Davoren G** (1998) Seabirds, prey and ocean features off southwestern Vancouver Island, Canada. *Poster*; International Ornithological Conference (Cape Town, South Africa) (other).
- Bertram DF, **Davoren GK**, Brown J, Golumbia T, Harfenist A (1998) Consistent patterns of interyear and intercolony variation in rhinoceros auklet nestling development and diet across oceanographic domains. *Oral*; Pacific Seabird Group Conference (Monterey, USA) (MSc).
- Davoren G** (1997) A diving marine bird as an indicator of ocean conditions in the near-shore environment. *Poster*; Society of Conservation Biology Conference (Victoria, Canada) (MSc).
- Davoren G** (1997) Variable time budgets of rhinoceros auklets at sea off southwestern Vancouver Island. *Oral*; Pacific Seabird Group Conference (Portland, USA) (MSc).

### RESEARCH GRANTS

**Summary** (Since 2003 - Academic Appointment at the University of Manitoba):

Status	Operating	Infrastructure	Ship & Twin Otter Time	Total
<i>Awarded</i>	<b>\$699,372</b>	<b>\$280,536</b>	<b>\$960,666</b>	<b>\$1,632,251</b>

**NOTE:** % INDICATE FUNDS TO DAVOREN IN COLLABORATIVE GRANTS

<u>Period</u>	<u>Amount</u>	<u>%</u>	<u>Title</u>	<u>Investigators</u>	<u>Role</u>	<u>Granting Agency/Program</u>
2015	\$8,700	100	Forage fish recruitment and individual-level foraging behaviour of marine predators under changing prey regimes	Davoren GK	PI	U of M Field Work Support Program
2014	\$94,775	90	The ecology of focal forage fish and its impact on marine predators	Davoren GK Montevecchi WA	PI	NSERC Discovery Ship time
2014-19	\$225,000	100	The ecology of focal forage fish and its	Davoren GK	PI	NSERC Discovery

			influence on marine predators			
2014	\$7,500	100	Individual-level foraging behaviour of marine predators under changing prey regimes	Davoren GK	PI	U of M Field Work Support Program
2014	\$75,823	90	The ecology of focal forage fish and its influence on marine predators	Davoren GK Montevecchi WA	PI	NSERC Discovery Ship time
2013	\$8,600	100	Predator-prey interactions of marine top predators and forage fish in coastal Newfoundland	Davoren GK	PI	U of M Field Work Support Program
2013	\$75,823	90	The ecology of focal forage fish and its impact on marine predators	Davoren GK Montevecchi WA	PI	NSERC Discovery Ship time
2012	\$5,440	100	Predator-prey interactions of marine top predators and forage fish in coastal Newfoundland	Davoren GK	PI	U of M Field Work Support Program
2012	\$7,500	100	Thermal habitat reconstruction of marine fish using otolith-based microchemistry	Davoren GK	PI	U of M Research Grants Established Faculty
2011	\$64,447	91	The ecology of focal forage fish and its impact on marine predators	Davoren GK Montevecchi WA	PI	NSERC Discovery Ship time
2010	\$90,984	91	The ecology of focal forage fish and its impact on marine predators	Davoren GK Montevecchi WA	PI	NSERC Discovery Ship time
2010-11	\$82,050	50	Trophic interactions and energy flow in the Lake Winnipeg Ecosystem	Hann BJ Davoren GK	Co-PI	Manitoba Hydro
2009	\$78,430	91	The ecology of focal forage fish and its impact on marine predators	Davoren GK Montevecchi WA	PI	NSERC Discovery Ship time
2009	\$7,260	100	How seabirds can help detect ecosystem change in the Arctic	Davoren GK	PI	U of M Research Grants Established Faculty
2008	\$60,605	88	The ecology of focal forage fish and its impact on marine predators	Davoren GK Montevecchi WA	PI	NSERC Discovery Ship time
2009	\$84,509	17	An early warning system for detecting Arctic marine ecosystem change using seabirds	Montevecchi WA Davoren GK Gaston AJ	Co-PI	Canadian International Polar Year Logistics Fund

2009	\$22,500	100	An early warning system using seabirds to detect ecosystem change in the high and low Arctic	Davoren GK	PI	Polar Continental Shelf Project Inkind Aerial Support
2008-12	\$30,000	100	Remote sensing of marine biological hotspots in the Canadian Arctic	Davoren GK	PI	Canadian Foundation for Innovation Infrastructure Operating
2007-13	\$152,250	100	The ecology of focal forage fish species and its impact on marine predators (2007-11 + 2 yr maternity leave extension)	Davoren GK	PI	NSERC Discovery
2007-10 2007	\$405,491	18	An early warning system for detecting Arctic marine ecosystem change using seabirds (+\$43,200 = 12 d of ship time (2007); \$129,600 = 36 d of ship time (2008/2009))	Montevecchi WA	Co-PI	International Polar Year
2008	\$469,511	37		Davoren GK		
2009	\$68,958	27		Gaston AJ		
2010	\$33,888	18				
2006	\$19,600	100	Impacts of climate change on vertebrate predators mediated through Arctic cod in the Canadian Arctic	Davoren GK	PI	Polar Continental Shelf Project Inkind Aerial Support
2005	\$6,000	50	Monitoring climate-driven variation in northern Alaskan waters with arctic and subarctic seabirds	Divoky G Davoren GK	Co-PI	World Wildlife Fund
2005	\$250,000	100	Remote sensing of marine biological hotspots in the Canadian Arctic	Davoren GK	PI	Canadian Foundation for Innovation New Opportunities
2005	\$14,000	100	Impacts of climate change on vertebrate predators mediated through Arctic cod in the Canadian Arctic	Davoren GK	PI	Polar Continental Shelf Project Inkind Aerial Support
2004-06 2004	\$220,433	48	Importance of capelin biology in sustaining trophic interactions in the Northwest Atlantic (+ \$68,400/yr for 3 yr= 19 d of ship time)	Montevecchi WA	Co-PI	NSERC Strategic Projects
2005	\$248,103	48		Davoren GK		
2006	\$216,723	42		Anderson JT deYoung B		
2004-06	\$60,000	100	Impacts of climate change on vertebrate	Davoren GK	PI	NSERC Discovery

			predators mediated through key forage fish species in the Canadian Arctic			
2004	\$7,500	100	Using seabird foraging ecology to indicate the changing biology and behaviour of forage fish species in the Canadian Arctic	Davoren GK	PI	U of M Research Grants New Faculty
2004	\$14,000	100	Impacts of climate change on vertebrate predators mediated through Arctic cod in the Canadian Arctic	Davoren GK	PI	Polar Continental Shelf Project Inkind Aerial Support
2004	\$30,536	100	Continuous monitoring of physical oceanographic parameters where key forage fish species aggregate in Canada's Arctic	Davoren GK	PI	NSERC Research Tools and Instruments
2003	\$7,500	100	Impacts of climate change on vertebrate predators mediated through Arctic cod in the Canadian Arctic	Davoren GK	PI	U of M Research Grants New Faculty
2003-04	\$55,000	100	Climate change impacts on Arctic marine predators	Davoren GK	PI	U of M Start Up Funds
<b>Memorial University of Newfoundland</b>						
2002-03	\$3,000	50	Educational Outreach Program - Witless Bay Important Bird Area	Davoren GK Walsh C	Co-PI	Important Bird Areas Community Action Fund
2001-02	\$3,500	50	Educational Outreach Program - Witless Bay and Quidi Vidi Lake Important Bird Areas	Davoren GK Walsh C	Co-PI	Important Bird Areas Community Action Fund
2000	\$7,000	100	Trophic interactions of marine predators and prey on the Newfoundland shelf	Davoren GK	PI	Mountain Equipment Co-operative Research Grant
<b>University of Victoria</b>						
1997	\$1,000	100	Parental investment in rhinoceros auklets at the colony and at sea	Davoren GK	PI	James Baillie Research Award
1996	\$1,000	100	Parental investment in rhinoceros auklets at the	Davoren GK	PI	John K. Cooper Research Grant



colony and at sea

<u>(A) ADDITIONAL INFRASTRUCTURE FUNDS</u>					
<u>Period</u>	<u>Amount</u>	<u>Title</u>	<u>Investigators</u>	<u>Role</u>	<u>Granting Agency/Program</u>
2009	\$158,300	The Ocean Sciences Centre: A Cold-Ocean Research Facility	Fleming IA Davoren GK & 4 others	Co-applicant	NSERC Major Resources Support Grant
2009	\$16,313,926 (CFI request \$6,525,570)	Infrastructure for cold-water and deep-sea research	Fleming IA (Project Manager)	Collaborator	Canadian Foundation for Innovation
2005	\$124,019	Genetic Analysis	Piercy-Normore MD Davoren GK & 6 others	Co-applicant	NSERC Research Tools and Instruments
<b>TOTAL</b>	<b><u>\$6,807,889</u></b>				

<u>(B) ADDITIONAL INKIND SUPPORT</u>						
<u>Period</u>	<u>Amount</u>	<u>%</u>	<u>Title</u>	<u>Investigators</u>	<u>Role</u>	<u>Granting Agency/Program</u>
2010	\$41,250 (25 receivers loan)	100	Spawning habitat selection of forage fish (capelin)	Davoren GK	PI	VEMCO (Amirix)
2009	\$27,700 (20 receivers loan)	100	Spawning habitat selection of forage fish (capelin)	Davoren GK	PI	VEMCO (Amirix)
<b>TOTAL</b>	<b><u>\$68,950</u></b>					

### TRAINING OF HIGHLY QUALIFIED PERSONNEL

#### Graduate Students (University of Manitoba)

Loeppky A (2014-present) Influence of temperature and salinity on otolith chemistry of larval capelin. MSc, Biological Sciences.

McNicholl D (2014-present) Capelin ecology in the Beaufort Sea and diet overlap with Arctic cod. MSc, Biological Sciences. UofM Faculty of Science Scholarship (co-supervise with Dr J Reist).

Crook K (2013-present) Impact of fish and invertebrate predation on capelin eggs at Newfoundland deep water spawning sites. MSc, Biological Sciences. University of Manitoba Graduate Fellowship.

Carvalho P (2013-present) Characterizing and defining multispecies biological hotspots based on demersal spawning sites of capelin for conservation purposes. PhD, Biological Sciences. Science Without Borders Scholarship.

Maxner E (2012-2014) Intrinsic and extrinsic factors influencing the timing of arrival of capelin (*Mallotus villosus*) to the spawning grounds. MSc, Biological Sciences. UofM Faculty of Science Scholarship.

Sheppard K (2010-2013) Trophic linkages among invasive rainbow smelt and commercially important piscivorous fish. MSc, Biological Sciences (co-supervise with Dr B Hann). UofM Faculty of Science Scholarship.

Olynyk A (2010-2013) Trophic linkages among zooplankton and the invasive rainbow smelt along with intraguild competition among planktivores. MSc, Biological Sciences (co-supervise with Dr B Hann). UofM Faculty of Science Scholarship.

- Allen J (2008-2011) Biological hotspots and their implications for individual and multi-species foraging interactions. PhD, Biological Sciences. University of Manitoba Graduate Fellowship. *DID NOT COMPLETE*
- Penton P (2006-2013) Adaptive significance of two spawning strategies in capelin. PhD, Biological Sciences. University of Manitoba Graduate Fellowship and NSERC Alexander Graham Bell CGS.
- Elliott K (2005-2007) Foraging behaviour of Thick-billed Murres in northern Hudson Bay. MSc, Zoology. NSERC PGS.
- Harter B (2005-2007) Black Guillemots as indicators of change in Arctic marine ecosystem. MSc, Zoology. University of Manitoba Graduate Fellowship.
- May C (2004-2006) Diel vertical movement and foraging patterns of capelin (*Mallotus villosus*) in the Northwest Atlantic. MSc, Zoology. *DID NOT COMPLETE*
- Penton P (2004-2006) Demersal spawning in capelin on the northeast coast of Newfoundland. MSc, Zoology.

#### Undergraduate Honours Students (University of Manitoba)

- Grenier G (2014-present) Growth rates of Arctic char in Cumberland Sound. BSc Honours (co-supervisor with Dr R Tallman, Biological Sciences).
- Bone B (2014-present) Egg cannibalism of capelin during spawning at beach and deep-water sites in coastal Newfoundland. BSc Honours (supervisor, Biological Sciences). Faculty of Science Undergraduate Student Research Award.
- Collerone S (2014) Habitat and distribution of larvae from three Manitoba lamprey species. BSc Honours (co-supervisor with Dr M Docker, Biological Sciences).
- Woloschiniwsky C (2014) Investigating natal philopatry in Newfoundland capelin (*Mallotus villosus*) using otolith elemental chemistry. BSc Honours (supervisor, Biological Sciences). Faculty of Science Undergraduate Student Research Award.
- Crook K (2013) Underwater foraging behaviour of common murres (*Uria aalge*) and antipredator behaviour of capelin (*Mallotus villosus*). BSc Honours (supervisor, Biological Sciences). Faculty of Science Undergraduate Student Research Award.
- Wild K (2013) The functional relationship between predator density and prey density of multiple marine species in coastal Newfoundland. BSc Honours (supervisor, Biological Sciences). NSERC Undergraduate Student Research Award.
- Sheppard K (2010) Trophic study of invasive rainbow smelt (*Osmerus mordax*) and native walleye (*Sander vitreus*) in the north basin of Lake Winnipeg, Manitoba. BSc Honours (co-supervisor with Dr B Hann, Biological Sciences).
- Olynyk A (2009) Prey selection of the invasive rainbow smelt in Lake Winnipeg. BSc Honours (co-supervisor with Dr B Hann, Biological Sciences).
- Arlt M (2007) Historical distribution of boreal caribou in the Prince Albert Greater Ecosystem in relation to landscape change. BSc Honours (co-supervisor with Dr M Manseau, Zoology).
- Reinfort B (2006) Biotic and abiotic factors affecting egg and pre-emergent larval mortality of capelin on a northeast Newfoundland beach. BSc Honours (supervisor, Zoology). Faculty of Science Undergraduate Student Research Award.

**\*\* I also have trained and supervised 15 undergraduate student research assistants and have been a member of the student advisory committees of 24 undergraduate and 20 graduate students both within and external to the Faculty of Science at the University of Manitoba.**

**TEACHING ACTIVITIES**

<b>Year</b>	<b>Semester</b>	<b>Course Number</b>	<b>Course Name</b>	<b>Enrollment (Credit Hours)</b>	<b>Role</b>
2004	Winter	22.722 (Graduate)	Advanced Topics in the Interaction of Physiology and Life History Traits influencing Animal Migration	1 (3)	Solitary
2004-05	Fall	22.375 (Undergrad)	Methods & Perspectives in Zoology	16-19 (3)	Co-taught
2004-05	Fall	22.722 (Graduate)	Advanced Topics in Marine Ecology	2 (3)	Solitary
2005-07, 09, 2011-13, 15	Winter	Biol 2300 (Undergrad)	Principles of Ecology	85-124 (3)	Co-taught, Solitary (2011-15)
2005-12	Summer-Winter	Biol 4110 (Undergrad)	Biological Sciences Honours Thesis Course	6-16 (6)	Co-taught
2006, 2008	Fall	Zool 2290 Botn 2280 (Undergrad)	Introductory Ecology	86-99 (3)	Solitary
2009-12 2012-14	Winter Fall	Biol 4220 (Undergrad)	Marine Biodiversity	8-18 (3)	Solitary

**THESIS, CANDIDACY EXAMINATIONS**

Geisler, M (2015) MSc, Biological Sciences, University of Manitoba (Thesis examiner).  
 Matthews, C (2014) PhD, Biological Sciences, University of Manitoba (PhD candidacy & thesis examiner).  
 Guzzo M (2013) PhD, Biological Sciences, University of Manitoba (PhD candidacy examiner).  
 Delventhal N (2013) PhD, Biological Sciences, University of Manitoba (PhD candidacy examiner).  
 Jameson J (2011) MSc, Biology, University of Winnipeg (Thesis examiner).  
 Asselin N (2010) MSc, Faculty of Environment, University of Manitoba (Thesis examiner).  
 Patterson K (2010) MSc, Biological Sciences, University of Manitoba (Thesis examiner).  
 Higdon J (2010) PhD, Faculty of Environment, University of Manitoba (PhD candidacy & thesis examiner).  
 Abgrall P (2009) PhD, Biology, Memorial University of Newfoundland (Thesis examiner).  
 Sareault J (2009) MSc, Faculty of Environment, University of Manitoba (Thesis examiner).  
 Barthe C (2008) PhD, Biological Sciences, University of Manitoba (PhD candidacy examiner).  
 Chambers C (2008) PhD, Zoology, University of Manitoba (PhD candidacy examiner).  
 Loewen T (2008) MSc, Zoology, University of Manitoba (Thesis examiner).  
 Campobello D (2008) PhD, Zoology, University of Manitoba (Thesis examiner).  
 Pink M (2007) PhD, Zoology, University of Manitoba (PhD candidacy examiner).  
 Loseto L (2007) PhD, Zoology, University of Manitoba (PhD candidacy & thesis examiner).  
 Hedges K (2007) PhD, Zoology, University of Manitoba (PhD candidacy examiner).  
 Robinson A (2007) MSc, Zoology, University of Manitoba (Thesis examiner).  
 Chiu S (2006) MSc, Zoology, University of Manitoba (Thesis examiner).  
 Chambellant M (2006) PhD, Zoology, University of Manitoba (PhD candidacy examiner).  
 VanWalleghem J (2006) MSc, Zoology, University of Manitoba (Thesis examiner).  
 Rock J (2005) MSc, Biology, Dalhousie University (Thesis examiner).  
 McGaha H (2004) PhD, Zoology, University of Manitoba (PhD candidacy examiner).

**INVITED PRESENTATIONS**

<u>Year</u>	<u>Organization</u>	<u>Title</u>
2015	Department of Zoology, Brandon University	Zoology School of Biological Sciences, University of Aberdeen
2015	Department of Entomology, University of Manitoba	The ecology of forage fish and its impact on marine predators in the northwest Atlantic
2010	Department of Biology, University of Saskatchewan	The ecology of forage fish and its impact on marine predators in the northwest Atlantic
2007	Department of Zoology, Brandon University	Declined (maternity leave)
2006	Department of Biology, University of Winnipeg	Predator-prey interactions: marine birds and fish in the Canadian Arctic
2005	Aquatic Biology Research Group, University of Manitoba	Importance of capelin ( <i>Mallotus villosus</i> ) biology in sustaining trophic interactions in the Northwest Atlantic
2003	Freshwater Institute Fisheries and Oceans Canada	Predator-prey interactions of seabirds and fish in the Canadian Arctic
2003	Department of Biology, Memorial University of Newfoundland	Conservation of seabird-fish interactions in the Northwest Atlantic
2003	Department of Biology, College of Staten Island, City University of New York	Predator-prey interactions of marine fish, birds and mammals on multiple scales: behaviour, ecology and conservation
2003	Department of Biology, Dalhousie University	Conservation of predator-prey interactions among marine fish, birds and mammals in the Northwest Atlantic
2003	Department of Zoology, University of Manitoba	Conservation of predator-prey interactions among marine fish, birds and mammals in the Northwest Atlantic
2003	Department of Biology, Mount Allison University	Predator-prey interactions of marine fish, birds and mammals on multiple scales: behaviour, ecology and conservation

**EDUCATIONAL/CONSERVATION OUTREACH AND MEDIA ACTIVITY**

<u>Year</u>	<u>Organization</u>	<u>Description</u>
2012	CBC <i>Wild Canada</i> (Documentary series)	Contacted by independent film maker (Brian Leith Productions / River Road Films) working for the CBC to film seabird-capelin interactions in Newfoundland.
2010	CBC's Fisheries Broadcast (Radio Interview)	Advertised capelin tagging and movement study (year 2).
2010	National Geographic (2 hour documentary: <i>Transparent Oceans</i> )	Contacted by independent film maker (Burning Gold Productions) working for National Geographic to film seabird-capelin interactions in Newfoundland.
2010-2011	Discovery Channel (Documentary series)	Contacted by independent film maker (Wild Horizons) working for Discovery Channel to film seabird-capelin interactions in Newfoundland.
2009	Meltwater Media	Described how seabirds are unlocking the secrets of

(1 hour documentary: <i>Arctic Cliffhangers</i> )	changing Arctic marine ecosystem, and how they provide vital information to guide climate change research. (Directors Steve Smith & Julia Szucs). Winner of “Best Wildlife Film” at the 2010 San Francisco Ocean Film Festival.
2009 CBC’s Fisheries Broadcast (Radio Interview)	Advertised capelin tagging and movement study (year 1).
2005 Peguis First Nations Science and Technology Symposium (high school students)	Delivered three 45 min oral presentations highlighting common conservation problems facing lakes and oceans in Manitoba.
2005 NSERC Strategic Grant (2004-06)	Delivered public presentations in Newfoundland communities where research was conducted. Visited 4 schools (incorporating students from 5 communities) and held public meetings to present results.
2001-2003 Bird Life International / Canadian Nature Federation	Designed, secured funding and organized an educational outreach program to increase communication among university researchers and community members, through a series of public (adult) and classroom presentations (grades 1–12), a poster, a website and field trips (grades 4-6).
1994 BC Ministry of Environment	Guided discussions with students (grade 6) to increase awareness of conservation issues.
1993 Swan Lake / Christmas Hill Nature Sanctuary	Guided nature walks for students (grades 2-4) to increase awareness of habitat conservation.

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## Jillian T. Detwiler

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<http://umanitoba.ca/Biology/people/Jill1/>

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### EDUCATION/EMPLOYMENT

- 2013-current Assistant Professor, Dept of Biological Sciences, University of Manitoba, Winnipeg, MB
- 2010-2013 Postdoctoral fellow, Dept of Biology, Texas A&M University, College Station, TX
- 2010 PhD, Purdue University, Dept of Biological Sciences, West Lafayette, IN
- 2004 MS, School of Biological Sciences University of Nebraska-Lincoln, Lincoln, NE
- 2002 BS, School of Biological Sciences (Honors Program), University of Nebraska-Lincoln, Lincoln, NE
- 2002 BA, School of Fine and Performing Arts (Honors Program), University of Nebraska-Lincoln, Lincoln, NE

### RESEARCH SUPPORT, GRANTS AND FELLOWSHIPS

- 2015 Fieldwork Support Grant, University of Manitoba (\$2506.00)
- 2014-2018 NSERC Discovery Grant (\$120,000)
- 2013-2016 Research Startup Funds, University of Manitoba (\$120,000)
- 2013-2015 University Research Grants Program, University of Manitoba (\$7500)
- 2012-2013 NIH NRSA Postdoctoral Fellowship (\$106,132)
- 2008 NSF GK12 International Experience: research and teaching in China (\$7000)
- 2007-2008 NSF GK12 Fellowship, NSF/Discovery Learning Center, Purdue University (\$30,000)
- 2006 Grants-in-Aid of Research, Sigma Xi Society (\$600)
- 2006 Indiana Academy of Sciences (\$1641)
- 2006 Cable-Silkman fellowship, Purdue University (\$1000)
- 2004-2007 NSF GAANN training grant, Purdue University (~\$24,000 a year)
- 2003-2004 Biological Sciences Special Funds, University of Nebraska-Lincoln (\$2285)
- 2003-2004 A.C. Cuckler fellowship award, University of Nebraska-Lincoln (\$9500)
- 2001-2003 UCARE Award, University of Nebraska-Lincoln, (\$3500)

### HONOURS AND AWARDS

- 2012 Ashton Cuckler New Investigator award, American Society of Parasitologists.
- 2008 Honorable Mention for best student presentation at the Annual Midwestern Conference of Parasitologists.

- 2005 Honorable Mention for best student presentation at the Annual Midwestern Conference of Parasitologists.
- 2004 Datus M. Hammond Award for best student presentation at the Rocky Mountain Conference of Parasitologists.
- 2003 Datus M. Hammond Award for best student presentation at the Rocky Mountain Conference of Parasitologists.
- 2003 UNL Spirit of Service Award 2002-2003 by Audubon Nebraska for various public presentations.
- 2001 The Marc Dresden Award for outstanding student presentation at the Southwestern Association of Parasitologists meeting.

**PUBLICATIONS** <sup>§</sup>denotes equal contribution, \*undergraduate researcher

- 16. Detwiler JT, Bolek MG (accepted) Presentation of the 2015 ASP Distinguished Service Award to John Janovy, Jr. *The Journal of Parasitology*
- 15. Detwiler JT, Criscione CD (2014) Recently introduced invasive geckos quickly reach population genetic equilibrium dynamics. *Biological Invasions* 16:2653-2667.
- 14. Zarlenga DS, Hoberg EP, Detwiler JT (2014) Diversity and history as drivers of helminth systematics and biology. In F. Bruschi (Ed) *Helminth infections and their impact on global public health* Springer pp 5-35.
- 13. Detwiler JT, Zajac AM, Minchella DJ, Belden LK (2012) Revealing cryptic parasite diversity in a definitive host: Echinostomes in muskrats. *The Journal of Parasitology* 98:1148-1155.
- 12. Owusu KA\*, Detwiler JT, Criscione CD (2012) Characterization of 21 microsatellite loci from the invasive Mediterranean gecko (*Hemidactylus turcicus*). *Conservation Genetics Resources* 4:563-565.
- 11. Gorton MJ<sup>§</sup>, Kasl EL<sup>§</sup>, Detwiler JT<sup>§</sup>, Criscione CD (2012) Testing local scale panmixia provides insights into the cryptic ecology, evolution, and epidemiology of metazoan animal parasites. *Parasitology* 139:981-997.
- 10. Detwiler JT, Criscione CD (2011) Testing Mendelian inheritance from field-collected parasites: revealing duplicated loci enables correct inference of reproductive mode and mating system. *International Journal for Parasitology* 41:1185-1195.
- 9. Detwiler JT, Criscione CD (2010) An infectious topic in reticulate evolution: Introgression and hybridization in animal parasites. *Genes* 1:102-123.
- 8. Dyehouse M, Detwiler JT, Li J, Bandy KM, Bennett D, Childress A, Harbor J (2010) Practical ways to assess and change your students' perceptions of scientists. *Science Scope* 33:25-31.

7. Detwiler JT, Bos DH, Minchella DJ (2010) Revealing the secret lives of cryptic species: Examining the phylogenetic relationships of echinostome parasites in North America. *Molecular Phylogenetics and Evolution* 55:611-620.
6. Gray TT\*, Detwiler JT, Minchella DJ (2009) Forming foci of transmission: the effects of resource utilization, species interaction, and parasitism on molluscan movement. *Canadian Journal of Zoology* 87:1024-1031.
5. Detwiler JT, Minchella DJ (2009) Intermediate host availability masks the strength of experimentally-derived colonization patterns in echinostome trematodes. *International Journal for Parasitology* 39:585-590.
4. Detwiler J, Janovy Jr, (2008) The role of phylogeny and ecology in experimental host specificity: Insights from a eugregarine-host system. *The Journal of Parasitology* 94:7-12.
3. Janovy Jr, Detwiler J, Schwank A, Bolek MG, Knipes A, Langford GJ (2007) New and amended descriptions of gregarines from flour beetles (*Tribolium* spp. and *Palorus subdepressus*: Coleoptera, Tenebrionidae). *The Journal of Parasitology* 93: 1155-1170.
2. Janovy Jr, Bolek MG, Detwiler J, Schwank S, Knipes A, Langford GJ (2007) *Gregarina niphandrodes* (Eugregarinorida: Septatorina): Oocyst surface architecture. *The Journal of Parasitology* 93:714-716.
1. Sandland G, Detwiler JT, Minchella DJ (2007) Understanding ecological principles through parasitological pedagogy. *Tested studies for laboratory teaching: Conference proceedings of the Association for Biology Laboratory Education* 28:295-308.

#### **SUPERVISION, TRAINING & MENTORING**

- 2015-present **Supervisor**, Chenhua Li, MSc, University of Manitoba.
- 2013-present External member, Alyssa Gleichsner, PhD candidate, Purdue University, IN, USA.
- 2013-present Collaborator, Sally Zemmer, PhD candidate, Virginia Tech, VT, USA.
- 2015-2015 **Supervisor**, Kate Parkinson, Faculty of Science USRA, University of Manitoba.
- 2015-2015 **Supervisor**, Laura Eliuk, Faculty of Science USRA, University of Manitoba.
- 2015-2015 **Supervisor**, Carmen Tse, NSERC USRA, University of Manitoba.
- 2015-2015 **Supervisor**, David Almeida, Science without Borders, University of Manitoba.
- 2015-2015 **Supervisor**, Parisa Selseleh, ICAN-WISE Scholar, University of Manitoba.
- 2015-2015 **Supervisor**, Yuya Miyashita, University of Manitoba.
- 2015-2015 **Supervisor**, Tamoghna Chakraborty, University of Manitoba.
- 2013-2015 Committee member, Danielle Mocker, MSc, University of Manitoba.
- 2014-2015 **Supervisor**, Lauren Wiens, Honours Undergraduate, University of Manitoba.



- 2014-2015     **Supervisor**, Nikola Svitlica, Honours Undergraduate, University of Manitoba.
- 2014-2015     **Supervisor**, Rachel Donnelly, Honours Undergraduate, University of Manitoba.
- 2014-2014     **Supervisor**, Tim Hartwick, Summer Research Assistant, St. Norbert's College, WI, USA.

#### **SELECTED PROFESSIONAL PRESENTATIONS** \*undergraduate researcher

Selseh P\*, Detwiler JT (2015) Linking DNA sequences from larval and adult stages reveals unexpected pattern of host specificity in echinostome trematodes. Rocky Mountain Conference of Parasitologists, Ogallala, NE, USA.

Almeida DJFD\*, Chakraborty T\*, Roth JD, Detwiler JT (2015) How do changes in the diet preferences of wolves affect parasites? Rocky Mountain Conference of Parasitologists, Ogallala, NE, USA.

Svitlica N\*, Hu Y\*, Detwiler JT (2015) Density dependent immune response of freshwater snails. American Society of Parasitologists, Omaha, NE.

Donnelly R\*, Detwiler JT (2015) Using integrative taxonomy to investigate crypsis within the echinostome trematodes. American Society of Parasitologists, Omaha, NE.

Detwiler JT, Criscione CD (2014) Role of parasite transmission in promoting inbreeding: the impact on sib-mating. Genomes to Biomes. Montreal, Quebec.

Detwiler JT, Criscione CD (2012) Testing Mendelian inheritance from field-collected parasites enables correct inference of reproductive mode and mating system. American Society of Parasitologists, Richmond, VT.

Detwiler JT (2012) Is *Echinostoma trivolvis* a species complex? Southwestern Association of Parasitologists, Kingston, Oklahoma.

#### **TEACHING EXPERIENCE**

2015-present   Molecular Ecology of Parasites special topics – Professor, University of Manitoba.

2014-present   Introductory Parasitology lecture and laboratory – Professor, University of Manitoba.

2014-present   Biodiversity and Sustainability lecture – Professor, University of Manitoba.

2009            Organisms and Populations lecture and laboratory – Teaching assistant, Purdue University.

2008            Biology Resource seminar and Diversity, Ecology and Behavior – Teaching assistant, Purdue University.

2007-2008     NSF GK12 fellow – Visiting scientist, Frankfort Middle School, IN (6<sup>th</sup> grade).

2005            Ecological Parasitology laboratory module – Co-designer and instructor, Purdue University.

2002-2004     Biodiversity laboratory - Teaching assistant, University of Nebraska-Lincoln.

2003            Ecology and Evolution laboratory – Teaching assistant, University of Nebraska-Lincoln.

2002 Biology 101 laboratory – Teaching assistant, University of Nebraska-Lincoln.

## **PROFESSIONAL ACTIVITIES AND SERVICES**

### **Invited Talks**

- 2015 Teaching parasitology while avoiding transmission and infecting the next generation. American Society of Parasitologists Students' Symposium, Omaha, NE.
- 2014 Revealing the cryptic ecology and evolution of macroparasites: Biodiversity, host specificity, and mating systems. Biology Departmental Seminar, University of Winnipeg.
- 2014 Revealing the cryptic ecology and evolution of macroparasites: Biodiversity, host specificity, and mating systems. Biology Departmental Seminar, Entomology Departmental Seminar, University of Manitoba.
- 2012 Integrating molecular and ecological approaches to elucidating parasite ecology and evolution. Department of Biological Sciences, Sam Houston State University, Huntsville, TX.
- 2011 Revealing the cryptic natural history of macroparasites: Biodiversity, infection patterns, and mating systems. Department of Biology Seminar, Virginia Tech, Blacksburg, VT.
- 2011 Revealing the cryptic natural history of macroparasites: Biodiversity, infection patterns, and mating systems. Wildlife and Fisheries Sciences Departmental Seminar, Texas A&M University.

### **Reviewer**

Journals Acta Protozoologica; Acta Tropica; Comparative Parasitology, Evolution; Folia Parasitologica; Freshwater Science; Genetica; Infection, Genetics and Evolution; International Journal of Molecular Sciences; International Journal for Parasitology; Journal of Helminthology; Journal of Parasitology; Molecular & Biochemical Parasitology; Molecular Phylogenetics & Evolution; Oecologia; Parasitology; PLOS ONE; Transactions of the Royal Society of Tropical Medicine & Hygiene; Veterinary Parasitology

Books Concepts in Parasitology

Funding Agencies Israel Binational Science Foundation; National Science Foundation

### **Workshops**

- 2013 New Faculty Institute: Building dynamic teachers for student success, Centre for the Advancement of Teaching and Learning, University of Manitoba.
- 2012 3-part Course Design series on writing effective learning outcomes, developing assessment and feedback tools, and enhancing teaching strategies, Center for Teaching Excellence, Texas A&M University, College Station, TX, USA.

- 2012 Roadmap to a Successful Academic Career Workshop, NSF ADVANCE program, Texas A&M University, College Station, TX, USA.
- 2011 Future Faculty Workshop, NSF ADVANCE program, Virginia Tech, Blacksburg, VT, USA.
- 2009 Bodega Applied Phylogenetics Workshop, Bodega Bay, CA, USA.

**Committees**

- 2015-2019 Lectureship Committee, American Society of Parasitologists.
- 2014-2019 Undergraduate Honours Committee, University of Manitoba.
- 2014-2015 Search Committee for the Molecular Population Genetics/Genomics position, Biological Sciences department, University of Manitoba.
- 2014-2015 Nominating Committee, Elected Chair, American Society of Parasitologists.
- 2012-2014 Ashton Cuckler New Investigator Award Committee, American Society of Parasitologists.
- 2010-2012 Student Awards Committee, American Society of Parasitologists.
- 2009 Student Representative, American Society of Parasitologists.
- 2008 Strategic Planning Committee, Biological Sciences department, Purdue University.
- 2007 Biology Graduate Student Council, Purdue University.
- 2007 Search Committee for the Evolutionary Ecology position, Purdue University.

**Community Outreach**

- 2015 Research Mentor for 2 Aboriginal grade 11 students in the Verna J. Kirkness Science and Engineering Program, June 1 – 5.

**MEMBERSHIP IN PROFESSIONAL SOCIETIES**

- |                                     |              |
|-------------------------------------|--------------|
| American Society of Parasitologists | 2003-Present |
| Canadian Society of Zoologists      | 2013-Present |

**CURRICULUM VITAE – OCTOBER 2015****MARGARET FELICE DOCKER**

Associate Professor, Department of Biological Sciences  
 University of Manitoba, Winnipeg, MB, R3T 2N2, Canada  
 Phone: (204) 474-8831; E-mail: Margaret.Docker@umanitoba.ca

**ACADEMIC INFORMATION****Post-Secondary Education:**

- 1992 PhD (Fisheries and Aquatic Sciences), University of Guelph, Ontario  
 Title: *Labile Sex Determination in Lampreys: The Effect of Larval Density and Sex Steroids on Gonadal Differentiation*  
 Advisor: Dr. F.W.H. Beamish
- 1985 BSc (Marine Biology, Honours), University of Guelph, Ontario  
 Graduated with Distinction

**ACADEMIC AND OTHER RESEARCH EXPERIENCE****2011 – present****Associate Professor, Department of Biological Sciences, University of Manitoba**

I teach courses in evolutionary biology, chordate zoology, and fish systematics and biogeography; conduct research on the molecular systematics, conservation genetics, genomics, and evolution of lampreys and other fishes; and supervise undergraduate and graduate students. I am currently chair of the Evolutionary and Biodiversity Theme Group, chair of the Department of Biological Sciences Graduate Studies Committee, a member of the Undergraduate Curriculum Committee, Seminar Committee, and Biological Collections and Museum Committee, and curator of the Stewart-Hay fish and herpetology collections.

**2006 – 2011****Assistant Professor, Department of Biological Sciences, University of Manitoba****2004 – 2006****Maternity Leave**

Although without a formal paid position, I remained active in research by preparing manuscripts for publication, presenting at conferences, applying for grants, serving on the advisory committee of graduate students at the University of Guelph and Humboldt State University, and supervising an undergraduate student at the University of Windsor.

**2000 – 2004****Postdoctoral Fellow, Great Lakes Institute for Environmental, University of Windsor**

I conducted molecular phylogenetic studies on a variety of aquatic organisms (e.g., dreissenid mussels, lampreys, Pacific salmon, and whitefish) where identification of taxonomic and management units is obscured by ambiguous morphometric and life history characters.

**1997 – 2000****Instructor and Research Associate, Biology Program, University of Northern British Columbia**

During the school year, I taught a total of five undergraduate (e.g., Introduction to Biology, Ichthyology, Conservation Biology) and one graduate course (Fisheries Ecology); during the summer, I conducted conservation genetic research on several rare lamprey species in the Klamath Basin, Oregon.

**1995 – 1997****Visiting Scientist, Department of Zoology, University of New Hampshire**

I used mitochondrial DNA sequence to determine the degree to which the unusual lampreys found in the Goose Lake Basin of Oregon are genetically distinct from other more common lamprey species.

**1994 – 1995****Postdoctoral Researcher, Fisheries and Oceans Canada, West Vancouver Laboratory**

I developed highly-sensitive, species-specific PCR assays to detect microsporidian parasites in pen-reared chinook salmon.

**1992 – 1994****Visiting Fellow, Fisheries and Oceans Canada, Pacific Biological Station and West Vancouver Laboratory**

I conducted the first published study to use mitochondrial DNA sequences to reconstruct the phylogeny of lampreys.

**1989****Senior Laboratory Instructor, Ichthyology, Department of Zoology, University of Guelph**

My responsibilities included laboratory preparation, presentation of pre-lab talks, organization of field trips, preparation and marking of assignments and exams, and maintenance of the fish museum.

**1985 – 1990****Graduate Teaching Assistant, Department of Zoology, University of Guelph**

I assisted senior laboratory instructors in a number of biology courses ranging from introductory zoology to third- and fourth-year courses such as Histology, Ichthyology, and Marine Biology.

**1984, 1985 (Summer)****NSERC Undergraduate Summer Research Fellow, Department of Zoology, University of Guelph**

I examined the nutritional factors affecting survival in embryo fish.

**1982, 1983 (Summer)****Laboratory Technician, Canada Centre for Inland Waters, Fisheries and Oceans Canada**

I conducted laboratory and field tests on the effects of pesticides on freshwater algae.

## RESEARCH PUBLICATIONS AND PRESENTATIONS

**Publications:**Books:

1. **Docker, M.F.** 2015. Lampreys: Biology, Conservation and Control, Vol. 1. Springer, Dordrecht, Netherlands (editor).

Invited Book Preface:

1. **Docker M.F.** (in press) Preface for Orlov A., and R.J. Beamish (editors) Jawless Fishes of the World. American Fisheries Society, Bethesda, Maryland.

Refereed Book Chapters:

1. **Docker, M.F.**, J.B. Hume, and B.J. Clemens. 2015. Introduction: a surfeit of lampreys. *In* Docker, M.F. (ed.), *Lampreys: Biology, Conservation and Control*, Vol. 1. Springer, Dordrecht, Netherlands. pp. 1–34.
2. Maitland, P.S., C.B. Renaud, B.R. Quintella, D.A. Close, and **M.F. Docker**. 2015. Conservation of native lampreys. *In* Docker, M.F. (ed.), *Lampreys: Biology, Conservation and Control*, Vol. 1. Springer, Dordrecht, Netherlands. pp. 375–428
3. Dunmall, K.M., J.M. Reist, E.C. Carmack, J.A. Babaluk, M.P. Heide-Jørgensen, and **M.F. Docker**. 2013. Pacific salmon in the Arctic: harbingers of change. *In* F.J. Mueter, D.M.S. Dickson, H.P. Huntington, J.R. Irvine, E.A. Logerwell, S.A. MacLean, L.T. Quakenbush, and C. Rosa (eds.) *Responses of Arctic Marine Ecosystems to Climate Change*. Alaska Sea Grant, University of Alaska Fairbanks. 23 pp. 0141-0163 doi: 10.4027/ramecc.2013.07.
4. **Docker, M.F.** 2009. A review of the evolution of nonparasitism in lampreys and an update of the paired species concept. Pages 71–114 *in* L.R. Brown, S.D. Chase, P.B. Moyle, R.J. Beamish, and M.G. Mesa, editors. *Biology, management, and conservation of lampreys in North America*. American Fisheries Society, Symposium 72, Bethesda, Maryland.
5. Goodman, D.H., A.P. Kinziger, S.B. Reid, and **M.F. Docker**. 2009. Morphological diagnosis of *Entosphenus* and *Lampetra ammocoetes* (Petromyzontidae) in Washington, Oregon, and California. Pages 223–232 *in* L.R. Brown, S.D. Chase, P.B. Moyle, R.J. Beamish, and M.G. Mesa, editors. *Biology, management, and conservation of lampreys in North America*. American Fisheries Society, Symposium 72, Bethesda, Maryland.
6. Renaud, C.B., **M.F. Docker**, and N.E. Mandrak. 2009. Taxonomy, distribution, and conservation of lampreys in Canada. Pages 293–309 *in* L.R. Brown, S.D. Chase, P.B. Moyle, R.J. Beamish, and M.G. Mesa, editors. *Biology, management, and conservation of lampreys in North America*. American Fisheries Society, Symposium 72, Bethesda, Maryland.

Non-Refereed Book Chapters:

1. Christiansen, J.S., J.D. Reist, R.J. Brown, V.A. Brykov, G. Christensen, K. Christoffersen, P. Cott, P. Crane, J.B. Dempson, **M. Docker**, K. Dunmall, A. Finstad, V.F. Gallucci, J. Hammar, L.N. Harris, J. Heino, E. Ivanov, O.V. Karamushko, A. Kirillov, A. Kucheryavyy, H. Lehtonen, A. Lynghammar, C.W. Mecklenburg, P.D.R Moller, T. Mustonen, A.G. Oleinik, M. Power, Y.S. Reshetnikov, V.I. Romanov, O.-T. Sandlund O.-T. C.D Sawatzky, M. Svenning, H.K. Swanson, and F.J. Wrona. 2013. Chapter 6: Fishes. Arctic biodiversity assessment: status and trends in Arctic biodiversity. Pages 192–245 *in* *Conservation of Arctic Flora and Fauna*, Akureyri, Iceland.

Refereed Articles in Academic Journals:Submitted:

1. **Docker, M.F.**, G.S. Silver, J.C. Jolley, and E.K. Spice. A simple microsatellite marker distinguishes North American lamprey genera *Lampetra* and *Entosphenus*: comparison between genetic and morphological identification techniques. Submitted to *North American Journal of Fisheries Management* (October 2015)
2. Rohlfing, K., Stuhlmann, F., **M.F. Docker**, and T. Burmester. Convergent evolution of hemoglobin switching in jawed and jawless vertebrates. Submitted to *BMC Evolutionary Biology* (October 2015)
3. Clemens, B.J., L. Wyss, R. McCoun, I. Courter L. Schwabe, C. Peery, C.B. Schreck, and **M.F. Docker**. Behavioral flexibility in spawning migrations of Pacific lamprey *Entosphenus tridentatus*. Submitted to *Hydrobiologia* (July 2015)
4. Clemens, B., **M. Docker**, M. Moser, and 19 others. A framework to increase knowledge for west coast lampreys of North America. Submitted to *Fisheries* (July 2015)

*Revised and Provisionally Accepted:*

1. Jolley, J.C. G. Kovalchuk, and **M.F. Docker**. River lamprey *Lampetra ayresii* outmigrant upstream of the John Day Dam in the Mid-Columbia River. *Northwestern Naturalist* (NWN15-21); revisions submitted July 23, 2015
2. Gingera, T.D., T.B. Steeves, D.A. Boguski, S. Whyard, W. Li, and **M.F. Docker**. Detection and identification of lampreys in Great Lakes streams using environmental DNA. *Journal of Great Lakes Research* (GLR-D-15-00119); revisions submitted Oct 16, 2015

*Published:*

1. McCauley, D.W., **M.F. Docker**, S. Whyard, and W. Li. 2015. Lampreys as diverse model organisms in the genomics era. Cover article for *BioScience*. doi: 10.1093/biosci/biv139.
2. Blanchfield P.J., K.A. Kidd, **M.F. Docker**, V.P. Palace, B.J. Park, and L.D. Postma. 2015. Recovery of a wild fish population from whole-lake additions of a synthetic estrogen. *Environmental Science and Technology* 49: 3136–3144.
3. Bartels, H., **M.F. Docker**, M. Krappe, M.M. White, C. Wrede, and I.C. Potter (2015) Variations in the presence of chloride cells in the gills of lampreys and their evolutionary implications. *Journal of Fish Biology* 86: 1421–1428.
4. Hess, J.E., N.R. Campbell, **M.F. Docker**, C. Baker, A. Jackson, R. Lampman, B. McIlraith, M.L. Moser, D.P. Statler, W.P. Young, A.J. Wildbill, and S.R. Narum. 2015. Use of genotyping-by-sequencing data to develop a high-throughput and multi-functional SNP panel for conservation applications in Pacific lamprey. *Molecular Ecology Resources* 15: 187–202.
5. Heath, G., D. Childs, **M.F. Docker**, D.W. McCauley, and S. Whyard, S. 2014. RNA interference technology to control pest sea lampreys - a proof-of-concept. *PLoS ONE* 9 (2): e88387.
6. Penton, P.M., C.T. McFarlane, E.K. Spice, **M.F. Docker**, and G.K. Davoren. 2014. Lack of genetic divergence in capelin (*Mallotus villosus*) spawning at beach versus subtidal habitats in coastal embayments of Newfoundland. *Canadian Journal of Zoology* 92: 377–382.
7. Spice, E.K. and **M.F. Docker**. 2014. Reduced fecundity in non-parasitic lampreys may not be due to heterochronic shift in ovarian differentiation. *Journal of Zoology* 294: 50–58.
8. Spice, E.K., S. Whyard, and **M.F. Docker**. 2014. Gene expression during ovarian differentiation in parasitic and non-parasitic lampreys: implications for fecundity and life history types. *General and Comparative Endocrinology* 208: 116–125.
9. Hess, J.E., N.R. Campbell, D.A. Close, **M.F. Docker**, and S.R. Narum. 2013. Population genomics of Pacific lamprey: adaptive variation in a highly dispersive species. *Molecular Ecology* 22: 2898–2896.
10. Backhouse-James, S.M. and **M.F. Docker**. 2012. Microsatellite and mitochondrial DNA markers show no evidence of population structure in walleye (*Sander vitreus*) in Lake Winnipeg. *Journal of Great Lakes Research* 38: 47–57.
11. Bartels, H., **M.F. Docker**, U. Fazekas, and I.C. Potter. 2012. Functional and evolutionary implications of the cellular composition of the gill epithelium of feeding adults of a freshwater parasitic species of lamprey, *Ichthyomyzon unicuspis*. *Canadian Journal of Zoology* 90: 1278–1283.
12. Boguski, D.A., S.B. Reid, D.H. Goodman, and **M.F. Docker**. 2012. Genetic diversity, endemism, and phylogeny of lampreys within the genus *Lampetra sensu stricto* (Petromyzontiformes: Petromyzontidae) in western North America. *Journal of Fish Biology* 81: 1891–1914.
13. **Docker, M.F.**, N.E. Mandrak, and D.D. Heath. 2012. Contemporary gene flow between “paired” silver (*Ichthyomyzon unicuspis*) and northern brook (*I. fossor*) lampreys: implications for conservation. *Conservation Genetics* 13: 823–835.
14. Spice, E.K., D.H. Goodman, S.B. Reid, and **M.F. Docker**. 2012. Neither philopatric nor panmictic: microsatellite and mtDNA evidence suggest lack of natal homing but limits to dispersal in Pacific lamprey. *Molecular Ecology* 21: 2916–2930.

15. Taylor, E.B., L.N. Harris, E.K. Spice, and **M.F. Docker**. 2012. Microsatellite DNA analysis of parapatric lamprey (*Entosphenus* spp.) populations: implications for evolution, taxonomy and conservation of a Canadian endemic. *Canadian Journal of Zoology* 90: 291–303.
16. Reid, S.B., Boguski, D.A., D.H. Goodman, and **M.F. Docker**. 2011. Validity of *Lampetra pacifica* (Petromyzontiformes: Petromyzontidae), a brook lamprey described from the lower Columbia River Basin. *Zootaxa* 3091: 42–50.
17. Spice, E.K., T.A. Whitesel, C.T. McFarlane, and **M.F. Docker**. 2011. Characterization of 12 microsatellite loci for the Pacific lamprey (*Entosphenus tridentatus*) and cross amplification in five other lamprey species. *Genetics and Molecular Research* 10: 3246–3250.
18. Clemens, B.J., T.R. Binder, **M.F. Docker**, M.L. Moser, and S.A. Sower. 2010. Similarities, differences, and unknowns in biology and management of three parasitic lampreys of North America. *Fisheries* 35: 580–594.
19. Luzier, C.W., **M.F. Docker**, and T.A. Whitesel. 2009. Characterization of ten microsatellite loci for western brook lamprey *Lampetra richardsoni*. *Conservation Genetic Resources* 2: 71–74.
20. McFarlane, C.T. and **M.F. Docker**. 2009. Characterization of 14 microsatellite loci in the paired lamprey species *Ichthyomyzon unicuspis* and *I. fossor* and cross amplification in four other *Ichthyomyzon* species. *Conservation Genetic Resources* 1: 377–380.
21. Goodman, D.H., S.B. Reid, **M.F. Docker**, G.R. Haas, and A.P. Kinziger. 2008. Evidence for high levels of gene flow among populations of a widely distributed anadromous lamprey *Entosphenus tridentatus* (Petromyzontidae). *Journal of Fish Biology* 72: 400–417.
22. Heath, D.D., S. Jamieson, I. Stasiak, C.M. Bettles, and **M.F. Docker**. 2008. Genetic differentiation among sympatric migratory and resident life-history forms of *Oncorhynchus mykiss* in British Columbia. *Transactions of the American Fisheries Society* 137: 1268–1277.
23. **Docker, M.F.**, G.R. Haas, D.H. Goodman, S.B. Reid, and D.D. Heath. 2007. PCR-RFLP markers detect 29 mitochondrial haplotypes in Pacific lamprey (*Entosphenus tridentatus*). *Molecular Ecology Notes* 7: 350–353.
24. Neave, F.B., N.E. Mandrak, **M.F. Docker**, and D.L. Noakes. 2007. Differentiating sympatric *Ichthyomyzon ammocoetes* using meristic, morphological, pigmentation and gonad analyses. *Canadian Journal of Zoology* 85: 549–560.
25. Roy, D., **M.F. Docker**, G.D. Haffner, and D.D. Heath. 2007. Body shape vs. colour associated initial divergence in the *Telmatherina* radiation in Lake Matano, Sulawesi, Indonesia. *Journal of Evolutionary Biology* 20: 1126–1137.
26. **Docker, M.F.** 2006. Bill Beamish's contributions to lamprey research and recent advances in the field. *Guelph Ichthyology Reviews* 7:1–52.
27. Neave, F.B., N.E. Mandrak, **M.F. Docker**, and D.L. Noakes. 2006. Effects of preservation on pigmentation and length measurements in larval lampreys. *Journal of Fish Biology* 68: 991–1001.
28. Heath, D.D., J.M. Shrimpton, R.I. Hepburn, S.K. Jamieson, S.K. Brode, and **M.F. Docker**. 2006. Population structure and divergence using microsatellite and gene locus markers in Chinook salmon (*Oncorhynchus tshawytscha*) populations. *Canadian Journal of Fisheries and Aquatic Sciences* 63: 1370–1383.
29. Bettles, C.M., **M.F. Docker**, B. Dufour, and D.D. Heath. 2005. Hybridization dynamics between sympatric species of trout: loss of reproductive isolation. *Journal of Evolutionary Biology* 18: 1220–1233.
30. Therriault, T.W., M.I. Orlova, **M.F. Docker**, H.J. MacIsaac, and D.D. Heath. 2005. Invasion genetics of a freshwater mussel (*Dreissena rostriformis bugensis*) in Eastern Europe: high gene flow and multiple introductions. *Heredity* 95: 16–23.
31. Bettles, C.M., **M.F. Docker**, B. Dufour, and D.D. Heath. 2005. Hybridization dynamics between sympatric species of trout: loss of reproductive isolation. *Journal of Evolutionary Biology* 18: 1220–1233.



32. Therriault, T.W., M.I. Orlova, **M.F. Docker**, H.J. MacIsaac, and D.D. Heath. 2005. Invasion genetics of a freshwater mussel (*Dreissena rostriformis bugensis*) in Eastern Europe: high gene flow and multiple introductions. *Heredity* 95: 16–23.
33. Roy, D., **M.F. Docker**, P. Hehanussa, D.D. Heath, and G.D. Haffner. 2004. Genetic and morphological data supporting the hypothesis of adaptive radiation in the endemic fish of Lake Matano. *Journal of Evolutionary Biology* 17: 1268–1276.
34. Maeva, E., I. Bruno, B.S. Zielinski, **M.F. Docker**, F.M. Severin, and R.G. Maev. 2004. The use of pulse-echo acoustic microscopy to non-invasively determine sex of living larval sea lamprey, *Petromyzon marinus*. *Journal of Fish Biology* 65: 148–156.
35. Therriault, T.W., **M.F. Docker**, M.I. Orlova, D.D. Heath, and H.J. MacIsaac. 2004. Molecular resolution of Dreissenidae (Mollusca: Bivalvia) including the first report of *Mytilopsis leucophaeata* in the Black Sea basin. *Molecular Phylogenetics and Evolution* 30: 479–489.
36. **Docker, M.F.**, A. Dale, and D.D. Heath. 2003. Erosion of interspecific reproductive barriers resulting from hatchery supplementation of rainbow trout sympatric with cutthroat trout. *Molecular Ecology* 12: 3515–3521.
37. **Docker, M.F.**, S.A. Sower, J.H. Youson, and F.W.H. Beamish. 2003. Future sea lamprey control through regulation of metamorphosis and reproduction: A report from the SLIS II New Science and Control workgroup. *Journal of Great Lakes Research* 29 (Supplement 1): 801–809.
38. **Docker, M.F.**, and D.D. Heath. 2003. Genetic comparison between anadromous steelhead and freshwater-resident rainbow trout in British Columbia, Canada. *Conservation Genetics* 4: 227–231.
39. **Docker, M.F.**, and D.D. Heath. 2002. PCR-based markers detect genetic variation at growth and immune function-related loci in chinook salmon (*Oncorhynchus tshawytscha*). *Molecular Ecology Notes* 2: 606–609
40. Lorion, C.M., D.F. Markle, S.B. Reid, and **M.F. Docker**. 2000. Re-description of the presumed-extinct Miller Lake lamprey, *Lampetra minima*. *Copeia* 2000: 1019–1028.
41. **Docker, M.F.**, J.H. Youson, R.J. Beamish, and R.H. Devlin. 1999. Phylogeny of the lamprey genus *Lampetra* inferred from mitochondrial cytochrome *b* and ND3 gene sequences. *Canadian Journal of Fisheries and Aquatic Sciences* 56: 2340–2349.
42. Kent, M.L., **M. Docker**, J. Khattra, C.R. Vossbrinck, D.J. Speare, and R.H. Devlin. 1999. *Microsporidium prosopium* n. sp. (Microsporidia) from the musculature of the mountain whitefish *Prosopium williamsoni* from British Columbia: Morphology and phylogeny. *Journal of Parasitology* 85: 1114–1119.
43. **Docker, M.F.**, M.L. Kent, D.M.L. Hervio, J.S. Khattra, L.M. Weiss, A. Cali, and R.H. Devlin. 1997. Ribosomal DNA sequence of *Nucleospora salmonis* Hedrick, Groff and Baxa, 1991 (Microsporea: Enterocytozoidae): Implications for phylogeny and nomenclature. *Journal of Eukaryotic Microbiology* 44: 55–60.
44. **Docker, M.F.**, R.H. Devlin, J. Richard, and M.L. Kent. 1997. Sensitive and specific polymerase chain reaction assay for detection of *Loma salmonae* (Microsporea). *Diseases of Aquatic Organisms* 29: 41–48.
45. Shaw, R.W., M.L. Kent, **M.F. Docker**, A.M.V. Brown, R.H. Devlin, and M.L. Adamson. 1997. A new species of *Loma* (Microsporea) in shiner perch (*Cymatogaster aggregata*). *Journal of Parasitology* 83: 296–301.
46. Kent, M.L., D.M.L. Hervio, **M.F. Docker**, and R.H. Devlin. 1996. Taxonomy studies and diagnostic tests for myxosporean and microsporidian pathogens of salmonid fishes utilising ribosomal DNA sequence. *Journal of Eukaryotic Microbiology* 43: S98–99.
47. **Docker, M.F.**, and F.W.H. Beamish. 1994. Age, growth, and sex ratio among populations of least brook lamprey, *Lampetra aepyptera*, larvae: an argument for environmental sex determination. *Environmental Biology of Fishes* 41: 191–204.

48. Murdoch, S.P., **M.F. Docker**, and F.W.H. Beamish. 1992. Effect of density and individual variation on growth in sea lamprey (*Petromyzon marinus*) larvae in the laboratory. *Canadian Journal of Zoology* 70: 184–188.
49. Murdoch, S.P., F.W.H. Beamish, and **M.F. Docker**. 1991. Laboratory study of growth and interspecific competition in larval lampreys. *Transactions of the American Fisheries Society* 120: 653–656.
50. **Docker, M.F.**, and F.W.H. Beamish. 1991. Growth, fecundity, and egg size of least brook lamprey, *Lampetra aepyptera*. *Environmental Biology of Fishes* 31: 219–227.
51. **Docker, M.F.**, T.E. Medland, and F.W.H. Beamish. 1986. Energy requirements and survival in embryo mottled sculpin (*Cottus bairdi*). *Canadian Journal of Zoology* 64: 1104–1109.
52. Wong, P.T.S., Y.K. Chan, J.S. Rhamey, and **M. Docker**. 1984. Relationship between water solubility of chlorobenzenes and their effects on a freshwater alga. *Chemosphere* 13: 991–996.

#### Refereed Reports:

1. **Docker, M.F.** Update COSEWIC Status Report on Vancouver Lamprey *Lampetra macrostoma*, prepared for Committee on the Status of Endangered Wildlife in Canada, Environment Canada, Gatineau, Quebec. Revised draft submitted December 2007. v + 35 pp.
2. Close, D., **M. Docker**, T. Dunne, and G. Ruggerone. 2010. Final Report of the Klamath River Expert Panel: Scientific assessment of two dam removal alternatives on lamprey, prepared for U.S. Fish and Wildlife Service. Revised draft submitted August 2010. 55 pp.

#### Book Reviews:

1. **Docker, M.F.** 2008. Book critique: Hardisty shares his final thoughts on lampreys. *Environmental Biology of Fishes* 82: 11–15.

#### Conference Presentations:

##### Invited Conference Presentations:

1. **Docker M.F.**, J.D. Reist, and T.D. Gingera. 2015. Innovations in zebra mussel detection: using environmental DNA as an early detection surveillance tool. Zebra Mussel Monitoring and Control, Opportunities for Innovation and Business Development, Winnipeg, January 2015.
2. **Docker, M.F.** T.D. Gingera, T.B. Steeves, S. Whyard, and W. Li 2014. Environmental DNA and other genetic tools for lamprey species ID and distribution sampling. Keynote address, Institute of Fisheries Management Lamprey Conference, York, UK, May 2014.
3. **Docker, M.F.** 2013. Evolution, dispersal, and genetic stock structure of Pacific lamprey, river lamprey, and western brook lamprey. One of keynote speakers invited by symposium organizer David Noakes (Oregon State University). Lamprey Symposium, Oregon Hatchery Research Center, October 2013.
4. **Docker, M.F.** 2013. Comparing species concepts in lamprey “paired species.” 143<sup>rd</sup> Annual Meeting of the American Fisheries Society, Little Rock, Arkansas, September 2013.
5. **Docker, M.F.** 2012. The evolutionary and ecological importance of lampreys. Keynote address, Lamprey Summit III, Portland, Oregon, June 2012.
6. **Docker, M.F.** and I.C. Potter. 2011. Evolution of different migratory and feeding types in lampreys. 141<sup>st</sup> American Fisheries Society Annual Meeting, Seattle, Washington, September 2011.
7. **Docker, M.F.**, D.A. Boguski, D.H. Goodman, and S.B. Reid. 2010. Mitochondrial and nuclear genetic markers suggest several cryptic brook lamprey species (genus *Lampetra*) on the west coast of North America. 63<sup>rd</sup> Canadian Conference for Fisheries Research, Winnipeg, Manitoba, January 2010.

8. **Docker, M.F.** 2006. Genetic data suggest that northern brook and silver lampreys are a single species. Great Lakes Fishery Commission Annual Meeting, Traverse City, Michigan, June 2006.
9. **Docker, M.F.** 2005. Bill Beamish's contributions to lamprey research and recent advances in the field. 58<sup>th</sup> Canadian Conference for Fisheries Research, Windsor, Ontario, January 2005.
10. **Docker, M.F.** 2004. Genetic markers to distinguish among west coast lamprey species and the population structure of these species. Columbia River Basin Lamprey Workshop, Vancouver, Washington, February 2004.
11. **Docker, M.F.** 2002. Genetic tools used in fish biology: Conservation, aquaculture, and phylogenetics. Beckman Coulter Advanced Technology Seminar Series, Detroit, Michigan, April 2002.
12. **Docker, M.F.** 2002. Applications of the CEQ<sup>TM</sup> 8000 to conservation genetic studies at the Great Lakes Institute for Environmental Research. Beckman Coulter Genetic Analysis Forum. Fullerton, California, July 2002.
13. **Docker, M.F.** 1999. Lampreys of the Klamath and Goose Lake basins of Oregon. Oregon Department of Fish and Wildlife 1999 Fish Biology Meeting, Bend, Oregon, June 1999.
14. **Docker, M.F.** 1992. Labile sex determination in lampreys. Vertebrate Sex Determination/Differentiation Workshop, Great Lakes Fishery Commission, Chicago, Illinois, March 1992.

Invited Seminars:

1. **Docker, M.F.** 2013. Repeated independent evolution of nonparasitism in lampreys: are there parallels with insects? Department Seminar, Department of Entomology, University of Manitoba, Winnipeg, March 2013.
2. **Docker, M.F.** 2010. Nonparasitism in lampreys: an unparalleled case of parallel evolution. Department Seminar, Institute of Biodiversity, University of Glasgow, October 2010.
3. **Docker, M.F.** 2007. Paired lamprey species and the repeated evolution of nonparasitism. Department Seminar, Department of Biology, University of Regina. October 2007.

Other Seminars:

1. **Docker, M.F.** 2015. The cultural, ecological, and scientific importance of lampreys. Crackerjack Seminar Series, Department of Biological Sciences, University of Manitoba, September 2015.

Other Oral Conference Presentations:

1. Gingera, T., R. Bajno, J. Reist, and **M. Docker**. 2015. Environmental DNA (eDNA) detection of zebra mussels in Lake Winnipeg at the leading edge of an invasion. 2015 Western Canada Water Annual Conference, Winnipeg, September 2015.
2. **Docker, M.F.** 2015. The cultural, ecological, and scientific importance of lampreys. 145<sup>th</sup> American Fisheries Society Annual Meeting, Portland, August 2015.
3. Clemens, B.J., and **M.F. Docker**. 2015. What is the evidence for the '20% body size rule' for mating as a speciation mechanism among lampreys (and what are the implications for conservation and management)? 145<sup>th</sup> American Fisheries Society Annual Meeting, Portland, August 2015.
4. Mochnacz, N., D. Isaak, **M. Docker**, J. Reist. 2015. The cold hard facts: developing a thermal niche definition for juvenile Bull Trout. 145<sup>th</sup> American Fisheries Society Annual Meeting, Portland, August 2015.
5. K. Dunmall, N. DeCovich, R. Bajno, W. Templin, **M. Docker**, and J. Reist 2015. Mackenzie River Chum Salmon: clinging to or colonizing the top of the world? 145<sup>th</sup> American Fisheries Society Annual Meeting, Portland, August 2015.

6. Mochnacz, N.J., D. Isaak, D. Teleki, M. McPherson, B. Lewis, **M. Docker**, J.D. Reist, and P.A. Cott. 2014. A watershed-scale sampling protocol for distribution and trend assessments of stream salmonids in the Northwest Territories. Yellowknife Geoscience Forum, Yellowknife, November 2014.
7. Mochnacz, N.J., M. Docker, D. Isaak, and J. Reist. 2014. Developing a thermal niche definition for northern Bull Trout populations, *Salvelinus confluentus* Curiosity Society Meeting, Canal Flats, BC, October 2014.
8. **Docker, M.F.** and E.K. Spice. 2014. Flexibility in timing of ovarian differentiation in lampreys may correspond with feeding type flexibility. 144<sup>th</sup> American Fisheries Society Annual Meeting, Quebec City, August 2014.
9. Bartels H., **M. Docker**, M. Krappe, M. White, C. Wrede, and I.C. Potter. 2014. The mitochondria-rich cells in the gills of lampreys and their presence in various freshwater species. 144<sup>th</sup> American Fisheries Society Annual Meeting, Quebec City, August 2014.
10. **Docker, M.F.** 2014. The importance of lampreys in scientific research. International Congress on the Biology of Fish, Edinburgh, August 2014.
11. **Docker, M.F.** 2014. European and North American *Lampetra*: different but the same, Institute of Fisheries Management Lamprey Conference, York, UK, May 2014.
12. Spice, E.K., S. Whyard, and **M.F. Docker**. 2013. Sex differentiation in lampreys: is there differential timing and gene expression in parasitic versus non-parasitic species? 8<sup>th</sup> General Meeting of the Canadian Society for Ecology and Evolution, Kelowna, May 2013.
13. Gingera, T., S. Whyard, M. Steeves, W. Li, and **M. Docker**. 2013. The use of environmental DNA (eDNA) for detecting larval lampreys within stream systems as a tool for conservation and control. Prairie University Biology Symposium, Winnipeg, February 2013.
14. Li, Y., C.B. Renaud, A.M. Naseka, and **M.F. Docker**. 2013. The phylogeny with the lamprey genus *Lethenteron* using cytochrome b gene. Prairie University Biology Symposium, Winnipeg, February 2013.
15. McFarlane, C.T. and **M.F. Docker**. 2013. Gene expression during metamorphosis in paired species of lampreys. Prairie University Biology Symposium, Winnipeg, February 2013.
16. Spice, E.K., **M.F. Docker**, and S. Whyard. 2013. Sex differentiation in lampreys: differential timing and gene expression in parasitic versus non-parasitic species. Prairie University Biology Symposium, Winnipeg, February 2013.
17. Hess, J, N. Campbell, D. Close, **M. Docker**, and S. Narum. 2012. Population genomics of Pacific lamprey (*Entosphenus tridentatus*): adaptive variation in a panmictic species. First Joint Conference on Evolutionary Biology, Ottawa, July 2012.
18. McFarlane, C. and **M. Docker**. 2011. Evolutionary dynamics of paired lamprey species using multiple molecular markers. 6<sup>th</sup> General Meeting of the Canadian Society for Ecology and Evolution, Banff, May 2011.
19. **Docker, M.F.** 2010. Divergent feeding types in lampreys: the repeated evolution of nonparasitism. 63<sup>rd</sup> Canadian Conference for Fisheries Research, Winnipeg, Manitoba, January 2010.
20. Backhouse, S. and **M.F. Docker**. 2010. Using microsatellite and mitochondrial DNA variation to investigate population structure of walleye (*Sander vitreus*) in Lake Winnipeg. 63<sup>rd</sup> Canadian Conference for Fisheries Research, Winnipeg, Manitoba, January 2010.
21. Schroeder, B.S., R.D. Mooi, and **M.F. Docker**. 2010. An isolated population of threespine stickleback in Nueltin Lake, Manitoba: post-glacial dispersal and population relatedness. 63<sup>rd</sup> Canadian Conference for Fisheries Research, Winnipeg, Manitoba, January 2010.
22. Backhouse, S.M. and **M.F. Docker**. 2009. Walleye population structure and identification in Lake Winnipeg using microsatellite DNA variation. 139<sup>th</sup> American Fisheries Society Annual Meeting, Nashville, Tennessee, August 2009.
23. McFarlane, C.T. and **M.F. Docker**. 2009. Testing the phylogenetic and biological species concepts in the paired lamprey species, *Ichthyomyzon unicuspis* and *I. fessor*. 139<sup>th</sup> American Fisheries Society Annual Meeting, Nashville, Tennessee, August 2009.

24. Boguski, D.A., S.B. Reid, D.H. Goodman, and **M.F. Docker**. 2008. Genetic diversity, endemism, and biogeography of the western brook lamprey (*Lampetra richardsoni*). 8<sup>th</sup> International Congress on the Biology of Fish, Portland, Oregon, July 2008.
25. Renaud, C.B. **M.F. Docker**, and N.E. Mandrak. 2008. Lampreys in Canada: changes since 1973. 138<sup>th</sup> American Fisheries Society Annual Meeting, Ottawa, August 2008.
26. **Docker, M.F.**, N.E. Mandrak, and D.D. Heath. 2007. Polyphyly and absence of fixed sequence differences suggest that “paired” species in the lamprey genus *Ichthyomyzon* represent two feeding types of a single species. 87<sup>th</sup> Joint Meeting of Ichthyologists and Herpetologists, St. Louis, July 2007.
27. Boguski, D.A., D.H. Goodman, S.B. Reid, and **M.F. Docker**. 2007. Brook lamprey diversity along the Pacific coast of North America. 87<sup>th</sup> Joint Meeting of Ichthyologists and Herpetologists, St. Louis, July 2007.
28. **Docker, M.F.** 2007. The evolution of nonparasitism in lampreys: an update on the paired species concept. 137<sup>th</sup> American Fisheries Society Annual Meeting, San Francisco, September 2007.
29. Renaud, C.B., **Docker, M.F.**, and N.E. Mandrak. 2007. Taxonomy, distribution and conservation of lampreys in Canada. 137<sup>th</sup> American Fisheries Society Annual Meeting, San Francisco, September 2007.
30. Goodman, D.H., A.P. Kinziger, S.B. Reid, and **M.F. Docker**. 2007. Morphological diagnosis of *Entosphenus* and *Lampetra ammocoetes* (Petromyzontidae) in Washington, Oregon and California. 137<sup>th</sup> American Fisheries Society Annual Meeting, San Francisco, September 2007.
31. Reid, S.B., D.H. Goodman, D. Boguski, and **M.F. Docker**. 2007. Unparalleled diversity of lamprey species from the west coast of North America. 137<sup>th</sup> American Fisheries Society Annual Meeting, San Francisco, September 2007.
32. S. Reid, D. Goodman, **M. Docker**, and D. Markle. 2005. The inland lampreys: diversity in the Klamath and Goose Basins. Oregon Chapter of the American Fisheries Society, Corvallis, Oregon, September 2005.
33. Goodman, D.H., S. Reid, **M.F. Docker**, and A.P. Kinziger. 2005. Phylogeography of *Entosphenus tridentatus* (Petromyzontidae). 85<sup>th</sup> Joint Meeting of Ichthyologists and Herpetologists, Tampa, Florida, July 2005.
34. **Docker, M.F.**, S.B. Reid, and D.F. Markle. 2005. Are lampreys with different adult life history types really different species? California-Nevada Chapter of the American Fisheries Society Symposium and 39<sup>th</sup> Annual Meeting, Sacramento, California, April 2005.
35. Goodman, D., S. Reid, and **M. Docker**. 2005. A phylogeographic study of Pacific Lamprey. California-Nevada Chapter of the American Fisheries Society Symposium and 39<sup>th</sup> Annual Meeting, Sacramento, California, April 2005.
36. Reid, S.B., D.H. Goodman, and **M. Docker**. 2005. The Western Lamprey Project. California-Nevada Chapter of the American Fisheries Society Symposium and 39<sup>th</sup> Annual Meeting, Sacramento, California, April 2005.
37. Heath, D., S. Jamieson, I. Stasiak, C. Bettles, and **M. Docker**. 2004. Population genetics of sympatric migratory and resident life history rainbow trout (*Oncorhynchus mykiss*) in British Columbia. 134<sup>th</sup> American Fisheries Society Annual Meeting, Madison, Wisconsin, September 2004.
38. Roy, D., **M.F. Docker**, P. Hehanussa, D.D. Heath, and G.D. Haffner. 2004. Associations in colouration patterns, morphology and genetic structure of a radiating freshwater fish genus from an ancient tropical island lake. Symposium for the Society for the Study of Evolution, Fort Collins, Colorado, June 2004.
39. Maeva, E., I. Bruno, F. Severin, R. Gr. Maev, B. Zielinski, and **M. Docker**. 2003. Method of acoustic microscopy for sex determination of living sea lamprey larvae, *Petromyzon marinus*. Canadian Association of Physicists Annual Congress, Charlottetown, Prince Edward Island, June 2003.

40. Heath, D.D., J.M. Shrimpton, C.R. Busch, and **M.F. Docker**. 2003. Using functional versus neutral genetic markers for stock identification: natural selection in harness. 133<sup>th</sup> American Fisheries Society Annual Meeting, Quebec City, August 2003.
41. **Docker, M.F.**, M. Nurse, C.R. Busch, and D.D. Heath. 2003. Improving natural disease resistance in farmed chinook salmon, *Oncorhynchus tshawytscha*, using marker-assisted selection. 56<sup>th</sup> Canadian Conference for Fisheries Research, Ottawa, January 2003.
42. Bettles, C.M., **M.F. Docker**, B. Dufour, and D.D. Heath. 2003. A genetic investigation of hybridization between cutthroat and rainbow trout. 56<sup>th</sup> Canadian Conference for Fisheries Research, Ottawa, January 2003.
43. Roy, D., **M. Docker**, P. Hehanussa, G.D. Haffner, and D. Heath. 2003. Genetic evidence of adaptive radiation in a continental island lake. 56<sup>th</sup> Canadian Conference for Fisheries Research, Ottawa, January 2003.
44. **Docker, M.F.**, B. Young, and D.D. Heath. 2002. Disease resistance and MHC genotype in an alternative male reproductive strategy in chinook salmon. Ecological and Evolutionary Ethology of Fishes, Quebec City, August 2002.
45. Heath, D.D., R. Hepburn, S. Brode, and **M. Docker**. 2002. Rapid genetic divergence among salmon populations at functional marker loci relative to neutral loci. Symposium for the Society for the Study of Evolution. Urbana-Champaign, Illinois, June 2002.
46. **Docker, M.F.**, and D.D. Heath. 2001. Genetic comparison between sympatric life histories of *Oncorhynchus mykiss* (anadromous steelhead and freshwater-resident rainbow trout) in British Columbia. 54<sup>th</sup> Canadian Conference for Fisheries Research, Toronto, Ontario, January 2001.
47. D. Roy, **M. Docker**, D. Heath, and G.D. Haffner. 2001. Can empty water be a barrier? Population structure of telmatherinids (sailfins) and oryzias (ricefish) in an ancient continental island lake, Lake Matano, Sulawesi, Indonesia. Symposium for the Society for the Study of Evolution. Knoxville, Tennessee, June 2001.
48. Reid, S., C. Lorion, D. Markle, **M. Docker**, T. Forbes, and S. Peets. 1999. Rediscovery of the Miller Lake lamprey, *Lampetra minima*. 1999 Desert Fish Council Meeting. Ciudad Victoria, Tamaulipas, Mexico, November 1999.
49. **Docker, M.F.**, J.H. Youson, R.J. Beamish, and R.H. Devlin. 1995. Phylogeny of the lamprey genus *Lampetra* inferred from cytochrome b and ND3 gene sequences. 7th Annual Meeting, Gilbert Ichthyological Society, University of Washington, Seattle, October 1995.
50. **Docker, M.F.**, M.L. Kent, D.M.L. Hervio, and R.H. Devlin. 1995. Ribosomal DNA sequence of *Nucleospora salmonis* (Microsporea: Enterocytozooidea) and a PCR test for its detection in chinook salmon. BC Parasitologists Meeting. University of British Columbia, Vancouver, March 1995.
51. **Docker, M.F.** and F.W.H. Beamish. 1987. Sex ratio variations in larval least brook lamprey. 49th Midwest Fish and Wildlife Conference, Milwaukee, Wisconsin, December 1987.

Poster Presentations:

1. **Docker, M.** 2014. Are Sea Lamprey native to Lake Ontario? Debating the evidence. 144<sup>th</sup> American Fisheries Society Annual Meeting, Quebec City, August 2014.
2. **Docker, M.**, T. Gingera, T.B. Steeves, and W. Li. 2014. Detection and Identification of Lampreys in Great Lakes Streams Using Environmental DNA. 144<sup>th</sup> American Fisheries Society Annual Meeting, Quebec City, August 2014.
3. **Docker, M.F.**, G. Heath, D. Childs, D.W. McCauley, and S. Whyard. 2014. RNA interference technology in sea lamprey: a proof-of-concept. International Congress on the Biology of Fish, Edinburgh, August 2014.
4. Spice, E.K., **M.F. Docker**, and S. Whyard. 2014. Gene expression during ovarian differentiation in parasitic and non-parasitic lampreys: implications for fecundity and life history types. International Congress on the Biology of Fish, Edinburgh, August 2014.

5. Spice, E.K. and **M.F. Docker**. 2014. Flexibility in timing of ovarian differentiation in northern brook and chestnut lampreys may correspond with feeding type flexibility. Institute of Fisheries Management Lamprey Conference, York, UK, May 2014.
6. Hart, C.G., **M.F. Docker**, and J.D. Reist. 2013. Developing species-specific DNA markers for gadoids in the Beaufort Sea. Prairie University Biology Symposium, Winnipeg, February 2013.
7. Postma, L., D. Tenkula, and **M. Docker**. 2012. Patterns of mitochondrial DNA haplotypes from beluga whales (*Delphinapterus leucas*) in space and time: influence of matriline on summer habitat use in the Beaufort Sea. First Joint Conference on Evolutionary Biology, Ottawa, July 2012.
8. Boguski, D.A., S.B. Reid, S.B., D.H. Goodman, and **M.F. Docker**. 2011. Yet another “splitter” – genetic diversity reveals cryptic lamprey species in western North America. 141<sup>st</sup> American Fisheries Society Annual Meeting, Seattle, September 2011.
9. **Docker, M.F.**, K.D. Bailey, and E.K. Spice. 2011. Simple genetic assay distinguishes the lamprey genera *Entosphenus* and *Lampetra* and further supports placement of the Kern Brook Lamprey in the genus *Lampetra*. 141<sup>st</sup> American Fisheries Society, Seattle, September 2011.
10. Postma, L. and **Docker, M.F.** 2011. In the wrong place at the wrong time: beluga whales (*Delphinapterus leucas*) and ice-entrapments in the Husky Lakes, Northwest Territories, Canada. 19<sup>th</sup> Biennial Conference on the Biology of Marine Mammals, Tampa, Florida, November 2011.
11. Spice, E.K., D.H. Goodman, S.B. Reid, and **M.F. Docker**. 2011. Microsatellite analysis indicates low genetic differentiation and lack of natal homing in Pacific Lamprey. 141<sup>st</sup> American Fisheries Society, September 2011.
12. Whitesel, T.A., E.K. Spice, G.S. Silver, K.D. Bailey, and **M.F. Docker**. 2011. Microsatellite analysis indicates high genetic differentiation and population structure in Western Brook Lamprey in the Columbia River Basin. 141<sup>st</sup> American Fisheries Society, September 2011.
13. R.D. Mooi, Schroeder, B.S., and **M.F. Docker**. 2010. An isolated and differentiated population of *Gasterosteus aculeatus* (Gasterosteidae: Gasterosteiformes) from Nuelin Lake in northwestern Manitoba. 90<sup>th</sup> Joint Meeting of Ichthyologists and Herpetologists, Providence, Rhode Island, July 2010.
14. Spice, E. and **M.F. Docker**. 2010. Population structure of Pacific Lampreys (*Entosphenus tridentatus*) along the west coast of North America. 63<sup>rd</sup> Canadian Conference for Fisheries Research, Winnipeg, January 2010.
15. McFarlane, C.M. and **M.F. Docker**. 2010. Detection of selection for feeding type in paired lamprey species. 63<sup>rd</sup> Canadian Conference for Fisheries Research, Winnipeg, January 2010.
16. Schroeder, B.S., R.D. Mooi, and **M.F. Docker**. 2009. An isolated population of three-spined stickleback (*Gasterosteus aculeatus*) identified in Nuelin Lake, Manitoba and Nunavut: post-glacial dispersal and population relatedness. 139<sup>th</sup> American Fisheries Society Annual Meeting, Nashville, Tennessee, August 2009.
17. **Docker, M.F.** 2007. Heterochrony and the evolution of nonparasitism in lampreys. 1<sup>st</sup> General Meeting of the Canadian Society for Ecology and Evolution, Toronto, May 2007.
18. **Docker, M.**, Maeva, E., Zielinski, B., Bruno, I., Maev R.G. 2005. Non-invasive sex determination of larval sea lampreys using acoustic microscopy. 58<sup>th</sup> Canadian Conference for Fisheries Research, Windsor, January 2005.
19. **Docker, M.**, F. Neave, N. Mandrak, and D. Noakes. 2004. Identification of native lampreys: the enigma of *Ichthyomyzon* species. Sea Lamprey Research Priorities Working Group Meeting, Guelph, Ontario, September 2004.
20. Therriault, T., M. Orlova, **M. Docker**, H. Maclsaac, and D. Heath. 2004. Genetic identity and invasion dynamics of the quagga mussel in the Volga River basin and Great Lakes as revealed by microsatellite analyses. 13<sup>th</sup> International Invasive Species Conference, Ennis, Ireland, September 2004.
21. Roy, D., **M. Docker**, P. Hehanussa, D.D. Heath, and G.D. Haffner. 2004. Colouration patterns do not fall along genetic species lines in *Telmatherina*, a tropical island radiating freshwater fish

- genus from Sulawesi. 29<sup>th</sup> Congress of the International Association of Limnology, Helsinki, Finland, August 2004.
22. Youson, J.H., **M. Docker**, and S.A. Sower. 1995. Concentration of gonadotropin-releasing hormones in brain of larval and metamorphosing lampreys of two species with different adult life histories. 5<sup>th</sup> International Symposium, Reproductive Physiology of Fish, University of Texas, Austin, Texas, July 1995.
  23. **Docker, M.F.** and F.W.H. Beamish. 1989. Effects of gonadal steroids on sexually differentiated sea lamprey, *Petromyzon marinus*. XI<sup>th</sup> International Symposium on Comparative Endocrinology, Malaga, Spain, May 1989.

### Research Reports:

1. **Docker, M.**, S. Whyard, M. Steeves, and W. Li. 2014. Detection and identification of lampreys in streams using environmental DNA. Great Lakes Fishery Commission Project Completion Report, Ann Arbor, Michigan. 24 pp.
2. **Docker, M.F.** 2013. Gene expression differences between feeding types in the paired lampreys *Ichthyomyzon unicuspis* and *I. fossor*. Great Lakes Fishery Commission Project Completion Report, Ann Arbor, Michigan. 18 pp.
3. **Docker, M.F.** 2013. Microsatellite analysis on Pacific Lamprey from the Willamette Basin, OR. Final report to the Columbia River Inter-Tribal Fish Commission, Portland, Oregon, 6 pp.
4. S. Whyard and **M. Docker**. 2012. Gene silencing technologies to control sea lamprey – a proof-of-concept. Great Lakes Fishery Commission Project Completion Report, Ann Arbor, Michigan. 18 pp.
5. **Docker, M.** 2010. Microsatellite analysis on Pacific Lamprey along the west coast of North America. Annual report to the U.S. Fish and Wildlife Service, Arcata, California. 21 pp.
6. **Docker, M.F.**, N.E. Mandrak, D.D. Heath, and K.T. Scribner. 2005. Genetic markers to distinguish and quantify the level of gene flow between northern brook and silver lampreys. Great Lakes Fishery Commission Project Completion Report, Ann Arbor, Michigan. 37 pp.
7. Mandrak, N.E., **M.F. Docker**, and D.D. Heath. 2004. Native *Ichthyomyzon* lampreys of the Great Lakes: development of genetic markers and a morphological key to ammocoetes. Great Lakes Fishery Commission Project Completion Report, Ann Arbor, Michigan. 114 pp.

## TEACHING ACTIVITIES

### Undergraduate Courses:

#### University of Manitoba:

1. BIOL 2210: Chordate Zoology (2008 – 2010, 2012 – 2015)
2. BIOL 3300: Evolutionary Biology (2006 – 2015)
3. BIOL 4212: Systematics and Biogeography of Fishes (2008 – 2014)
4. BIOL 4890: Special Topics in Biology: Cell and Molecular Aspects of Lamprey Development (2010)

#### University of Northern British Columbia:

1. BIOL 100: Introduction to Biology (1998 – 2000)
2. BIOL 307: Ichthyology and Herpetology (1997)
3. BIOL 311: Cell and Molecular Biology (1998)
4. BIOL 406: Fisheries Ecology (1997 – 1998)
5. BIOL 411: Conservation Biology (1999)



**Graduate Courses:**University of Manitoba:

1. ZOOL 7220: Advanced Topics in Zoology: Aquatic Biology (2008 – 2009)
2. BIOL 7220: Critical Thinking in Biological Sciences (2010 – 2015)
3. BIOL 7600: Special Topics in Biology: Cell and Molecular Aspects of Lamprey Development (2010)
4. BIOL 7600: Special Topics in Biology: Advanced Fish Systematics (2012)
5. BIOL 7600: Special Topics in Biology: Advanced Evolutionary Biology (2014)

## SUPERVISION OF GRADUATE AND UNDERGRADUATE RESEARCH

**Graduate Students:**

Supervised: in reverse chronological order

University of Manitoba:

MSc Students: \* = graduated

1. Khan, Arfa (MSc)  
Gene expression during testicular differentiation in metamorphosing lampreys (2015 – present)
2. Gingera, Timothy (MSc)  
Environmental DNA technologies for detection and identification of rare and invasive aquatic species (2014 – present; co-supervised with Dr. James Reist)
3. Li, Youyang (MSc\*)  
Phylogeny of the lamprey genus *Lethenteron* using molecular data (2011 – 2014)
4. Childs, Darcy (MSc\*)  
Genomic and phylogenetic assessment of sea lamprey (*Petromyzon marinus*) *Hox* genes and analysis of *Hox* genes in association with myomeres across multiple lamprey genera (2011 – 2013; co-supervised with Dr. Steven Whyard)
5. Spice, Erin (MSc\*)  
Ovarian differentiation in an ancient vertebrate: Timing, candidate gene expression, and global gene expression in parasitic and non-parasitic lampreys (2010 – 2013)
6. Heath, George (MSc\*)  
RNAi and sexual development in sea lamprey (*Petromyzon marinus*): augmentation of current control strategies (2010 – 2012; co-supervised with Dr. Steven Whyard)
7. McFarlane, Craig (MSc)  
Genetic basis of feeding type in paired species of lamprey (2009 – 2013)
8. Kowalchuk, Matthew (MSc)  
Taxonomic and phylogenetic analysis of North American Dolly Varden (*Salvelinus malma*) using mitochondrial and nuclear markers (2009 – 2012; co-supervised with Dr. James Reist)
9. Backhouse, Stephanie (MSc\*)  
Using microsatellite and mitochondrial DNA variation to investigate population structure of walleye (*Sander vitreus*) in Lake Winnipeg (2007 – 2009)
10. Boguski, David (MSc\*)  
The genetic diversity of brook lampreys genus *Lampetra* (Petromyzontidae) along the Pacific coast of North America (2007 – 2009)

## PhD Students:

1. Ajmani, Nisha (PhD)  
Genomic and transcriptomic basis for feeding type in parasitic and non-parasitic lampreys (2015 – present; co-supervised with Dr. Sara Good, University of Winnipeg)
2. Mochnacz, Neil (PhD)  
Ecological thresholds of stream salmonids in the north: developing better tools to support environmental assessment and ecosystem-based management (2014 – present; co-supervised

- with Dr. Daniel Isaak, U.S. Forest Service)
3. Dunmall, Karen (PhD)  
Salmonids and Arctic climate change: colonizations and interactions of salmon and chars (2011 – present; co-supervised with Dr. James Reist)
  4. Postma, Lianne (PhD)  
Genetic monitoring and conservation of beluga whales (*Delphinapterus leucas*) in the western Canadian Arctic (2010 – present)

Advisory Committee Member: alphabetically (\* = graduated)

*University of Manitoba*:

1. Abbasi, Roohollah (PhD)  
Phylogenomics approaches to the study of the evolution of colour patterns in Lady and Admiral Butterflies Genus *Vanessa* (Advisor: Dr. Jeffrey Marcus)
2. Herrera, Andres (PhD)  
Molecular phylogeny of Ichneumonidae and the evolution of parasitic life strategies (Advisor: Dr. Barbara Sharanowski) (Department of Entomology)
3. Hunter, Lisa (MSc)  
Avoidance behaviour in betta fish (Advisor: Dr. Joseph Pear) (Department of Psychology)
4. Gardiner, Kathleen (MSc\*)  
The role of cephalopods in the Canadian Arctic: an examination of their distribution, biogeography and trophic interactions within the Canadian eastern Arctic (Advisor: Dr. Terry Dick)
5. Kissinger, Benjamin (PhD)  
Phenotypic plasticity of Lake Trout *Salvelinus namaycush* (Walbaum 1792): analysis of saltwater habitat use by a stenohaline freshwater species (Advisors: Drs. James Reist and Gary Anderson)
6. Klassen, Cheryl (PhD\*)  
Means and persistence of growth rate variability within juvenile lake sturgeon cohorts: implications for natural and artificial recruitment (Advisor: Dr. Gary Anderson)
7. McDougall, Craig (MSc\*)  
Investigating downstream passage of lake sturgeon over a hydroelectric generating station (Advisors: Drs. Gary Anderson, Steve Peake)
8. Murray, Laura (MSc\*)  
Effect of Nanosilver particles on metabolism and cortisol release in Rainbow trout (*Oncorhynchus mykiss*) (Advisors: Drs. Mike Rennie, Jim Roth)
9. Namin, Hooman (MSc\*)  
Fingerprinting of mosquito species occurring in Canada (Advisors: Drs. Barbara Sharanowski and Mahmood Iranpour) (Department of Entomology)
10. Piekarski, Patrick (MSc)  
Molecular phylogeny of the Vespidae (Advisor: Dr. Barbara Sharanowski) (Department of Entomology)
11. Pawlychyn, Zoya (MSc\*)  
Adaptation and habitat selection during the migration of an Arctic anadromous fish, broad whitefish, *Coregonus nasus* (Pallas 1776) (Advisor: Dr. Ross Tallman)
12. Penton, Paulette (PhD\*)  
An elucidation of the factors responsible for the presence of two spawning strategies in capelin (*Mallotus villosus*) in coastal Newfoundland (Advisor: Dr. Gail Davoren)
13. Schroeder, Bethany (MSc\*)  
Postglacial history of three-spined stickleback (*Gasterosteus aculeatus*) in Nueltin Lake, MB and Nunavut (Advisor: Dr. Randall Mooi)
14. Ulrich, Kendra (MSc\*)  
Trophic ecology of Arctic char (*Salvelinus alpinus*) in the Cumberland Sound region of the

Canadian Arctic: Insights from stable isotope and fatty acid analyses (Advisor: Dr. Ross Tallman)

15. Van Wallegghem, Elissa (MSc\*)  
Diagnostic assay development and live infection study for the Namao virus (Advisors: Drs. Sharon Clouthier and Gary Anderson)

*Other Universities:*

1. Goodman, Damon (MS)  
Evidence for high levels of gene flow among populations of a widely distributed anadromous lamprey; Humboldt State University, Arcata, California (Completed 2006; Advisors: Drs. Andrew Kinzinger, Stewart Reid)
2. Roy, Denis (PhD)  
The evolutionary history and ecology of *Telmatherina* in Lake Matano: An example of adaptive radiation in an ancient lake; University of Windsor, Windsor, Ontario (Completed 2006; Advisors: Drs. Douglas Haffner, Daniel Heath)
3. Neave, Fraser (MSc)  
The utility of meristic, morphometric, pigmentation and gonad analysis in the identification of *Ichthyomyzon* larvae; University of Guelph, Guelph, Ontario (Completed 2004; Advisors: Drs. Nicholas Mandrak, David Noakes)

**Undergraduate Honours Thesis Students:**

Supervised: in reverse chronological order

*University of Manitoba:*

1. Fox, Alicia  
Molecular phylogeny of the lamprey genus *Lethenteron* (2015 – 2016)
2. Collerone, Stacey  
Habitat and distribution of larval and spawning silver, chestnut, and northern brook lampreys in Manitoba (2013 – 2014; co-supervised with Dr. Gail Davoren)
3. Gingera, Timothy  
The use of environmental DNA (eDNA) for detecting larval lampreys within stream systems as a tool for conservation and control (2012 – 2013)
4. Hart, Christopher  
Developing species-specific DNA markers for gadoids in the Beaufort Sea (2012 – 2013)
5. Wiens, Lilian  
Characterization of the globin genes of cyclostomes (2012 – 2013; co-supervised with Dr. Kevin Campbell)
6. Spice, Erin  
Population structure of the Pacific lamprey, *Entosphenus tridentatus*, along the west coast of North America: evidence against natal homing (2009 – 2010)
7. McFarlane, Craig  
Testing the phylogenetic and biological species concepts in the paired lamprey species, *Ichthyomyzon unicuspis* and *I. fossor* (2008 – 2009)

Advisory Committee Member:

*University of Manitoba:*

1. Haverstick, Ashley  
Species relationships of the tortoiseshell butterflies (Lepidoptera: Nymphalidae): testing the hypothesis of introgressive mitochondrial hybridization in the genera *Aglais* and *Nymphalis* (2015 – 2016; Advisor: Dr. Jeffrey Marcus)
2. Bone, Bryden  
Cannibalism in capelin *Mallotus villosus* (2014 – 2015; Advisor: Dr. Gail Davoren)

*University of Winnipeg:*

1. Groening, Laura  
Variation of Dolly Varden *Salvelinus malma* in Northwestern North America (2007 – 2008)  
(Advisor: Dr. James Reist)

**Undergraduate Student Research Award (USRA) Supervision:**

1. Bryden Bone (NSERC 2015)  
Sensitive environmental DNA assays to detect silver, chestnut, and northern brook lampreys
2. Alicia Fox (Faculty of Science 2015)  
Molecular phylogeny of the lamprey genus *Lethenteron*
3. Cassidy Erdelyan (Faculty of Science 2011; co-supervised with Dr. S. Whyard)  
Detection and identification of lamprey species using environmental DNA
4. Martin, Amanda (Faculty of Science 2011; co-supervised with Dr. S. Whyard)  
Detection and identification of lamprey species using environmental DNA
5. McFarlane, Craig (NSERC 2008)  
Characterization of 14 microsatellite loci

**ACADEMIC AWARDS AND RESEARCH FUNDING****Academic Awards:**

- |            |  |
|------------|--|
| 1984       | University of Guelph Alma Mater BSc Scholarship                                  |
| 1984       | University of Guelph Biological Science Students' Council Scholarship            |
| 1984, 1985 | NSERC Undergraduate Summer Research Awards                                       |
| 1985–1989  | NSERC Postgraduate Scholarships  |
| 1985       | Keith Ronald Graduate Scholarship  |
| 1986       | College of Biological Science Alumni Association Alma Mater Graduate Scholarship |

**Research Funding:**

1. Dunmall, K., N. Mochnacz, and **M.F. Docker**  
Monitoring Pacific salmon to understand cumulative impacts of climate change in the Arctic (2015 – 2016)  
Northwest Territories Environment and Natural Resources, Cumulative Impact Monitoring Program  
\$55,000
2. Environmental DNA sampling for chestnut and northern brook lampreys in Manitoba (2015 – 2016)  
Faculty of Science Field Work Support Program  
\$1,862
3. Rees, C.B., **M.F. Docker**, J.J. Amberg, W. Li, and T.B. Steeves  
Sea lamprey quantitative environmental DNA surveillance (2014 – 2016)  
Great Lakes Fishery Commission (Sea Lamprey Research Program)  
\$240,000 USD
4. **Docker, M.F.**  
Tailoring genomics techniques for fisheries and conservation applications (2014 – 2016)  
Fisheries and Oceans Canada, Academic Research Contribution Program  
\$91,000
5. Dunmall, K., N. Mochnacz, and **M.F. Docker**  
Monitoring Pacific salmon to understand cumulative impacts of climate change in the Arctic (2014 – 2015)  
Northwest Territories Environment and Natural Resources, Cumulative Impact Monitoring

- Program  
\$52,250
6. **Docker, M.F.**  
Developmental and genetic basis of life history variation along a speciation continuum (2013 – 2018)  
NSERC Discovery Grant  
\$110,000
  7. **Docker, M.F.**  
Collection of lampreys in Manitoba to determine if adult feeding type determined by the rearing environment (2013 – 2014)  
Faculty of Science Field Work Support Program  
\$2,220
  8. Docker, M.F.  
Genetic differentiation of chestnut lamprey from co-occurring lamprey species  
Fisheries and Oceans Canada (Species at Risk Program)  
\$4,400
  9. Dunmall, K., N. Mochnacz, and **M.F. Docker**  
Monitoring Pacific salmon to understand cumulative impacts of climate change in the Arctic (2013 – 2014)  
Northwest Territories Environment and Natural Resources, Cumulative Impact Monitoring Program  
\$66,000
  10. **Docker, M.F.**  
Using next-generation sequencing to test for inter-basin transfer of invasive lampreys (2013 – 2014)  
University of Manitoba University Research Grant Program  
\$7,080
  11. Dunmall, K., N. Mochnacz, and **M.F. Docker**  
Monitoring Pacific salmon to understand cumulative impacts of climate change in the Arctic (2012 – 2013)  
Aboriginal Affairs and Northern Development Canada, Cumulative Impact Monitoring Program  
\$50,875
  12. **Docker, M.F.**, S. Whyard, T.B. Steeves, and W. Li  
Detection and identification of lampreys in streams using environmental DNA (2011 – 2014)  
Great Lakes Fishery Commission (Sea Lamprey Research Program)  
\$83,475
  13. **Docker, M.F.**  
Gene expression differences between feeding types in the paired lampreys *Ichthyomyzon unicuspis* and *I. fossor* (2011 – 2014)  
Great Lakes Fishery Commission (Sea Lamprey Research Program)  
\$20,000
  14. **Docker, M.F.**  
Taxonomy and systematics of lamprey genus *Lethenteron* (2011 – 2012)  
Canadian Museum of Nature  
\$3,000
  15. **Docker, M.F.**  
Collection of lampreys in Manitoba (*Ichthyomyzon* spp.) for genetic and developmental studies (2012 – 2013)  
Faculty of Science Field Work Support Program  
\$1,750

15. **Docker, M.F.**  
Microsatellite analysis on Pacific lamprey from the Willamette Basin (2010 – 2011)  
Columbia River Inter-Tribal Fish Commission  
\$15,394 USD
16. **Docker, M.F.**  
Microsatellite analysis on Pacific lamprey along the west coast of North America (2010 – 2011)  
U.S. Fish and Wildlife Service  
\$13,000 USD
17. **Docker, M.F.**  
High-throughput molecular genetics facility (2010)  
Canada Foundation for Innovation (Leaders Opportunity Fund)  
\$256,000
18. S. Whyard and **Docker, M.F.**  
Gene silencing technologies to control sea lamprey – a proof-of-concept (2009 – 2011)  
Great Lakes Fishery Commission (Sea Lamprey Research Program)  
\$93,014
19. **Docker, M.F.**  
Methow lamprey inventory and assessment (Washington) (2009)  
National Fish and Wildlife Foundation  
\$4,000 USD
20. **Docker, M.F.**  
Testing the congruence of independent DNA markers in phylogeny reconstruction (2008 – 2010)  
University of Manitoba University Research Grants Program (URGP)  
\$6,605
21. Neave, F.B., T.B. Steeves, **M.F. Docker**, T.C. Pratt, and R.L. McLaughlin  
An investigation of a potential morphotype trigger in two *Ichthyomyzon* species (2007 – 2013)  
Great Lakes Fishery Commission (Sea Lamprey Research Program)  
\$140,030 total (\$91,530 for the genetics portion to be conducted at U of M)
22. **Docker, M.F.**  
Disruptive selection and the genetic basis for repeated evolution of nonparasitism in lampreys (2007 – 2012)  
NSERC Discovery Grant  
\$86,600
23. **Docker, M.F.**  
Evaluating the population structure of lamprey, *Lampetra richardsoni* and *Entosphenus tridentatus* (2007 – 2011)  
U.S. Fish and Wildlife Service  
\$48,000 USD
24. **Docker, M.F.**  
Population structure and stock identification of walleye in Lake Winnipeg using microsatellite DNA variation (2007 – 2009)  
Manitoba Fisheries Enhancement Fund  
\$65,750
25. **Docker, M.F.**, S. Whyard, and G. Valdimarsson  
Refrigerated tabletop centrifuge with microplate capacity for use in DNA sequencing and other molecular genetic studies (2007)  
NSERC Research Tools and Instruments Grant  
\$13,886

26. **Docker, M.F.**  
Genetic study of isolated brook lamprey populations along the west coast of North America: Identification of potential new species (2006)  
University of Manitoba University Research Grants Program (URGP)  
\$5,904
27. **Docker, M.F.**, N.E. Mandrak, D.D. Heath, and K.T. Scribner  
Genetic markers to distinguish northern brook and silver lampreys (2003 – 2004)  
Great Lakes Fishery Commission (Sea Lamprey Research Program)  
\$17,850 USD
28. Mandrak, N.E., **M.F. Docker**, and D.D. Heath  
Native *Ichthyomyzon* lampreys of the Great Lakes Basin: Development of genetic markers and a morphological key to ammocoetes (2002 – 2003)  
Great Lakes Fishery Commission (Sea Lamprey Research Program)  
\$67,463 USD
29. Haas, G. and **M.F. Docker**  
Status and conservation of biodiversity in lamprey species in BC (2000 – 2001)  
Habitat Conservation Trust Fund  
\$30,000
30. **Docker, M.F.**, S.B. Reid, and D.F. Markle  
Status of the presumed extinct Miller Lake lamprey, *Lampetra minima*, in the Klamath Basin, Oregon (1998 – 1999)  
U.S. Fish and Wildlife Service (Species at Risk Program)  
\$29,336 USD
31. **Docker, M.F.**  
Goose Lake lamprey study (1996 – 1999)  
Oregon Department of Fish and Wildlife  
\$38,000 USD  
Sower, S.A., **M.F. Docker**, and A. Gorbman  
Hormonal sterilization of early lamprey larvae (1994 – 1996)  
Great Lakes Fishery Commission (Sea Lamprey Research Program)  
\$17,000 USD

## SERVICE AT THE UNIVERSITY OF MANITOBA

### Departmental Committees:

#### *Ongoing Department of Biological Sciences Committees:*

1. Seminar Committee (2007 – present)  
With input from the department, this committee helps select and invite up to 10 seminar speakers per year, including at least two external speakers.
2. Chair of Evolution and Biodiversity Theme Group (2009 – present)  
I facilitate discussions among the various faculty members associated with this theme group, and serve as an advisor to students interested in the Evolution and Biodiversity theme.
3. Graduate Studies Committee (2012 – present; Chair since 2014)  
I help evaluate applicants to the Department of Biological Sciences MSc and PhD programs; chair PhD proposal presentations, MSc and PhD defenses, and PhD candidacy exams in other departments or serve as the GSC examiner on PhD candidacy exams; and will be helping to oversee the graduate program review which is to be completed by March 2016.
4. Undergraduate Studies Curriculum Committee (2009 – present)  
I participate in discussions regarding changes to the undergraduate curriculum, including the introduction of new courses or modifications to existing courses.

## 5. Biological Collections and Museum Committee (2014 – present)

This committee: 1) coordinates curation efforts among the different biological collections within the department, with the intent of making these collections and their databases available to the university and wider scientific communities; and 2) is working to improve the infrastructure associated with the Stewart-Hay Memorial Museum and promote its use for teaching and outreach.

*Search Committees:*

1. Biology Instructor I (2007)
2. Canada Research Chair Tier II position in Phylogenomics (2007)
3. Assistant Professor in Parasitology (2012)
4. Assistant Professor in Ornithology (2013)
5. Assistant Professor in Molecular Population Genetics and Genomics (2014)
6. Assistant Professor in Fish Physiology (2015)

*PhD Candidacy Examination Committees:*

Examiner for the following students:

1. Chambellant, Magaly (Feb 2007)
2. Pink, Melissa (Mar 2007)
3. Penton, Paulette (Apr 2008)
4. Day, Chris (Apr 2009)
5. Klassen, Cheryl (Jun 2009)
6. Allen, Joe (Apr 2010)
7. Athukorala, Sarangi (Nov 2012)
8. Deduke, Chris (Jan 2013)
9. Halwas, Sara (Apr 2013)
10. Abbasi, Roohollah (Oct 2013; Jan 2014)
11. Choy, Emily (Dec 2013)
12. Szumski, Christa (May 2014)

Chair for:

1. Shearer, David (May 2007)

*Other Contributions to the Department of Biological Sciences:*

1. Curator, Department of Biological Sciences Fish Museum (2006 – present)
2. BIOL 3100 Skills in Biological Sciences (2009 – present)  
Yearly presentation to class entitled “Animal Aquatic Research” and serve as advisor for student literature reviews and proposals

*Outreach for the Department of Biological Sciences:*

1. Peguis First Nation Science and Technology Symposium  
I designed and delivered hands-on workshops entitled “Animal CSI: Species Identification Using DNA Analysis” for First Nation high school students from Manitoba (February 2007, 2008)
2. Radio interview with Marilyn Maki, Radio Noon (CBC Manitoba), regarding my research using genetic markers to examine population structure and stock identification of walleye in Lake Winnipeg (September 2007)
3. Seven Oaks School Division Met School  
I met with high school students interested in learning more about evolution  
Teacher contact: David Zynoberg (November 2009)
4. University of Manitoba Info Days  
I gave two presentations entitled “Evolution of Biological Diversity” to promote the Evolution and Biodiversity Theme in the Department of Biological Sciences (February 2010)



5. International Baccalaureate Outreach Workshop  
I gave hands-on workshop entitled "Animal CSI" (March 2010)
6. University of Manitoba, 10<sup>th</sup> Annual Undergraduate Research Poster Competition judge  
(October 2015)

Faculty Committees:

*Doctoral Dissertation Defense Committee Chair:*

- Golkari, Saber; Department of Botany (June 2007)
- Carrie, Jesse; Department of Environment and Geography (March 2010)
- Roche-Lima, Abiel; Department of Computer Science (November 2014, February 2015)

*Search Committees*

- Department of Statistics, two Assistant Professor positions (2008 – 2009)
- Department of Chemistry, Assistant Professor in Organic Chemistry (2013)
- Department of Chemistry, Head (2014 – 2015)

*Other*

- Faculty of Science Promotion Nucleus Committee (2013 – present)

University Committees:

- Faculty Council of Graduate Studies (2007 – 2008)

## SERVICE TO THE PROFESSION

Journal Referee for:

1. Acta Zoologica
2. Biological Journal of the Linnean Society
3. BMC Genetics
4. Canadian Field-Naturalist
5. Canadian Journal of Fisheries and Aquatic Sciences
6. Canadian Journal of Zoology
7. Comparative Biochemistry and Physiology
8. Conservation Genetics
9. Contributions to Zoology
10. Copeia
11. Current Biology
12. Current Zoology
13. Ecology of Freshwater Fish
14. Environmental Biology of Fishes
15. Evolutionary Ecology
16. Fisheries
17. Genetica
18. Genome
19. Heredity
20. Ichthyological Research
21. Journal of Biomedical Sciences and Engineering
22. Journal of Experimental Zoology
23. Journal of Fish Biology
24. Journal of Great Lakes Research
25. Journal of Natural History

26. Marine and Freshwater Research
27. Molecular Ecology
28. Molecular Phylogenetics and Evolution
29. North American Journal of Aquaculture
30. North American Journal of Fisheries Management
31. Proceedings of the Royal Irish Academy
32. Proceedings of the Royal Society B: Biological Sciences
33. Royal Irish Academy
34. Transactions of the American Fisheries Society
35. Zookeys
36. Zootaxa

Peer Reviewer for:

1. Two chapters in American Fisheries Society “Biology, Management, and Conservation of Lampreys in North America” symposium proceedings
2. Four chapters in American Fisheries Society “Jawless Fishes of the World” symposium proceedings
3. One chapter in SD McCormick, AP Farrell and CJ Brauner (eds) Euryhaline fishes, vol 32, Fish physiology, Academic Press

Book Reviewer for:

1. Arctic Marine Fishes of Canada, University of Toronto Press: reviewed penultimate draft of manuscript, providing an assessment of the overall project in terms of its aims, scope, and structure

External PhD Thesis Reviewer for:

1. Vilnius University, Lithuania, Institute of Ecology of Nature Research Centre – Robertas Staponkus, “Biology and peculiarities of the population-genetic structure of Lithuanian cephalaspidomorphs (Cephalaspidomorphi)” (Supervisor: Dr. Vytautas Kesminas; October 2015)
2. Rennes University, France, Conservation and Restoration of Aquatic Ecosystems – Quentin Rougemont, “Evolution of anadromy in lampreys.” (Supervisors: Drs. Guillaume Evanno, Sophie Launey; November – December 2015)

Technical Reviewer for:

1. Management Plan for the Northern Brook and Silver lampreys in Canada (Great Lakes – Upper St. Lawrence populations)
2. National Recovery Team for Morrison Creek Lamprey
3. National Recovery Team for Vancouver Lamprey
4. University of Winnipeg, Animal Care Scientific Merit

Grant Proposal Reviewer for:

1. Alberta Innovates – Technology Futures: Ingenuity New Faculty Award Proposal
2. Canada Foundation for Innovation (CFI)
3. Great Lakes Fishery Commission
4. Habitat Conservation Trust Fund
5. Mitacs Converge Research Program
6. Natural Sciences and Engineering Research Council (NSERC) Discovery Grants
7. Natural Sciences and Engineering Research Council (NSERC) Strategic Grants
8. Portuguese Science Foundation
9. Pollock Conservation Cooperative Research Center (PCCRC)

Symposium Organization:

1. Biology of Lampreys: From Ecology to Genomics symposium at the 8<sup>th</sup> International Congress on the Biology of Fish, Portland, Oregon (July 2008)
2. Divergent Morphotypes in Temperate Species: Resources and Evolution symposium at the 63<sup>rd</sup> Canadian Conference for Fisheries Research, Winnipeg (January 2010)
3. Lampreys: Performance, Physiology, and Coping with Environmental Disturbances symposium at the 11<sup>th</sup> International Congress on the Biology of Fish, Edinburgh (August 2014)

Professional Societies:

1. Secretary–Treasurer of the Mid-Canada Chapter (MCC) of the American Fisheries Society (2009 – present)
2. Canadian Conference for Fisheries Research (CCFFR) Board of Directors (2015 – present)

Science Advisory Boards:

1. COSEWIC (Committee on the Status of Endangered Wildlife in Canada) Freshwater Fishes Species Specialist Subcommittee (2007 – present)  
My duties on this committee include reviewing approximately 15 species status reports per year, providing status recommendations for approximately 10–15 species per year, helping decide which freshwater fish species are priorities for status reports in the coming year, evaluating the bids from contractors seeking to write the status reports, reviewing applications for new Species Specialist Subcommittee members, attending a three-day annual meeting, and participating in conference calls and e-mail discussions throughout the year; recently reappointed to third four-year term.
2. Great Lakes Fishery Commission Sea Lamprey Research Board (December 2015)  
The board meets twice per year during March and September to review research proposals and formulate an annual program of research entitled “Sea Lamprey Research Program” around thematic areas and recommends this program for funding to the Commission
3. Manitoba Conservation and Water Stewardship Zebra Mussel Scientific Advisory Team (2015 – present)

Other Service to the Profession:

1. Invited expert to participate in a pre-COSEWIC assessment meeting on silver lamprey; Fisheries and Oceans Canada, Burlington, Ontario (March 2007)
2. Invited expert to participate in a workshop entitled, “The Interaction between Sea Lamprey Control and Species listed under the Canadian Species at Risk Act;” Fisheries and Oceans Canada, Sarnia, Ontario (March 2008)
3. Invited panel expert to evaluate a proposal by the U.S. Fish and Wildlife Service (USFWS) to remove four dams in the Klamath River in Oregon and California, Medford, Oregon (July 2010)
4. Invited expert to participate in a pre-COSEWIC assessment meeting on lake sturgeon; Fisheries and Oceans Canada, Winnipeg (October 2015)

August 2015

**CURRICULUM VITAE****BRUCE AUSTIN FORD****PERSONAL:**

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University of Manitoba  
Winnipeg, Manitoba  
R3T 2N2

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email bruce.ford.umanitoba.ca  
websites bruceford.weebly.com  
winherbarium.weelby.com

**POST-SECONDARY EDUCATION:**

<u>Year</u>	<u>Degree/ Diploma</u>	<u>Institution</u>	<u>Subject</u>	<u>Thesis title</u>
1990	Ph. D.	University of Toronto, Toronto, Ontario	Botany	The taxonomy of the circumpolar short-beaked taxa of <i>Carex</i> section <i>Vesicariae</i> .
1985	Hon. B.Sc.	Trent University, Peterborough, Ontario	Biology	An autecological study of <i>Platanthera leucophaea</i> in Ontario.
1980	Certificate	National Outdoor Leadership School, Lander, Wyoming	Wilderness survival, outdoor skills	NA
1979	Diploma	Seneca College, King City, Ontario	Historical and Natural Interpretation	NA

**EMPLOYMENT HISTORY:**

<u>Dates</u>	<u>Position</u>	<u>Employer</u>
04/04-present	Professor	Department of Biological Sciences (formerly the Department of Botany), University of Manitoba, Winnipeg, Manitoba
07/93-present	Curator, University of Manitoba Herbarium (WIN)	Department of Biological Sciences, University of Manitoba, Winnipeg, Manitoba
01/98-03/04	Associate Professor	Department of Botany, University of Manitoba, Winnipeg, Manitoba
07/00 - 07/03	Assistant Head	Department of Botany, University of Manitoba, Winnipeg, Manitoba
07/93 - 01/98	Assistant Professor	Department of Botany, University of Manitoba, Winnipeg, Manitoba
07/90 - 08/91 & 04/92 - 06/93	Environmental Consultant	Ecological Services for Planning Ltd., Guelph, Ontario
09/91 - 04/92	Assistant Scientific Editor/Database Manager, Flora of North America Project	Missouri Botanical Garden, St. Louis, Missouri
1985- 1990	Teaching Assistant	University of Toronto, Toronto, Ontario
1985	Rare Vascular Plant Research Technician	Canadian Museum of Nature, Ottawa
1983-1984	Teaching Assistant	Trent University, Peterborough Ontario
1979-1983	Interpretive Naturalist	Parks Canada: Banff, Point Pelee, and St. Lawrence Islands National Parks

**GRANTS/CONTRACTS:**

<u>Year</u>	<u>Source</u>	<u>Title of Grant</u>	<u>Total Amount</u>
2014-2016	National Geographic Society, Research and Exploration Grant	Vietnam: center of origin for the world's largest flowering plant genus	\$19,850 USD
2015	Faculty of Science, University of Manitoba, Field Work Support Program	A comprehensive botanical study and classification of Manitoba's alvars	\$8,010
2014	Faculty of Science, University of Manitoba, Field Work Support Program	A comprehensive botanical study and classification of Manitoba's alvars	\$5,000
2014	Nature Conservancy of Canada	A comprehensive botanical study and classification of Manitoba's alvars	\$7,000
2012-2013	National Geographic Society, Research and Exploration Grant	Vietnam: evolutionary hotspot for a hyper-diverse flowering plant clade	\$16,731 USD
2013	Faculty of Science, University of Manitoba, Field Work Support Program	Reproductive biology and long-term monitoring of an endangered and a common orchid species	\$6,468
2008-2013	CFI New Initiatives Fund	Canadian University Biodiversity Consortium (Lead institution, University of Montreal)	\$142,723 (U of M portion of the grant)

2007-2012	NSERC Discovery Grant	Systematics of Cariceae (Cyperaceae)	\$105,850
2011-2012	Canada-California Strategic Innovation Partnership	<i>Canadensys</i> -UC Berkeley Biodiversity Databases Business Plan (lead institution, University of Montreal)	\$7,000 (U of M portion of grant)
2009-2010	Canada-California Strategic Innovation Partnership	<i>Canadensys</i> -UC Berkeley Biodiversity Databases Collaboration (lead institution, University of Montreal)	\$2,700 (U of M portion of the grant)
2008-2010	Endangered Species Recovery Fund (World Wildlife Fund and Environment Canada)	Conservation implications of hybridization between the endangered Small White Lady's Slipper orchid and the common Yellow Lady's Slipper orchid	\$16,809
2008-2010	Special Conservation and Endangered Species Fund (Manitoba Conservation)	Conservation implications of hybridization between the endangered Small White Lady's Slipper orchid and the common Yellow Lady's Slipper orchid	\$15,811
2002-2006	NSERC Discovery Grant	Systematics of the genus <i>Carex</i>	\$150,000
2002-2003	Parks Canada	Botanical Survey of Wapusk National Park of Canada with Special Reference to Coastal Regions	\$5,000
2001-2002	Parks Canada	Botanical Survey of Wapusk National Park of Canada with Special Reference to Coastal Regions	\$5,600
1998-2002	NSERC Discovery Grant	Systematics of the genus <i>Carex</i>	\$87,120
2001	Northern Scientific Training Program	Genetic diversity in disjunct and contiguous populations of arctic plant species: a method of identifying priority areas for conservation	\$2,650

2000	Northern Scientific Training Program	Genetic diversity in disjunct and contiguous populations of arctic plant species: a method of identifying priority areas for conservation	\$2,500
1997-1999	Alberta Environmental Protection	Dwarf mistletoe infection experimental manual	\$8,000
1997-2000	Alberta Environmental Protection	The use of genetic population structure and infectivity studies to assess adaptation of dwarf mistletoe parasites to coniferous host populations	\$12,397
1997-1998	British Columbia Forest Service	Field studies of dwarf mistletoe in British Columbia	\$2,000
1997-1998	University of Manitoba Research Grant	Susceptibility of jack pine to infections by dwarf mistletoe parasites from sympatric and allopatric host populations	\$2,150
1994-1997	NSERC Discovery Grant	Biological and historical factors affecting genetic diversity in <i>Carex</i> section <i>Phyllostachys</i> (Cyperaceae)	\$80,000
1996	Environment Canada	Developing a user-friendly database for the University of Manitoba Herbarium	\$12,000
1996	Canadian Forest Service	Creating an accessible database of the flora of the Manitoba Model Forest	\$15,000
1996	Province of Manitoba	Urban Green Team - summer student employment funding	\$4,200
1995	NSERC Equipment Grant	The University of Manitoba Herbarium NSERC Equipment Grant (with N. Kenkel, Dept. of Biological Sciences, University of Manitoba)	\$25,557
1995	Province of Manitoba	Urban Green Team - summer student employment funding	\$8,400
1994-1995	University of Manitoba Research Grant	Genetic structure of mistletoe ( <i>Arceuthobium americanum</i> ) populations in jack pine stands in Manitoba	\$3,333



While I was not an official applicant on a CFI (Canadian Foundation for Innovation) New Opportunities Grant awarded to Drs. M. Piercey-Normore, A. Worley, and T. de Kievit in 2003 (total value of grant \$446,586), I was the unofficial lead on all aspects of the grant related to the herbarium compactor system (total value \$130,940). This system was installed in August 2003 and has doubled the capacity of the University of Manitoba Herbarium allowing for expansion of the specimen collection.

**CONTRIBUTIONS TO THE TRAINING OF HIGHLY QUALIFIED PERSONNEL:**

- Graduate students supervised

<u>Name</u>	<u>Years supervised</u>	<u>Degree</u>	<u>Title of research project</u>	<u>Present position</u>
Steven Anderson	2015-	M. Sc.	Project to be determined	
Pauline Catling	2014-	M. Sc.	A comprehensive botanical study and classification of alvar ecosystems in the Interlake Region of Manitoba	
Melissa Pearn	2010-2013	M. Sc.	Pollination and comparative reproductive success in lady's slipper orchids <i>Cypripedium candidum</i> and <i>C. parviflorum</i> and their hybrids in southern Manitoba	Nature Conservancy of Canada
Jennifer Line	1999-2006	M. Sc.	Potential effects of glacial history on allozyme variation in <i>Tofieldia pusilla</i> (Liliaceae)	Botanist, Yukon Department of the Environment
Cheryl Jerome	1997- 2001	Ph. D.	Evolutionary biology of the parasitic angiosperm <i>Arceuthobium americanum</i> (Viscaceae) as determined by population genetic analysis and infectivity experiments	Research Scientist, CIER
Julian Starr	1995-1997	M. Sc.	The origin and phylogenetic position of <i>Carex</i> sect. <i>Phyllostachys</i> in the genus <i>Carex</i> (Cyperaceae)	Assoc. Professor, University of Ottawa

- Undergraduate students supervised

<u>Name</u>	<u>Years supervised</u>	<u>Degree</u>	<u>Title of research project</u>	<u>Present position</u>
Steven Anderson	2014-	Hon. B. Sc.	The influence of flower colour and pollination route size on pollinator visitations in two rewardless orchids, <i>Cypripedium candidum</i> and <i>Cypripedium parviflorum</i>	
Jarrold Sumlak	2009-2010	Hon. B. Sc.	Taxonomy of <i>Carex fissa</i> (sect. <i>Multiflorae</i> , Cyperaceae)	
Jordan Becker	2009-2010	Hon. B. Sc.	Systematics of <i>Linum lewisii</i> and the status of the Hudson Bay endemic <i>Linum lepaei</i>	Botanist, Nature Conservancy of Canada
Jeff Saarela	1999-2000	Hon. B. Sc.	Taxonomy of the <i>Carex backii</i> complex (sect. <i>Phyllostachys</i> , Cyperaceae)	Research Scientist, Canad. Mus. Nature
Lillian Mackenzie	1997-1998	Hon. B. Sc.	The anti-microbial potential of the genus <i>Carex</i> (Cyperaceae)	Lawyer
Julian Starr	1994-1995	Hon. B. Sc.	Phylogeny and character evolution in <i>Carex</i> sect. <i>Phyllostachys</i>	Assoc. Professor, University of Ottawa

- Undergraduate and graduate research assistants supervised (all part time or summer positions)

<u>Name</u>	<u>Years</u>	<u>Project title</u>
Michelle Perron	2014-	University of Manitoba Work-Study program- databasing the University of Manitoba Herbarium
Diana Sawatzky	2010-2013	Canadian University Biodiversity Consortium - Databasing the University of Manitoba Herbarium
Mason Kulbaba	2010-2013	Canadian University Biodiversity Consortium - Databasing the University of Manitoba Herbarium
David Heinrichs	2010-2012	Canadian University Biodiversity Consortium - Databasing the University of Manitoba Herbarium and Conservation implications of hybridization between the endangered Small White Lady's Slipper orchid and the common Yellow Lady's Slipper orchid

Alex Hare	2011	Conservation implications of hybridization between the endangered Small White Lady's Slipper orchid and the common Yellow Lady's Slipper orchid
Joshua Pearlman (NSERC Undergraduate Award recipient)	2008-2010	Conservation implications of hybridization between the endangered Small White Lady's Slipper orchid and the common Yellow Lady's Slipper orchid <u>and</u> Canadian University Biodiversity Consortium - Databasing the University of Manitoba Herbarium
Melissa Pearn (NSERC Undergraduate Award recipient)	2009	Conservation implications of hybridization between the endangered Small White Lady's Slipper orchid and the common Yellow Lady's Slipper orchid
Jarrod Sumlak	2009	Conservation implications of hybridization between the endangered Small White Lady's Slipper orchid and the common Yellow Lady's Slipper orchid
Ameet Bharaj	2008-2009	Conservation implications of hybridization between the endangered Small White Lady's Slipper orchid and the common Yellow Lady's Slipper orchid
Lauren Sawich	2007	Conservation implications of hybridization between the endangered Small White Lady's Slipper orchid and the common Yellow Lady's Slipper orchid

- Research associates/postdoctoral fellows/technicians supervised

<u>Name</u>	<u>Years supervised</u>	<u>Position</u>
Diana Sawatzky	2013-	Assistant Curator, University of Manitoba Herbarium
Elizabeth Punter	1998-2013	Assistant Curator, University of Manitoba Herbarium
Habibollah Ghazvini	2009-2010	Research Associate – Conservation implications of hybridization between the endangered Small White Lady's Slipper orchid and the common Yellow Lady's Slipper orchid
Habibollah Ghazvini	2004-2007	Research Associate – systematics of <i>Carex</i>
Qixing Zhou	2006-2007	Postdoctoral Fellow - Systematics of Calycanthaceae
Mahmood Iranpour	2003-2004	Postdoctoral Fellow/Research Associate – systematics of <i>Carex</i>
Gloria Keleher	1993- 1997	Assistant Curator, University of Manitoba Herbarium

Ross McQueen	1994 -1995	Research Associate – systematics of <i>Carex</i>
Ross McQueen	1995 - 1996	Research Associate - development of a University of Manitoba Herbarium database

## **CURRENT RESEARCH INTERESTS:**

### **Sedge Research**

My primary research interest is the systematics of sedges (genus *Carex*, family Cyperaceae), a group of grass-like plants comprised of over 2100 species. Sedges are one of the most widespread and ecologically important groups of flowering plants. They occur in habitats ranging from marshes to deserts and they dominate many ecosystems, including tundra and savanna. Some species are habitat-specific, narrowly distributed, and of conservation concern, whereas others are ubiquitous weeds that occur in a variety of environments. Despite the significance of sedges, species are often considered difficult to distinguish from one another and many have avoided the study of these plants because they are considered too challenging. However, by using evidence from micro- and macromorphology, molecular approaches (AFLPs, DNA sequencing), phytogeography, and ecology I am able to gain a clearer understanding of taxonomically difficult species groups and achieve new insights into the evolution of this remarkable group of plants.

To date our studies have shown that *Carex* can be divided into eight evolutionary lineages: Large Core *Carex*, Small Core *Carex*, Siderostictae, Schoenoxiphium, Vignea, Caricoid Clades, Hypolytroides, and Dissitiflora Clade. Interestingly, many of these lineages are comprised of, or are sister to, Southeast Asian species. Moreover, these Asian taxa often possess morphological characters that are unusual for the genus. Our findings also suggest that morphological diversification may have occurred in clades dominated by Asian species followed by canalization of a narrower range of morphologies in species-rich, cosmopolitan lineages. Ongoing research is focused on taxonomic and phylogenetic studies of Vietnamese and other Indochinese sedges (<http://news.umanitoba.ca/exploring-the-unknown/>; <http://bruceford.weebly.com/research.html>)

In addition to our phylogenetic studies focused on Asian species, we have been examining evolutionary relationships within the Vignea Clade a taxonomically complex lineage of about 300 species. To date we have produced a detailed molecular phylogeny of this taxon using nrDNA sequences and amplified fragment length polymorphisms (AFLPs). Trends related to geography and evolution of inflorescence types were evident in our study. However, many clades had poor statistical support. A preliminary screening of “bar coding” genes found little variation suggesting that the Vignea Clade may have undergone recent diversification in comparison to other groups of sedges.

### **Orchid Research**

Hybridization is a naturally occurring phenomenon that can be a catalyst for evolutionary change and speciation in plants. However, hybridization can threaten the genetic purity of endangered species, especially when these hybrids are fertile. In collaboration with Dr. Anne Worley, University of Manitoba, we are studying the population biology of the globally endangered small white lady’s slipper (*Cypripedium candidum*) and the common yellow lady’s slipper (*C. parviflorum*) in Canada. The goals of our research are to understand why hybridization occurs and what the outcome of this process might be for these species.

Preliminary studies of four Manitoban populations indicated that individuals identified as *C. candidum* and *C. parviflorum* on the basis of their morphology were genetically distinct. Similarly, plants with a hybrid appearance were genetically intermediate. However, the genetic profile of some “pure” individuals suggested that cryptic hybrids were present in all populations. Ongoing studies will confirm the consistency of this pattern over the Canadian range of *C. candidum*.

We are also studying the reproductive biology of white and yellow lady’s slippers, and the influence of the surrounding floral community on hybridization and reproductive success. Our initial studies of fruit set and pollen viability indicate that *Cypripedium candidum* may have lower fertility than either hybrids or *C. parviflorum*. Future research will determine if this pattern is consistent over a wider geographic range.

### **Dwarf Mistletoe Research**

In our dwarf mistletoe research we are interested in studying the role of micro-evolutionary forces acting upon widespread, parasitic angiosperms. Towards this end, we have been examining the population genetic structures of the widespread dwarf mistletoe species *Arceuthobium americanum* and its jack and lodgepole pine hosts (*Pinus banksiana* and *P. contorta*) using AFLPs. Our results indicate that *A. americanum* can be divided into distinct races each found on different host species. We have also discovered that both geography and host specificity influence the genetic structure of these host races. We are currently investigating the broader implications of these findings by studying an unrelated species *A. pusillum* (along with its spruce hosts - *Picea* spp.), throughout its range in Canada.

## **RESEARCH CONTRIBUTIONS:**

### **Refereed publications (books or articles in professional journals)**

- Journal papers

FORD, B. A., A. T. VU, K. T. NGUYEN, and J. R. STARR. 2015. *Luzula effusa* var. *chinensis* (Juncaceae): the first record for the wood-rush genus in Vietnam. *Phytotaxa* 204: 116-122.

GLOBAL CAREX GROUP. 2015. Making *Carex* monophyletic (Cyperaceae, tribe Cariceae): a new broader circumscription. *Botanical Journal of the Linnean Society* 179: 1-42.

STARR, J. R., F. H. JANZEN, and B. A. FORD. 2015. Three new, early diverging *Carex* (Cariceae, Cyperaceae) lineages from East Asia with important evolutionary and biogeographic implications for sedges. *Molecular Phylogenetics and Evolution* 88: 105-120.

FORD, B. A., H. GHAZVINI, R. F. C. NACZI, and J. R. STARR. 2012. Phylogeny of *Carex* subg. *Vigneae* (Cyperaceae) based on amplified fragment length polymorphism and nrDNA data. *Systematic Botany* 37: 913-925. *A picture showcasing our paper was included in a photomontage on the front cover of the journal.*

SEMPLE, J. C., L. TONG, B. A. FORD, and C. E. PUNTER. 2012. *Solidago jejunifolia* new to Manitoba and Canada. *Phytoneuron* 2012-112: 1-5.

FORD, B. A., A. C. WORLEY, R. F. C. NACZI, and H. GHAZVINI. 2009. Amplified fragment length polymorphism analysis reveals high genetic variation in the Ouachita Mountain endemic *Carex latebracteata* (Cyperaceae) *Botany* 87: 770-779.

- WORLEY, A. C., L. SAWICH, H. GHAZVINI, and B. A. FORD. 2009. Hybridization and introgression between a rare and a common lady's slipper orchid, *Cypripedium candidum* and *C. parviflorum* (Orchidaceae). *Botany* 87: 1054-1065.
- STARR, J. R. and B. A. FORD. 2009. Phylogeny and evolution in Cariceae (Cyperaceae): current knowledge and future directions. *The Botanical Review* 75: 110-137.
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- FORD, B. A., M. IRANPOUR, R. F. C. NACZI, J. R. STARR, and C. A. JEROME. 2006. Phylogeny of *Carex* subg. *Vignea* (Cyperaceae) based on non-coding nrDNA sequence data. *Systematic Botany* 31: 70-82.
- JEROME, C. A. and B. A. FORD. 2002. The discovery of three genetic races of the dwarf mistletoe *Arceuthobium americanum* (Viscaceae) provides insight into the evolution of parasitic angiosperms. *Molecular Ecology* 11: 387-405.
- JEROME, C. A. and B. A. FORD. 2002. Comparative population structure and genetic diversity of *Arceuthobium americanum* (Viscaceae) and its *Pinus* host species: insight into host-parasite evolution in parasitic angiosperms. *Molecular Ecology* 11: 407-420.
- FORD, B. A. and R. F. C. NACZI. 2001. Genetic diversity in the *Carex jamesii* complex (Cyperaceae: sect. *Phyllostachyae*) with insights into the evolution and origin of the newly described species *Carex timida*. *Sida* 19: 885-897.
- NACZI, R. F. C. and B. A. FORD. 2001. Systematics of the *Carex jamesii* complex (Cyperaceae: *Phyllostachyae*). *Sida* 19: 853-884.
- SAARELA, J. M. and B. A. FORD. 2001. Taxonomy of the *Carex backii* complex (sect. *Phyllostachyae*, Cyperaceae). *Systematic Botany* 26: 704-721.
- STARR, J. R. and B. A. FORD. 2001. The taxonomic and phylogenetic utility of vegetative anatomy and fruit epidermal silica bodies in *Carex* section *Phyllostachys* (Cyperaceae). *Canadian Journal of Botany*. 79: 362-379.
- STARR, J. R., R. J. BAYER, and B. A. FORD. 1999. The phylogenetic position of *Carex* section *Phyllostachys* and its implications for phylogeny and subgeneric circumscription in *Carex* (Cyperaceae). *American Journal of Botany* 86: 563-577. *Canadian Botanical Association A. E. Porsild Award winner, best-published student paper in systematics and phytogeography for 1999.*
- FORD, B. A., D. A. R. McQUEEN, J. R., STARR, and R. F. C. NACZI. 1998. The impact of species-specific traits and phylogenetic relatedness on allozyme diversity in *Carex* section *Phyllostachys* (Cyperaceae). *Plant Systematics and Evolution* 212: 13-29.
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- FORD, B. A., D. A. R. McQUEEN, R. F. C. NACZI, and A. A. REZNICEK. 1998. Allozyme variation and genetic relationships among species in the *Carex willdenowii* complex (Cyperaceae). *American Journal of Botany* 85: 546-552.
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- CRINS, W. J. and B. A. FORD. 1988. The parasitic dodders (*Cuscuta*: Cuscutaceae) in Ontario. *Canadian Field-Naturalist* 102: 209-215.
- FORD, B. A. and P. W. BALL. 1988. A reevaluation of the *Triglochin maritimum* complex (Juncaginaceae) in eastern and central North America and Europe. *Rhodora* 90: 313-337.

- Book

- NACZI, R. F. C. and B. A. FORD (eds.). 2008. Sedges: Uses, Diversity, and Systematics of the Cyperaceae. *Monographs in Systematic Botany from the Missouri Botanical Garden* 108: 1-298.

- Books chapters

- FORD, B. A. 2012. *Coptis*, *Caltha*, *Actaea*, and *Enemion* (Ranunculaceae). *In*: The Jepson Manual: Vascular Plants of California. 2nd edition. B. G. BALDWIN, D. H. GOLDMAN, D. J. KEIL, R. PATTERSON, T. J. ROSATTI, and D. H. WILKEN, eds. University of California Press, Berkeley.
- FORD, B. A., R. F. C. NACZI, and J. R. STARR. 2008. *Carex* sect. *Phyllostachyae*: the value of a multidisciplinary approach in conducting systematics studies in sedges, pp. 227-242. *In*: Sedges: Uses, Diversity, and Systematics of Cyperaceae. R. F. C. NACZI and B. A. FORD, eds. *Monographs in Systematic Botany from the Missouri Botanical Garden* 108: 1-298.
- CRINS, W. J., R. F. C. NACZI, A. A. REZNICEK, and B. A. FORD. 2002. *Carex* sect. *Phyllostachyae*, pp. 558-563. *In*: Flora of North America Editorial Committee, eds., Flora of North America North of Mexico, Vol. 23: Magnoliophyta: Commelinidae (in part): Cyperaceae. Oxford University Press, Oxford and New York.
- FORD, B. A. and A. A. REZNICEK. 2002. *Carex* sect. *Squarrosae*, pp. 518-519. *In*: Flora of North America Editorial Committee, eds., Flora of North America North of Mexico, Vol. 23: Magnoliophyta: Commelinidae (in part): Cyperaceae. Oxford University Press, Oxford and New York.
- REZNICEK, A. A. and B. A. FORD. 2002. *Carex* sect. *Vesicariae*, pp. 501-511. *In*: Flora of North America Editorial Committee, eds., Flora of North America North of Mexico, Vol. 23: Magnoliophyta: Commelinidae (in part): Cyperaceae. Oxford University Press, Oxford and New York.
- DUTTON, B. E., C. S. KEENER, and B. A. FORD. 1997. *Anemone*, pp. 139-158. *In*: Flora of North America Editorial Committee, eds., Flora of North America North of Mexico, Vol. 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford and New York.

- FORD, B. A. 1997. *Actaea*, pp. 181-183. *In*: Flora of North America Editorial Committee, eds., Flora of North America North of Mexico, Vol. 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford and New York.
- FORD, B. A. 1997. *Caltha*, pp. 187-189. *In*: Flora of North America Editorial Committee, eds., Flora of North America North of Mexico, Vol. 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford and New York.
- FORD, B. A. 1997. *Coptis*, pp. 242-245. *In*: Flora of North America Editorial Committee, eds., Flora of North America North of Mexico, Vol. 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford and New York.
- FORD, B. A. 1997. *Enemion*, pp. 246-249. *In*: Flora of North America Editorial Committee, eds., Flora of North America North of Mexico, Vol. 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford and New York.
- FORD, B. A. 1997, pp. 176-177. *Helleborus*. *In*: Flora of North America Editorial Committee, eds., Flora of North America North of Mexico, Vol. 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford and New York.
- FORD, B. A. 1997. *Hydrastis* pp. 87-88. *In*: Flora of North America Editorial Committee, eds., Flora of North America North of Mexico, Vol. 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford and New York.
- FORD, B. A. 1997, pp. 184. *Nigella*. *In*: Flora of North America Editorial Committee, eds., Flora of North America North of Mexico, Vol. 3: Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, Oxford and New York.
- BALL, P. W. and B. A. FORD. 1987. Juglandaceae, 4 pp. *In*: K. M. Pryer and G. W. Argus, eds., Atlas of the Rare Vascular Plants of Ontario. Part 4. National Museum of Natural Sciences, Ottawa.
- CRINS, W. J. and B. A. FORD. 1987. Cuscutaceae, 7 pp. *In*: K. M. Pryer and G. W. Argus, eds., Atlas of the Rare Vascular Plants of Ontario. Part 4. National Museum of Natural Sciences, Ottawa.
- FORD, B. A. and C. A. KEDDY. 1987. Malvaceae, 4pp. *In*: K. M. Pryer and G. W. Argus, eds., Atlas of the Rare Vascular Plants of Ontario. Part 4. National Museum of Natural Sciences, Ottawa.

### **Non-refereed publications**

- Conference proceeding

WORLEY, A. C. and B. A. FORD. 2010. Hybridization in prairie orchids: conservation threat or life as usual? 9<sup>th</sup> Prairie Conservation and Endangered Species Conference, Winnipeg, Manitoba. February 2010. 11 pp.

- Published abstracts/conference presentations

CATLING, P., N. KENKEL, and B. FORD. 2015. The classification and management of alvars in the Interlake Region of Manitoba, Canada. Joint Meeting of the Botanical Society of America and the Canadian Botanical Association, The Shaw Conference Centre, Edmonton Alberta, July 2008 (<http://2015.botanyconference.org/engine/search/index.php?func=detail&aid=700>).



- STARR, J., F. JANZEN, and B. FORD. 2015. Three new, early diverging *Carex* (Cariceae, Cyperaceae) lineages from East and Southeast Asia with important evolutionary and biogeographic implications. Joint Meeting of the Botanical Society of America and the Canadian Botanical Association, The Shaw Conference Centre, Edmonton Alberta, July 2008 (<http://2015.botanyconference.org/engine/search/index.php?func=detail&aid=319>).
- FORD, B. A., J. A. MACKLIN, and J. M. SAARELA. 2014. 50-years of floristic research in Canada: looking to the past to shape the future. Annual Meeting of the Canadian Botanical Association, Montreal Botanical Garden, Montreal, QC, June 2014. Symposium Abstracts pg. 21 (<http://www.irbv.umontreal.ca/wp-content/uploads/cba-abc2014-programme.pdf>). *This was an invited talk that was given during the General Symposium commemorating the 50<sup>th</sup> anniversary of the Canadian Botanical Association.*
- JANZEN, F. H., J. R. STARR, and B. A. FORD. 2014. Is *Carex* section *Hypolytroides* sister to all other species in tribe Cariceae (Cyperaceae). Annual Meeting of the Canadian Botanical Association, Montreal Botanical Garden, Montreal, QC, June 2014. Poster and Oral Presentation Abstracts pg. 51 (<http://www.irbv.umontreal.ca/wp-content/uploads/cba-abc2014-programme.pdf>).
- FORD, B. A., J. R. STARR, K. T. NGUYEN, and A. T. VU. 2013. Sedge hunting in Vietnam: species discoveries and insights into the origin of *Carex* (Cyperaceae). 5<sup>th</sup> International Conference on the Comparative Biology of Monocotyledons, New York Botanical Garden, July 2013. Monocots V Abstracts pg. 42 (<https://www.regonline.com/custImages/320000/329272/NYBGMonocotsVAbstractBook.pdf>).
- STARR, J. R., C. GILMOUR, R. F. C. NACZI, S. DONADIO, É. LÉVEILLÉ -BOURRET, B. A. FORD, D. SPALINK, and K. SYSTMA. 2013. Phylogeny of the Hyperdiverse Cariceae + Dulichieae + Scirpeae S. S. Clade (Cyperaceae). 5<sup>th</sup> International Conference on the Comparative Biology of Monocotyledons, New York Botanical Garden, July 2013. Monocots V Abstracts pg. 114 (<https://www.regonline.com/custImages/320000/329272/NYBGMonocotsVAbstractBook.pdf>).
- PEARN, M., A. C. WORLEY, B. A. FORD. 2012. Hybridization in the lady's slipper orchids *Cypripedium candidum* and *Cypripedium parviflorum*: reproductive success, pollination, and the role co-flowering species. 23<sup>rd</sup> North American Prairie Conference, University of Manitoba, August 2012. Abstracts pg. 23 Conference Program (<http://www.napc2012.org>).
- WORLEY, A. C., B. A. FORD, and M. PEARN. 2012. Genetics of an endangered orchid: could hybridization cause extinction through genetic assimilation? 23<sup>rd</sup> North American Prairie Conference, University of Manitoba, August 2012. Abstracts pg. 23 Conference Program (<http://www.napc2012.org>).
- WORLEY, A. C., B. A. FORD, and M. PEARN. 2012. Hybridization and pollination in rewardless orchids: conservation threat or life as usual. Evolution Ottawa, 1<sup>st</sup> Joint Conference on Evolutionary Biology (American Society of Naturalists, Canadian Society for Ecology and Evolution, European Society for Evolutionary Biology, Society for the Study of Evolution, Society of Systematic Biologists), Carleton University and University of Ottawa, July 2012.
- WORLEY, A. C. and B. A. FORD. 2010. Hybridization in prairie orchids: conservation threat or life as usual? 9<sup>th</sup> Prairie Conservation and Endangered Species Conference, Winnipeg, Manitoba. February 2010. Conference Program pg. 33-34.

- FORD, B. A., R. F. C. NACZI, J. R. STARR, and H. GHAZVINI. 2008. Phylogeny of *Carex* subg. *Vignea* (Cyperaceae) based on amplified fragment length polymorphisms (AFLPs) and non-coding nrDNA sequence data. American Institute of Biological Sciences (AIBS) meeting, University of British Columbia, July 2008. ([www.2008.botanyconference.org/engine/search/index.php?func=detail&aid=197](http://www.2008.botanyconference.org/engine/search/index.php?func=detail&aid=197)).
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- FORD, B. A., M. IRANPOUR, R. F. C. NACZI, J. R. STARR, and C. A. JEROME. 2004. Relationships, basal taxa, and inflorescence evolution in *Carex* subg. *Vignea* (Cyperaceae) as inferred from non-coding rDNA sequences. The Canadian Botanical Association Conference Proceedings pg. 27. Canadian Botanical Association annual meeting, University of Manitoba, June 2004.
- FORD, B. A., R. F. C. NACZI, and J. R. STARR. 2002. *Carex* sect. *Phyllostachyae*: the Value of a Multidisciplinary Approach in Conducting Systematics Studies in Sedges. Sedges 2002: International Conference on Uses, Diversity, and Systematics of Cyperaceae, Delaware State University, Dover, DE, June 2002.
- WILLIAMS, V. and B. A. FORD. 2002. Taxonomy of the *Carex leptalea* complex (Cyperaceae). Sedges 2002: International Conference on Uses, Diversity, and Systematics of Cyperaceae, Delaware State University, Dover, DE, June 2002.
- CALIE, P. J., N. SELTSAM, A. T. DENHAM, and B. A. FORD. 2001. Genetic diversity present in the restricted endemic *Solidago shortii* (Asteraceae). American Institute of Biological Sciences (AIBS) meeting Albuquerque, New Mexico, August 2001. AIBS conference abstracts ([www.botany2001.org/section5/abstracts/23.shtml](http://www.botany2001.org/section5/abstracts/23.shtml)).
- JEROME, C. A. and B. A. FORD. 2000. Genetic analysis reveals three distinct races of the parasitic flowering plant, *Arceuthobium americanum*. Canadian Botanical Association/Canadian Society of Plant Physiologists meeting London, Ontario, June 2000. Conference Program and Abstract Book. pg. 19. Honorable mention, Lionel Cinq-Mars award for the best student oral paper.
- JEROME, C. and B. A. FORD. 1999. Two distinct host races of *Arceuthobium americanum*. XVI International Botanical Congress-Abstracts. Abstract 695, pg. 408. XVI International Botanical Congress, St. Louis, Missouri, August 1999.

- NACZI, R. F. C. and B. A. FORD. 1998. Systematics of the *Carex jamesii* complex (section *Phyllostachys*, Cyperaceae). American Journal of Botany 85: 423. (Abstr.). AIBS meeting Baltimore, Maryland, August 1998.
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- STARR, J. R., B. A. FORD, and R. J. BAYER. 1997. Testing phylogenetic hypotheses in *Carex* (Cyperaceae) using sequences from the internal transcribed spacer (ITS) region of nrDNA. AIBS meeting Montréal, Québec, August 1997. American Journal of Botany 84: 235. *Lionel Cinq-Mars award for the best student oral paper.*
- STARR, J. R., R. J. BAYER, and B. A. FORD. 1996. Phylogeny and sectional delimitation in *Carex* (Cyperaceae) using sequences from the internal transcribed spacer of nrDNA. American Journal of Botany 83: 194. (Abstr.). AIBS meeting Seattle, Washington, August 1996.
- NACZI, R. F. C., B. A. FORD, and A. A. REZNICEK. 1995. Taxonomy of the *Carex willdenowii* complex (Cyperaceae). American Journal of Botany 82: 152. (Abstr.). AIBS meeting, San Diego, California, August 1995.
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- FORD, B. A. and P. W. BALL. 1989. Allozyme variation in North American members of the short-beaked taxa of *Carex* section *Vesicariae* (Cyperaceae). American Journal of Botany 76: 241. (Abstr.). AIBS meeting, University of Toronto, August 1989. *Honorable mention, Lionel Cinq-Mars award for the best student oral paper.*
- FORD, B. A. and P. W. BALL. 1987. A biosystematic study of the *Carex saxatilis* L. complex. The Canadian Botanical Association Bulletin 20: (3) 7. Canadian Botanical Association meeting, Université de Montréal, June 1987.
- FORD, B. A. and R. JONES. 1985. An autecological study of *Platanthera leucophaea* (Nutt.) Lindl. in Ontario. Canadian Congress of Biology, Program and Abstract Book. Abstract CB2.01. University of Western Ontario, June 1985.
- JONES, R. and B. A. FORD. 1985. Effects of Great Blue Heron (*Ardea herodias*) guano on soils and vegetation in a sugar maple/beechness woodlot. Canadian Congress of Biology, Program and Abstract Book. Abstract CB10.10. University of Western Ontario, June 1985.

- Publications

- CATLING, P. K., P. M. CATLING, J. CAYOUILLE, M. OLDFHAM, B. FORD, C. HAMEL, and C. FRIESEN. 2014. Canadian alvars and limestone barrens: areas of special conservation concern for plants. Canadian Botanical Association Bulletin 47(1): 9-11.
- FORD, B. A., J. R. STARR, K. T. NGUYEN, and A. T. VU, and J. REGALADO. 2012. Vietnam: evolutionary hotspot for a hyper-diverse flowering plant clade. Final project report for National Geographic Society Research and Exploration Grant # 9035-11. 13 pp.

- SAARELA, J. M., L. J. GILLESPIE, P. SOKOLOFF, and B. A. FORD. 2012. Arctic Flora of Canada and Alaska: guide for contributors. Canadian Museum of Nature, Ottawa. 43 pp.
- PUNTER, C. E., D. PUNTER, M. D. PIERCEY-NORMORE, and B. A. FORD. 2006-2010. Botanical survey of the northeastern coastal region of Wapusk National Park. *A series of annual reports submitted to Parks Canada (travel expenses covered by Parks Canada)*.
- WORLEY, A. C., B. A. FORD, M. A. PEARN, and J. D. PEARLMAN. 2008-2011. Conservation implications of hybridization between the endangered small white lady's slipper orchid and the common yellow lady's slipper orchid. *A series of 10 reports submitted to Canadian Wildlife Service, Manitoba Conservation, Manitoba Orchid Society, Ontario Parks, Tall Grass Prairie Management Committee, Walpole Island First Nation, and World Wildlife Fund in fulfillment of funding and/or permit requirements. Reports ranged in size from 4-26 pp.*
- ALLEN, G. and B. A. FORD. 2004. COSEWIC status report update on swamp rose mallow (*Hibiscus moscheutos*). Committee on the Status of Endangered Wildlife in Canada, Ottawa.
- PUNTER, C. E. and B. A. FORD. 2004. Outsmarting poison ivy. *Manitoba Naturalist Society Bulletin* 30(5): 4-5.
- PUNTER, C. E. and B. A. FORD. 1998. COSEWIC assessment and update status report on western silver-leaf aster (*Aster sericeus*) in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa.
- FORD, B. A. 1993. COSEWIC status report on *Vaccinium stamineum* L., a threatened species in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa.
- FORD, B. A. 1985. COSEWIC status report on Swamp Rose Mallow, *Hibiscus moscheutos*, a rare species in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa.
- FORD, B. A. 1984. Deerberry (*Vaccinium stamineum* L.) in Ontario. *The Plant Press* 2: 40-42.
- FORD, B. A. 1984. Pollination of Orchids. *Trent University Biology Department Ecology Bulletin* 8: 4-8.

### Invited lectures and workshops

- Lectures

Introduction to the University of Manitoba and our National Geographic sponsored research on the sedges of Vietnam. Department of Botany, Faculty of Biology, VNU University of Science, Hanoi Vietnam. April 2015.

Sedge hunting in Vietnam: species discoveries and insights into the origin of the world's largest flowering plant genus. Department of Biological Sciences Seminar Series, University of Manitoba, March 2014.

The University of Manitoba Vascular Plant Herbarium (WIN). Department of Biological Sciences Seminar Series, University of Manitoba, April 2013.

Sedge hunting in Vietnam: species discoveries and insights into the origin of *Carex* (Cyperaceae). Department of Entomology Seminar Series, University of Manitoba, March 2013.

Phylogenetic relationships in *Carex* subg. *Vignea* (Cyperaceae). Encyclopedia of Life – Biodiversity Synthesis Group Meeting, Field Museum of Natural History, Chicago, September 2011.

Botanical Survey of Wapusk National Park, Manitoba: 2002-2010. Arctic Flora of Canada and Alaska, First Workshop/Meeting, Canadian Museum of Nature, Ottawa, March 2011.

Hybridization and introgression between a rare and a common lady's slipper orchid, *Cypripedium candidum* and *C. parviflorum* (Orchidaceae). Manitoba Association of Plant Biologist Annual Meeting, University of Winnipeg, November 2009.

Morphological and genetic evidence for hybridization between a rare and common lady's slipper orchid, *Cypripedium candidum* and *C. parviflorum* (Orchidaceae). Manitoba Orchid Society Meeting, February 2008.

Taxonomy of *Carex* sect. *Phyllostachys* (Cyperaceae): Insights into Evolutionary Relationship in the Genus *Carex*. Department of Botany, University of Tennessee, Knoxville, April 2000 (same seminar also given in the Department of Botany, University of Manitoba, September 2000).

The Pros and Cons of Industry Collaboration for Science Faculty. Strengthening Industry Ties with Science Workshop, Faculty of Science, University of Manitoba, March 1999.

Plant Taxonomy and Evolution: Examples From Research on *Carex* section *Phyllostachys* (Cyperaceae). Department of Entomology, University of Manitoba, September 1996.

Darwin and his Orchids. University of Manitoba, Darwin Symposium, March 1994.

Pollination Biology of Manitoban Orchids. University of Manitoba Field Station (Delta Marsh), Summer Seminar Series, July 1993.

The Taxonomy of the Short-beaked Taxa of *Carex* sect. *Vesicariae*. Department of Biology, Central Michigan University, Mt. Pleasant, Michigan, October 1988.

- Drawing Workshops and Art Exhibitions

In collaboration with the Assistant Curator of WIN, local artists, the Edge Gallery, and Video Pool we have hosted two herbarium art workshops (November 29-30, 2014 and July 4-5, 2015) in the University of Manitoba Vascular Plant Herbarium (see <http://winherbarium.weebly.com/news-events--people.html>). Demand for the workshop was overwhelming and participants were selected on the basis of a competitive application process. The art resulting from this workshop was showcased in an exhibition at the Edge Gallery, February 20-March 6, 2015 and the Video Pool Media Arts Centre August 21-September 4, 2015. Local media, especially the Winnipeg Free Press, have taken an interest in our art exhibitions (<http://www.winnipegfreepress.com/arts-and-life/entertainment/arts/night-at-the-herbarium-294158201.html>).

### Identification/Training Workshops

Sedges have edges, rushes are round, grasses are hollow, what have YOU found? Identification workshop, Manitoba Naturalists Society, University of Manitoba, Winnipeg, March 2009.

The Boreal Forest of the Whiteshell (with Isobel Waters). Creative Retirement Manitoba (day-long bus tour and hike with ca. 40 seniors). June 2007 and 2009. Creative Retirement is nationally recognized for developing and offering innovative and interactive learning opportunities for seniors ([www.crm.mb.ca](http://www.crm.mb.ca)).

Sedge Identification Workshop (three day workshop held at the Kananaskis Research Station, Kananaskis Provincial Park with both a lab and field component). Prairie and Northern Plant Diversity Centre, Devonian Botanic Garden, University of Alberta, June 2006.

Sedge Identification Workshop (four day workshop held at the Palisades Centre, Jasper National Park with both a lab and field component). Prairie and Northern Plant Diversity Centre, Devonian Botanic Garden, University of Alberta, July 2004.

The Edge on Sedges: Basics of Sedge Morphology, Terminology, and Identification Strategies. Manitoba Naturalists Society, University of Manitoba, Winnipeg, February 2003.

Basics of Sedge Morphology, Terminology, and Identification Strategies. Sedges 2002: International Conference on Uses, Diversity, and Systematics of Cyperaceae, Delaware State University, Dover, DE, June 2002.

Sedges of Coastal Plain Regions of Delaware and Maryland. Sedges 2002: International Conference on Uses, Diversity, and Systematics of Cyperaceae, Delaware State University, Dover, DE, June 2002.

Sedge Identification Workshop (four day workshop held at the University of Manitoba with both a lab and field component). Prairie and Northern Plant Diversity Centre, Devonian Botanic Garden, University of Alberta, June 2001.

Classification and Plant Identification, Grade 6 class, Ecole St. Avila, Winnipeg, Manitoba, May 2001.

Sedge Identification Workshop (two day workshop with both lab and field component). Manitoba Association of Plant Biologists, University of Manitoba, Winnipeg, June 2000.

Isozyme Analysis (two day workshop). Eastern Kentucky University, Richmond, KY, April 2000.

Walpole Island Tall-Grass Prairie Flora. North American Prairie Conference, 13th annual meeting, Windsor, Ontario, August 1992.

Walpole Island Tall-Grass Prairie Flora (lecture and two-day field trip). American Institute of Biological Sciences (AIBS), 40th annual meeting, University of Toronto, Toronto, Ontario, August 1989.

## Other research contributions

- **Conferences and symposia organized** - XVII International Botanical Congress - Julian Starr (University of Ottawa), Matthias Hendrichs (Universität Tübingen), and I organized a symposium entitled: "Evolution in the genus *Carex* and tribe Cariceae: new ideas from new phylogenies" held in Vienna, Austria in July 2005. Eight internationally recognized experts in the field of sedge systematics (including myself) made presentations at this symposium. A paper resulting from this symposium was published in the journal *Botanical Review* (Starr and Ford 2009)  
Canadian Botanical Association Conference - I was a co-organizer along with other members of the Botany Department, University of Manitoba of the annual meeting of the Canadian Botanical Association held in June 2004 at the University of Manitoba.  
Sedges 2002 - Robert Naczi (Delaware State University), Tony Reznicek (University of Michigan), and I organized the first international conference devoted entirely to the uses, diversity, and systematics of Cyperaceae. The conference took place June 6-8, 2002 at Delaware State University, Dover, DE. The conference drew approximately 100 participants from the United States, Canada, Great Britain, Belgium, Brazil, and Kenya. Most of the world's leading experts in sedge systematics, horticulture, and ecology were in attendance at the conference. I took an active role in assisting with all aspects of conference organization including inviting speakers, organizing field trips, and editing conference abstracts. I also presented a paper, led a field trip, and conducted an identification workshop (see above). The proceedings from this conference were published by the Missouri Botanical Garden Press (Naczi and Ford 2008).
- **Editorship** - Western Canada Regional Coordinator, Flora of North America Project
- **Board of Directors** - Flora of North America Project
- **Director** – Canadian Botanical Association (2010-2014)
- **Project Steering Committee Member** - Arctic Flora of Canada and Alaska Project
- **Membership on Committee** - COSEWIC, Vascular Plant Species Specialist Group 2002-2009
- **Manuscript Reviews** - *American Journal of Botany*, *Botany* (formerly *Canadian Journal of Botany*), *Canadian Field Naturalist*, *Canadian Journal of Plant Science*, *Journal of the Botanical Research Institute of Texas* (formerly *Sida*), *Madroño*, *Molecular Ecology*, *Molecular Phylogenetics and Evolution*, *Nordic Journal of Botany*, *Novon*, *Systematic Botany*
- **Research Grant Reviews** - University of Western Ontario Academic Development Fund, Alberta Biodiversity Challenge, NSERC Discovery, NSF, CFI
- **University of Manitoba Herbarium (WIN)** – WIN, comprised of more than 78,000 specimens, is the most extensive and broadly representative collection of vascular plants of Manitoba. As curator of WIN, I identify plants for the general public and the wider scientific community. I also educate people as to the value of herbarium collections and the relevance of systematics to society. Through my personal field collections, those of my colleagues, along with an active exchange program, we add ca. 2000 specimens per annum to the herbarium. As a participant in the Canadian University Biodiversity Consortium we have databased and imaged over 19,000 specimens, Our data are accessible through Canadensys ([www.canadensys.net](http://www.canadensys.net)) and the Global Biodiversity Information Facility (GBIF): (<http://data.gbif.org/datasets/resource/14337/>). Since 2013 our data have been downloaded over 3500 times from these sites. The value of WIN will continue to increase through expansion of our current collection and enhancement of associated databases.

- **Websites and Social Media.** Working with the Assistant Curator of WIN and Graphic Designer Scott Ford, I developed websites for the herbarium ([winherbarium.weebly.com](http://winherbarium.weebly.com)) and my personal research and teaching ([bruceford.weebly.com](http://bruceford.weebly.com)). We have also developed a Facebook Page for the Herbarium (University of Manitoba WIN Herbarium).

**TEACHING (University of Manitoba Credit Courses Taught):**

- BIOL 2240 Non-flowering Plants
- BIOL 3242 Vascular Flora of Manitoba
- BIOL 4240 Advanced Plant Systematics
- BOTN 4890 Directed Studies in Botany
- BIOL 7220 Critical Thinking in Biological Sciences

**UNIVERSITY OF MANITOBA COMMITTEE AND ADMINISTRATIVE DUTIES:**

(a) Departmental

- Assistant Head Botany
- Curator, University of Manitoba Herbarium
- Appeal of Term Work Committee
- Faculty Search Committees
- Graduate Studies Committee
- Greenhouse Committee
- Instructor Position Search Committees
- Botany Seminar Series
- Curriculum Committee
- Space Committee
- Collections Committee

(b) Faculty

- Department of Biological Sciences Headship Committee
- Department of Botany Headship Committee
- Ecology Committee
- Interdepartmental Course Committee
- Science Executive Committee
- Committee on Graduate Studies
- Working Committee on Research Priorities
- Promotion and Tenure Committees





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## **Dr. Kevin Charles Fraser**

Correspondence language: English

### **Contact Information**

The primary information is denoted by (\*)

#### **Address**

Primary Affiliation (\*)

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Department of Biological Sciences  
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Canada

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## Dr. Kevin Fraser

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### Language Skills

Language	Read	Write	Speak	Understand	Peer Review
English	Yes	Yes	Yes	Yes	Yes

### Degrees

	Post-doctorate, Biology, York University Supervisors: Bridget Stutchbury, 2013/9 - 2014/7
	Post-doctorate, Biology, York University Supervisors: Stutchbury, Bridget, 2011/1 - 2013/8
- 2011/1	Doctorate, Biology, University of New Brunswick Supervisors: Diamond, Antony, 2006/9 - 2011/1
- 2006/9	Master's Thesis, Biology, Queen's University at Kingston Supervisors: Ratcliffe, Laurene, 2004/9 - 2006/9
- 2004/8	Master's Thesis, Film Production, Concordia University Supervisors: Bustros, Jean-Claude, 2002/9 - 2004/8
- 1997/5	Bachelor's Honours, Visual Art, McMaster University

### User Profile

Research Specialization Keywords: Biology, Behavioural Ecology, Conservation Biology

Research Disciplines: Biology and Related Sciences

Areas of Research: Biological Behavior

Fields of Application: Environment

### Employment

2014/7	Assistant Professor Biological Sciences, The University of Manitoba Full-time, Assistant Professor Tenure Status: Tenure Track
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- 2014/1 - 2014/4 Lecturer, Tropical Ecology Field Course  
Biology, Science, York University  
Part-time, Sessional, Lecturer  
Tenure Status: Non Tenure Track  
Instructor for Tropical Ecology, a new field-course offering in the Ontario Universities Program in Field Biology. Traveled with 14 students to a field research site in the Belizean rainforest, instructed students in key themes of tropical ecology and conservation, conducted a group field research project with birds, bats, and arthropods.
- 2008/9 - 2008/12 Lecturer, Ornithology, 4th yr course  
Biology, Fredericton, University of New Brunswick  
Part-time, Sessional, Lecturer  
Tenure Status: Non Tenure Track  
3 lectures and 3 hr. lab per week. Developed all new lecture and lab material.
- 2008/1 - 2008/9 Science Manager, Stable Isotopes in Nature Laboratory  
Biology, Fredericton, University of New Brunswick  
Part-time, Term  
Tenure Status: Non Tenure Track  
Science manager for a multi-user stable isotope lab. Assisted researchers design stable isotope projects and interpret data. Worked with lab team to develop lab methods.

## Research Funding History

### Awarded [n=13]

- 2015/7 - 2017/8 Faculty of Science Early Career Research Tools and Instruments Initiative, Grant  
Co-applicant  
**Funding Sources:**  
2015/7 - 2017/8 University of Manitoba  
Faculty of Science Early Career Research Tools and Instruments Initiative  
Total Funding - 21,124  
Portion of Funding Received - 21,124  
Funding Competitive?: Yes
- 2014/7 - 2017/7 University of Manitoba, Start-up Fund, Grant  
Principal Investigator  
**Funding Sources:**  
2014/7 - 2017/7 University of Manitoba  
Start-up Fund  
Total Funding - 110,000  
Portion of Funding Received - 110,000  
Funding Competitive?: Yes
- 2015/12 - 2016/12 Kenneth M Molson Foundation Grants in aid of Wildlife Research, Conservation, and  
Principal Investigator Habitat, Grant  
**Funding Sources:**  
2015/12 - 2016/12 Kenneth M Molson Foundation  
Total Funding - 15,000  
Portion of Funding Received - 15,000  
Funding Competitive?: Yes
- 2015/7 - 2016/7 Migration ecology and conservation of a declining migratory songbird, Grant  
Principal Applicant

**Funding Sources:**

2015/7 - 2016/7   Schad Foundation  
 Research Grants  
 Total Funding - 15,000  
 Portion of Funding Received - 15,000  
 Funding Competitive?: Yes

2015/7 - 2016/7   Determining range-wide influences on breeding productivity of declining migratory  
 Principal Applicant   songbirds in Alberta, Grant

**Funding Sources:**

2015/7 - 2016/7   Alberta Conservation Association  
 Conservation, Community, and Education Grants  
 Total Funding - 24,458  
 Portion of Funding Received - 8,150  
 Funding Competitive?: Yes

2015/1 - 2016/1   University Research Grants Program, Grant  
 Principal Investigator

**Funding Sources:**

2015/1 - 2016/1   University of Manitoba  
 University Research Grants Program  
 Total Funding - 7,500  
 Portion of Funding Received - 7,500  
 Funding Competitive?: Yes

2014/10 - 2015/10   Disney Worldwide Conservation Fund, Grant  
 Principal Investigator

**Funding Sources:**

2014/10 - 2015/10   Disney Worldwide Conservation Fund (DWCF)  
 Total Funding - 25,000  
 Portion of Funding Received - 25,000  
 Funding Competitive?: Yes

Co-applicant : Purple Martin Conservation Association

2013/9 - 2015/10   National Geographic Committee For Research and Exploration, Grant  
 Principal Investigator

**Funding Sources:**

2013/9 - 2015/10   National Geographic Society  
 Committee for Research and Exploration  
 Total Funding - 14,868  
 Portion of Funding Received - 14,868  
 Funding Competitive?: Yes

2013/9 - 2015/9   Liber Ero Postdoctoral Fellowship, Fellowship  
 Principal Investigator

**Funding Sources:**

2013/9 - 2015/9   Liber Ero Foundation  
 Liber Ero Postdoctoral Fellowship  
 Total Funding - 140,000  
 Portion of Funding Received - 85,000  
 Funding Competitive?: Yes

2014/1 - 2015/1   Schad Foundation, Grant  
 Principal Investigator

**Funding Sources:**

2014/1 - 2015/1   Schad Foundation  
 Grants for conservation research  
 Total Funding - 15,000  
 Portion of Funding Received - 15,000  
 Funding Competitive?: Yes

2014/1 - 2015/1 Kenneth M Molson Foundation Grants in aid of Wildlife Research, Conservation, and  
Principal Investigator Habitat, Grant

**Funding Sources:**

2014/1 - 2015/1 Kenneth M Molson Foundation  
Wildlife Research, Conservation, and Habitat  
Total Funding - 15,000  
Portion of Funding Received - 15,000  
Funding Competitive?: Yes

2013/2 - 2013/2 Purple Martin Conservation Association Research Grant, Grant  
Principal Investigator

**Funding Sources:**

2013/2 - 2013/2 Purple Martin Conservation Association  
Research Grant  
Total Funding - 2,500  
Portion of Funding Received - 2,500  
Funding Competitive?: Yes

2008/9 - 2009/9 University of New Brunswick, Scholarship  
Principal Applicant

**Funding Sources:**

2008/9 - 2009/9 University of New Brunswick  
Board of Governor's Award  
Total Funding - 2,500  
Portion of Funding Received - 2,500  
Funding Competitive?: Yes

**Completed [n=1]**

2008/5 - 2010/5 NSERC PGS-D, Scholarship  
Principal Investigator

**Funding Sources:**

2008/5 - 2010/5 Natural Sciences and Engineering Research Council of Canada  
(NSERC)  
PGS-D  
Total Funding - 42,000  
Portion of Funding Received - 42,000  
Funding Competitive?: Yes

**Student/Postdoctoral Supervision****Bachelor's Honours [n=3]**

2015/5 - 2016/5 Amanda Van Loon (In Progress) , University of Manitoba  
Principal Supervisor Student Degree Expected Date: 2016/5  
Thesis/Project Title: The impact of migratory stopover habitat quality on behaviour and performance in a declining, long-distance migratory songbird.

2015/5 - 2016/5 Kelsey Bell (In Progress) , University of Manitoba  
Principal Supervisor Student Degree Expected Date: 2016/5  
Thesis/Project Title: Determining critical overwintering habitat and conservation priorities for a declining aerial insectivore, purple martin (*Progne subis*)

2014/9 - 2015/4 Lawrence Lam (Completed) , University of Manitoba  
Principal Supervisor Thesis/Project Title: The influence of intrinsic and extrinsic factors on migration performance of a long-distance migratory songbird

**Master's Thesis [n=4]**

- 2015/9 - 2017/9 Roberto-Charron, Amélie (In Progress) , University of Manitoba  
Principal Supervisor Student Degree Expected Date: 2017/9  
Thesis/Project Title: Migration ecology and conservation of a declining, migratory songbird, Canada Warbler *Cardellina canadensis*  
Present Position: Graduate Student
- 2015/9 - 2017/9 Amanda Shave (In Progress) , University of Manitoba  
Principal Supervisor Student Degree Expected Date: 2017/9  
Thesis/Project Title: Climate change impacts on the migration phenology of a long-distance migratory songbird  
Present Position: Graduate Student
- 2015/9 - 2017/9 Lawrence Lam (In Progress) , University of Manitoba  
Principal Supervisor Student Degree Expected Date: 2017/9  
Thesis/Project Title: The influence of intrinsic and extrinsic factors on migratory flight performance in a long-distance migratory songbird  
Present Position: Graduate Student
- 2015/9 - 2017/9 Alisha Ritchie (In Progress) , University of Manitoba  
Principal Supervisor Student Degree Expected Date: 2017/9  
Thesis/Project Title: The impact of tropical climate and habitat loss on fitness of a long-distance migratory songbird  
Present Position: Graduate Student

**Event Administration**

- 2012-01-02 - 2012-08-18 Co-organizer, Symposium: "Tracking long-distance migration of small birds: new discoveries in migration ecology", North American Ornithological Conference IV, Vancouver, BC., Conference, 2012-08-15 - 2012-08-15
- 2009-01-05 - 2009-08-15 Organizer, Symposium: "Altitudinal migration of tropical birds", Conference, 2009-08-15 - 2009-08-15

**Committee Memberships**

- 2015/7 - 2018/7 Committee Member, Promotion Committee - Biological Sciences, The University of Manitoba
- 2015/3 - 2018/3 Committee Member, Faculty of Science Indigenous Participation - Research & Graduate Opportunities Sub-Committee (FoS IRGO), The University of Manitoba  
Participation in research outside the classroom or teaching laboratory is a powerful way to convey the inherent value of science, encourage science-related career choices, enhance practical skills training, and establish contact networks in the wider research community in the academic, public and private sectors. Anecdotally, the indigenous student population at the University of Manitoba is both currently and historically under-represented in research labs in the FoS, though hard data is lacking. The mandate of this subcommittee is to identify, create and promote opportunities for indigenous students to get involved in research in the Faculty of Science.
- 2015/3 - 2018/3 Chair, Biological Collections and Museum Committee, The University of Manitoba  
Chair of a committee of 6 faculty members and a graduate student representative in Biological Sciences. The terms of reference are: 1) to promote the curation of biological collections (vascular plant, bryophyte, lichen, fish, herpetile, bird, mammal, invertebrate) within the Department of Biological Sciences and make these collections and their associated information available to the University of Manitoba and wider scientific community; and 2) to improve the infrastructure associated with the Stewart Hay Memorial Museum and promote the use of this facility for teaching and outreach.

2013/9 - 2017/9      Committee Member, Research and Education Committee, Purple Martin Conservation Association  
5 academic and NGO members: Prioritize, direct, and promote Purple Martin research, conservation, and education activities across the distributional range of the species.

## Other Memberships

2005-01-01 -      Member, Society of Canadian Ornithologists  
2015-12-31      Attended annual meetings, organized symposium at joint meeting with other societies (Vancouver 2012)

2005-01-01 -      Member, American Ornithologists' Union  
2015-12-31      Attended annual meetings, judge for student presentations at 2013 meeting.

## Presentations

1. Amelie-Roberto Charron. (2015). Connecting boreal forest conservation with distant habitats through the journeys of migratory songbirds. The Wildlife Society annual meeting Symposium on Boreal Forest conservation, Winnipeg, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
2. (2014). Hemisphere to Hemisphere project - new discoveries in Purple Martin migration. Public seminar series Ellis Bird Farm, Red Deer, Canada  
Main Audience: General Public  
Invited?: Yes, Keynote?: Yes
3. (2013). Repeat tracking of individual trans-hemispheric migratory songbirds to examine interannual variation in migration timing and routes (poster). American Ornithologists Union and Cooper Ornithological Society joint annual meeting, Chicago, United States  
Main Audience: Researcher  
Invited?: No, Keynote?: No
4. (2013). Songbird Migration in a changing world. Public seminar series Ellis Bird Farm, Red Deer, Canada  
Main Audience: General Public  
Invited?: Yes, Keynote?: Yes
5. (2013). Songbird migration in a changing world: New discoveries and a flight plan for the future. Department of Biological Sciences seminar series, University of Manitoba, Winnipeg, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
6. (2013). Connecting conservation of migratory birds across hemispheres. Seminar series, Disney's Animals, Science, and Environment Department, Bueno Vista, United States  
Main Audience: Knowledge User  
Invited?: Yes, Keynote?: Yes
7. (2012). Connecting migratory bird populations across hemispheres. 19th annual A.D. Latornell conservation symposium 2012: Prescription for a healthy environment, session: "Canary in a coal mine", Barrie, Canada  
Main Audience: Knowledge User  
Invited?: Yes, Keynote?: Yes
8. (2012). Constrained migration schedules in a trans-hemispheric migrant songbird. 5th North American Ornithological Conference, Vancouver, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No

9. lecture in absentia Bridget Stutchbury. (2012). Frequent fliers: Tracking songbird migration through the Americas. Public lecture series. Beaty Biodiversity Museum <http://www.youtube.com/watch?v=2bU5ljs9hoA>, Vancouver, Canada  
Main Audience: General Public  
Invited?: Yes, Keynote?: Yes
10. (2012). Are northern populations of purple martin more at risk? New insights from direct tracking. Purple Martin Festival, Camrose, Canada  
Main Audience: General Public  
Invited?: Yes, Keynote?: Yes
11. (2012). Can migratory songbirds respond to a changing world?. Seminar Series, Dept. Biology, University of Windsor, Windsor, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
12. (2012). Low phenotypic variation in migration schedules of a declining migratory aerial insectivore. Workshop: Current understanding of aerial insectivore population declines in Canada. Bird Studies Canada, Port Rowan, Canada  
Main Audience: Decision Maker  
Invited?: Yes, Keynote?: No
13. (2011). Tracking migratory songbirds using geolocators: what are the ecological questions that can be addressed and future challenges?. European Ornithologists' Union 8th annual meeting, Riga, Latvia  
Main Audience: Researcher  
Invited?: Yes, Keynote?: Yes
14. (2009). Migration in the 3rd dimension: what we know about tropical altitudinal migration and why we need to know more. American Ornithologists' Union 127th annual meeting, Philadelphia, United States  
Main Audience: Researcher  
Invited?: No, Keynote?: No

## Broadcast Interviews

- |                            |   |
|----------------------------|---|
| 2014-06-09 -<br>2014-06-09 | "Tracking Mountain Bluebirds" Mike Symmington; based on migration tracking in Alberta (TV and online video), CBC NEWS Calgary <a href="http://www.cbc.ca/player/News/Canada/Calgary/ID/2463481629/">http://www.cbc.ca/player/News/Canada/Calgary/ID/2463481629/</a> , CBC   |
| 2013-06-06 -<br>2013-06-06 | "Purple Martin Monitoring", Frank Rackow, based on migration tracking research in Alberta (radio), CBC Calgary, The Home Stretch <a href="http://www.cbc.ca/homestretch/episode/2013/06/06/purple-martin-monitoring/">http://www.cbc.ca/homestretch/episode/2013/06/06/purple-martin-monitoring/</a> , CBC  |
| 2013-06-05 -<br>2013-06-05 | "Migratory birds affected by climate change", Marc Montgomery, based on research paper PLoS ONE 8(5):e64587 (radio), Radio International <a href="http://www.rcinet.ca/en/2013/06/05/migratory-birds-affected-by-climate-change/">http://www.rcinet.ca/en/2013/06/05/migratory-birds-affected-by-climate-change/</a> , CBC  |
| 2013-05-01 -<br>2013-06-01 | "Wildlife Wednesdays: Purple Martins, Migratory Songbirds", interview based on migration research at Disney through collaboration with Animal's, Science and Environment Dept. (online video), Walt Disneyworld's video blog <a href="https://www.youtube.com/watch?feature=player_embedded&amp;v=r6K2lqbl4xY">https://www.youtube.com/watch?feature=player_embedded&amp;v=r6K2lqbl4xY</a> , Walt Disneyworld parks |
| 2012-09-08 -<br>2012-09-08 | "Migrating Birds Leave On Time", Bob McDonald, based on new migration tracking research and published paper on repeatability of individual migration timing PLoS ONE:e40688 (radio), Quirks and Quarks <a href="http://www.cbc.ca/quirks/episode/2012/09/08/september-8-2012/">http://www.cbc.ca/quirks/episode/2012/09/08/september-8-2012/</a> , CBC  |

## Text Interviews

- |            |   |
|------------|---|
| 2015-04-01 | "The Amazing Flight, and Plight, of the Purple Martin" Niki Wilson, Wildlands Advocate magazine |
|------------|---|



2014-09-10	"A new kind of snowbird: as the climate warms, Canada will become a safe haven for U.S. flocks", Carol Sanders, Winnipeg Free Press
2013-07-10	"International bird researcher visits Ellis Bird Farm", Alf Cryderman, based on migration research in Alberta, Red Deer Express
2013-06-04	"Warmer springs could be leading to population declines in birds", Rodrigo Cotking, The Weather Network
2013-06-04	"Birds Migrating at the wrong time for warmer climate" Emily Chung, CBC News online <a href="http://www.cbc.ca/news/technology/birds-migrating-at-wrong-time-for-warmer-climate-1.1337461">http://www.cbc.ca/news/technology/birds-migrating-at-wrong-time-for-warmer-climate-1.1337461</a>
2013-06-03	"Researchers Study Decline of Purple Martin", Russel Anglin, Amarillo-Globe News
2012-07-26	"The songbirds you can set your watch by", Mark Prigg, based on publication of repeat-tracking study., Mail Online
2012-07-25	"Songbirds migrate on strict schedule", based on publication of repeat-tracking study, Science Daily
2012-06-16	"Return of the Purple Martin", Crystal Rhyno, based on migration tracking research in Alberta, Red Deer Advocate
2010-10-27	"Mt. Molt", David Malakoff, based on research paper, altitudinal migration of hummingbirds, Conservation Magazine <a href="http://conservationmagazine.org/2010/10/mt-molt/">http://conservationmagazine.org/2010/10/mt-molt/</a>

## Publications

### Journal Articles

1. Stutchbury BJM, Siddiqui R\*, Fraser KC. (2015). Ecological causes and consequences of intra-tropical migration in long-distance migratory birds. *The American Naturalist*.  
Submitted  
Refereed?: Yes
2. Lam L\*, McKinnon EA, Ray JD, Pearman M, Hvenegaard GT, Mejeur J, Moscar L, Pearson M, Applegate K, Mammenga P, Tautin J, & Fraser KC. (2015). The influence of morphological variation on migration performance in a trans-hemispheric migratory songbird. *Animal Migration*.  
Revision Requested  
Refereed?: Yes, Open Access?: Yes
3. Stutchbury BJM, Fraser KC, Silverio C, Kramer P, Aeppli B, Mickle N, Pearman MD, Savage A, & Mejeur J. (2015). Tracking mated songbird pairs on long-distance migration: migration schedules are not synchronized within-pairs. *Animal Behaviour*.  
Revision Requested  
Refereed?: Yes, Open Access?: No
4. McKinnon EA, Fraser KC, Stanley CQ & Stutchbury BJM. (2014). Tracking from the Tropics reveals behaviour of juvenile songbirds on their first spring migration. *PLoS ONE*. 9(8): e105605.  
Published  
Refereed?: Yes, Open Access?: Yes
5. Stanley CQ, McKinnon EA, Fraser KC, Macpherson MP, Casbourn G, Friesen L, Marra PP, Studds C, Ryder TB, Diggs NE, & Stutchbury BJM. (2014). Connectivity of Wood Thrush Breeding, Wintering, and Migration Sites Based on Range-Wide Tracking. *Conservation biology : the journal of the Society for Conservation Biology*. 29(1): 164-174.  
Published  
Refereed?: Yes

6. Chin, S, McKinnon, EA, Fraser, KC, Rotenberg, J & Stutchbury, BJM. (2014). No sex bias in Wood Thrushes (*Hylocichla mustelina*) captured using audio playback during the non-breeding season. *Wilson Journal of Ornithology*. 126(3): 599-605.  
Published  
Refereed?: Yes, Open Access?: No
7. Fraser KC, Silverio C, Kramer P, Mickle N, Aeppli R, & Stutchbury BJM. (2013). A trans-hemispheric migratory songbird does not advance spring schedules or increase migration rate in response to record-setting temperatures at breeding sites. *PLoS ONE*. 8(5): e64587.  
Published  
Refereed?: Yes, Open Access?: Yes
8. Fraser KC, Kramer P, Silverio C, Barrow J, Newstead D, Mickle N, Shaheen T, Mammenga P, Applegate K, & Stutchbury, BJM. (2013). Consistent range-wide pattern in fall migration strategy of purple martin (*Progne subis*), despite different migration routes at the Gulf of Mexico. *The Auk*. 130(2): 291--296.  
Published  
Refereed?: Yes
9. McKinnon EA, Stanley CQ, Fraser KC, MacPherson MM, Casbourn G, Marra PP, Studds CE, Diggs N, & Stutchbury BJM. (2013). Estimating geolocator accuracy for a migratory songbird using live ground-truthing in tropical forest. *Animal Migration*. 1: 31--38.  
Published  
Refereed?: Yes
10. McKinnon EA, Fraser KC & Stutchbury BJM. (2013). New discoveries in landbird migration using geolocators, and a flight plan for the future (+cover image). *The Auk*. 130(2): 211--222.  
Published  
Refereed?: Yes
11. Stanley CQ, MacPherson M, Fraser KC, McKinnon EA, & Stutchbury BJM. (2012). Repeat tracking of individual songbirds reveals consistent migration timing but flexibility in route. *PLoS ONE*. 7(7): e40688.  
Published  
Refereed?: Yes, Open Access?: Yes
12. McKinnon EA, Fraser KC, Diamond AW, Rimmer CC & Townsend JM. (2012). Stable-hydrogen isotope turnover in red blood cells of two migratory thrushes: application to studies of connectivity and carry-over effects. *Journal of Field Ornithology*. 83(3): 306--314.  
Published  
Refereed?: Yes
13. Fraser KC, Stutchbury BJM, Silverio C, Kramer PM, Barrow J, Newstead D, Mickle N, Cousens BF, Lee J C, Morrison DM, Shaheen T, Mammenga P, Applegate K, & Tautin J. (2012). Continent-wide tracking to determine migratory connectivity and tropical habitat associations of a declining aerial insectivore. *Proceedings of the Royal Society B: Biological Sciences*. 279: 4901-4906.  
Published  
Refereed?: Yes
14. Macdonald CA, Fraser KC, Gilchrist HG, Kyser TK, Fox JW & Love, OP. (2012). Strong migratory connectivity in a declining Arctic passerine. *Animal Migration*. 1: 23--30.  
Published  
Refereed?: Yes
15. Fraser KC, McKinnon EA, Diamond AW, & Chavarria, L. (2011). The influence of microhabitat, moisture and diet on stable-hydrogen isotope variation in a Neotropical avian food web. *Journal of Tropical Ecology*. 27(06): 563--572.  
Published  
Refereed?: Yes
16. Hardesty JL & Fraser KC. (2010). Using deuterium to examine altitudinal migration by Andean birds. *Journal of Field Ornithology*. 81(1): 83--91.  
Published  
Refereed?: Yes

17. Fraser KC, McKinnon EA, & Diamond AW. (2010). Migration, Diet, or Molt? Interpreting Stable-Hydrogen Isotope Values in Neotropical Bats. *Biotropica*. 42(4): 512--517.  
Published  
Refereed?: Yes
18. Fraser KC, Diamond, AW & Chavarria, L. (2010). Evidence of altitudinal moult-migration in a Central American hummingbird, *Amazilia cyanura*. *Journal of Tropical Ecology*. 26(06): 645--648.  
Published  
Refereed?: Yes

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## **Dr. William Mark Fry**

Correspondence language: English

Date of Birth: 6/13

Canadian Residency Status: Canadian Citizen

## **Contact Information**

The primary information is denoted by (\*)

### **Address**

Primary Affiliation (\*)

rm w469 Duff Roblin Building  
190 Dysart Rd  
Dept of Biological Sciences  
University of Manitoba  
Winnipeg Manitoba R3T 2N2  
Canada

### **Telephone**

Work (\*)                      204-474 7498

### **Email**

Work (\*)                      [Mark.Fry@ad.umanitoba.ca](mailto:Mark.Fry@ad.umanitoba.ca)

### **Website**

[www.obesityresearch.ca](http://www.obesityresearch.ca)

This is a draft version only. Do not submit to any funding organization. Only the final version from the History page can be submitted. It is strictly forbidden to submit this draft version to an organization that is not a member of the CCV. The complete list of CCV members is available at [www.ccv-cvc.ca](http://www.ccv-cvc.ca)



Protected when completed

## Dr. William Fry

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### Language Skills

Language	Read	Write	Speak	Understand	Peer Review
English	Yes	Yes	Yes	Yes	Yes

### Degrees

2004/5 - 2007/9	Post-doctorate, Post-doctorate, Neuroscience, Physiology, Queen's University at Kingston Degree Status: Completed Supervisors: Alastair Ferguson, 2004/5 - 2007/9
2001/1 - 2003/5	Post-doctorate, Post-doctorate, Neuroscience, Dartmouth Medical School Degree Status: Completed Supervisors: Robert Maue, 2001/1 - 2004/4
1995/5 - 2001/9	Doctorate, PhD, Basic Medical Sciences, Neuroscience, Memorial University of Newfoundland Degree Status: Completed Supervisors: Frances Moody-Corbett, 1995/9 - 2001/9
1990/9 - 1995/5	Bachelor's Honours, Bachelor's of Science, Biology, Memorial University of Newfoundland Degree Status: Completed Supervisors: Frances Moody-Corbett, 1993/5 - 1995/5

### User Profile

Researcher Status: Researcher

Research Career Start Date: 2007-10-01

Engaged in Clinical Research?: No

Research Interests: Neurobiology of obesity Energy homeostasis Sensory circumventricular organs

Fields of Application: Foundations and Knowledge Acquisition, Biomedical Aspects of Human Health, Pathogenesis and Treatment of Diseases

Disciplines Trained In: Neurosciences

Areas of Research: Neuronal and Synaptic Activity, Electrophysiology, Energy Metabolism, Feeding Behavior, Gene Regulation and Expression

Research Specialization Keywords: Neuroscience, homeostasis, electrophysiology

Research Disciplines: Neurosciences, Physiology, Cell Biology

## Employment

2007/10                      Assistant Professor  
 Biological Sciences, Science, The University of Manitoba  
 Full-time, Assistant Professor  
 Tenure Status: Tenure Track

## Affiliations

The primary affiliation is denoted by (\*)

(\*) 2007/10                      Assistant Professor, Biological Sciences, The University of Manitoba

## Leaves of Absence and Impact on Research

2011-07-04 -                      Sabbatical, The University of Manitoba  
 2011-12-30                      Did not leave UofM, son born 3 weeks before leave commenced. During leave I focused on setting up CFI purchased equipment (patch clamp rigs) and learning to use new software packages including MATLAB. During late June, and early September, I collected subfornical organs from ground squirrels as part of a collaboration with Dr James Hare in order to compare gene expression at these two time points using next generation sequencing. I extracted the total RNA and submitted this to Genome Quebec who constructed 100bp paired end libraries for each sample. I also learned to utilize software for analysis of next generation sequencing data, including GALAXY at UPENN, and TRINITY software for de novo transcriptome assembly. Learning to use these software packages was critical for analysis of next generation sequencing data from subfornical organ of ground squirrels.

2011-01-03 -                      Parental, The University of Manitoba  
 2011-05-16                      I was on leave from Jan 1 until May 21 2012 to provide care for child. I was the primary provider of care to infant during this period, and did not spend much time working on science.

## Research Funding History

### Awarded [n=2]

2014/3 - 2019/2                      Regulation of subfornical organ neurons by the novel Na<sup>+</sup> leakage channel NALCN:  
 Principal Applicant                      Interactions with neuropeptide Y, Grant, Operating

#### Funding Sources:

2014/3 - 2019/2                      Natural Sciences and Engineering Research Council of Canada (NSERC)  
 Total Funding - 185,000  
 Portion of Funding Received - 37,000  
 Funding Competitive?: Yes

2008/6 - 2014/9                      Neuronal plasticity in the area postrema: Roles in regulation of energy homeostasis,  
 Principal Applicant                      Grant, Establishment

#### Funding Sources:

2008/7 - 2014/12                      Manitoba Health Research Council (MHRC)  
 Establishment Grant  
 Total Funding - 99,862  
 Funding Competitive?: Yes

### Completed [n=9]

2008/3 - 2014/4                      A patch clamp set-up thermocycler for polymerase chain reaction: Tools for  
 Principal Applicant                      understanding neuronal excitability and gene expression, Grant, Infrastructure

**Funding Sources:**

Natural Sciences and Engineering Research Council of Canada  
(NSERC)  
Research Tools and Instruments  
Total Funding - 84,150 (Canadian dollar)  
Funding Competitive?: Yes

2008/3 - 2014/3  
Principal Applicant Regulation of energy homeostasis: a dynamic role for the subfornical organ, Grant, Operating

**Funding Sources:**

2008/4 - 2014/3 Natural Sciences and Engineering Research Council of Canada  
(NSERC)  
Total Funding - 184,750  
Portion of Funding Received - 184,750  
Funding Competitive?: Yes

2011/5 - 2012/6  
Principal Applicant Seasonal gene expression in a brain centre that regulates appetite of a hibernating mammal, Grant, Operating

**Funding Sources:**

2011/5 - 2012/6 University of Manitoba  
UGRP  
Total Funding - 7,492  
Portion of Funding Received - 7,492  
Funding Competitive?: Yes

2009/7 - 2012/6  
Co-applicant Cerebellar pathophysiology associated with Duchenne Muscular Dystrophy, Grant, Operating

**Funding Sources:**

2008/7 - 2012/6 Manitoba Institute of Child Health (The)  
Total Funding - 38,247  
Portion of Funding Received - 38,247  
Funding Competitive?: Yes

Co-investigator : Dr Judy Anderson

2010/1 - 2011/1  
Principal Applicant Neurobiology of obesity laboratory, Grant, Infrastructure

**Funding Sources:**

2010/1 - 2011/1 Canadian Foundation for Innovation  
Leaders Opportunity Fund  
Total Funding - 159,836  
Portion of Funding Received - 159,836  
Funding Competitive?: Yes

2007/10 - 2010/10  
Principal Applicant Startup, Grant, Infrastructure

**Funding Sources:**

2007/10 - 2010/10 University of Manitoba  
Total Funding - 90,000  
Portion of Funding Received - 90,000  
Funding Competitive?: No

2008/7 - 2010/7  
Principal Applicant Processing of satiety signal information at the area postrema, Grant, Operating

**Funding Sources:**

2008/7 - 2010/7 University of Manitoba  
P.H. Thorlakson Foundation  
Total Funding - 25,000 (Canadian dollar)

2010/1 - 2010/1 Neurobiology of obesity laboratory, Grant, Infrastructure

Principal Applicant **Funding Sources:**  
 Manitoba research Innovation Fund  
 Total Funding - 159,836  
 Portion of Funding Received - 159,836 (Canadian dollar)  
 Funding Competitive?: Yes

2004/10 - 2007/10  
 Principal Applicant Target Obesity Post-doctoral Fellowship, Fellowship  
**Funding Sources:**  
 Canadian Institutes of Health Research (CIHR)  
 Total Funding - 120,000 (Canadian dollar)  
 Funding Competitive?: Yes

## Courses Taught

Co-ordinator/instructor, The University of Manitoba  
 Course Title: Sensory Motor Physiology  
 Course Code: Biol 4470  
 Course Level: Undergraduate  
 Number of Credits: 3  
 Lecture Hours Per Week: 3

Instructor, The University of Manitoba  
 Course Title: Environmental Physiology of Animals 2  
 Course Code: Biol 3472  
 Section: 13 lectures  
 Number of Credits: 3  
 Lecture Hours Per Week: 3  
 Lab Hours Per Week: 6

Co-instructors: WeirauchD

Co-ordinator/instructor, The University of Manitoba  
 Course Title: Human Physiology 1  
 Course Code: Biol 2410  
 Section: 26 lectures  
 Number of Credits: 3  
 Lecture Hours Per Week: 3  
 Co-instructors: AndersonG

## Student/Postdoctoral Supervision

### Bachelor's [n=6]

2015/5 - 2015/9 Jennifer Egan (In Progress)  
 Principal Supervisor Student Degree Start Date: 2013/9  
 Student Degree Expected Date: 2017/5  
 Thesis/Project Title: USRA project student

2013/5 - 2013/9 Bruno Rodrigues, University of Manitoba  
 Principal Supervisor Student Degree Start Date: 2013/5  
 Thesis/Project Title: Examination of synaptic connectivity between TH neurons and NPY neurons within the mouse arcuate nucleus  
 Project Description: Brazilian Medical student, Science Without Borders Program



- 2013/5 - 2013/12  
Principal Supervisor Katie Tough (In Progress) , University of Manitoba  
Student Degree Start Date: 2013/5  
Student Degree Expected Date: 2016/5  
Thesis/Project Title: A12 neurons are regulated by NPY  
Project Description: USRA student,  
Present Position: Undergraduate program
- 2011/9 - 2012/5  
Principal Supervisor Jennifer Page (In Progress) , University of Manitoba  
Student Degree Start Date: 2012/9  
Student Degree Expected Date: 2016/5  
Thesis/Project Title: Identification of Dopamine Neurons in Appetite Centres of the Brain  
Project Description: Sanofi Biogenius Challenge, Oak Park High School student  
Present Position: University of Manitoba Undergraduate
- 2010/9 - 2011/9  
Principal Supervisor Katlyn Taylor (In Progress) , University of Manitoba  
Student Degree Start Date: 2010/9  
Student Degree Expected Date: 2014/5  
Thesis/Project Title: Regulation of gene expression in the rat SFO  
Project Description: NSERC/COOP summer student
- 2009/9 - 2010/9  
Principal Supervisor Melissa Bailey (Completed) , University of Manitoba  
Student Degree Start Date: 2008/9  
Student Degree Received Date: 2012/5  
Thesis/Project Title: Electrical properties of mouse A12 dopaminergic neurons maintained in dissociated culture  
Project Description: NSERC Summer Research student, COOP program  
Present Position: Rhodes Scholar, University of Oxford, currently enrolled in PhD program at Oxford
- Bachelor's Honours [n=4]**
- 2013/5 - 2014/5  
Principal Supervisor Samantha Lee (Completed) , University of Manitoba  
Student Degree Start Date: 2011/9  
Student Degree Received Date: 2014/5  
Thesis/Project Title: Regulation of arcuate nucleus dopaminergic neurons by serotonin  
Project Description: NSERC summer research Student Honours project research student  
Present Position: MSc student in my laboratory
- 2010/9 - 2012/5  
Principal Supervisor Karen Oswald (Completed) , University of Manitoba  
Student Degree Start Date: 2010/9  
Student Degree Received Date: 2012/5  
Thesis/Project Title: Ghrelin administration increases neurite outgrowth in arcuate nucleus tyrosine hydroxylase neurons in culture  
Project Description: Honours Research Project student  
Present Position: Graduate student in Master's of Physical Therapy at UofM
- 2009/9 - 2010/9  
Principal Supervisor Sylvia Wong (Completed) , University of Manitoba  
Student Degree Start Date: 2008/9  
Student Degree Received Date: 2011/5  
Thesis/Project Title: Food restriction alters expression of Nav1.3 splice variants in rat subfornical organ  
Project Description: Honours Research Project student COOP summer research student  
Present Position: Graduated MSc UofT, biotech in San Francisco

2008/9 - 2009/9 Chantel Urfano (Completed) , University of Manitoba  
 Principal Supervisor Student Degree Start Date: 2005/9  
 Student Degree Received Date: 2009/5  
 Thesis/Project Title: Immunolocalization of Nav1.3 in the rat subfornical organ  
 Project Description: Honours Research Project student COOP summer research student  
 Present Position: Technician at PHAC, Ottawa

### Master's Thesis [n=5]

2014/9 - 2016/9 Lauren Shute (In Progress) , University of Manitoba  
 Principal Supervisor Student Degree Expected Date: 2016/9  
 Thesis/Project Title: Role of NALCN channel in regulating electrical activity of subfornical organ neurons

2012/7 - 2014/9 Shuo Huang (Completed) , University of Manitoba  
 Principal Supervisor Student Degree Start Date: 2012/7  
 Student Degree Received Date: 2014/9  
 Thesis/Project Title: The Role of Sodium Voltage-Gated Channel 1.3 on Subfornical Organ Neurons  
 Present Position: PhD student in the lab of Gerald Zamponi, U Calgary

2012/5 - 2016/5 Samantha Lee (In Progress) , University of Manitoba  
 Principal Supervisor Student Degree Start Date: 2012/9  
 Student Degree Expected Date: 2016/9  
 Thesis/Project Title: Regulation of catecholamine neurons of the area postrema by satiety signals ghrelin and amylin

2009/9 - 2012/12 Suman Lakhi (Completed) , University of Manitoba  
 Principal Supervisor Student Degree Start Date: 2009/9  
 Student Degree Received Date: 2012/1  
 Thesis/Project Title: Regulation of subfornical organ neurons  
 Present Position: Instructor at Assiniboine College

2009/9 - 2011/1 Kathryn Drepko (Withdrawn) , University of Manitoba  
 Principal Supervisor Student Degree Start Date: 2009/9  
 Thesis/Project Title: Regulation of CVO neurons by the satiety hormone Glucagon-like peptide-1 (GLP-1). Withdrawn after having children.  
 Present Position: Homemaker

### Doctorate [n=7]

2012/9 - 2016/12 Kurt Schall (Withdrawn) , University of Manitoba  
 Academic Advisor Student Degree Start Date: 2011/9  
 Thesis/Project Title: IL-1 $\beta$  Influence on MC and HPC Plasticity

2010/3 - 2010/9 Nicole Portisanos (Completed) , University of Manitoba  
 Academic Advisor Student Degree Start Date: 2006/9  
 Student Degree Received Date: 2010/9  
 Thesis/Project Title: Nutritional regulation of central fat mass and obesity-associated (FTO) expression, and its association with the central melanocortin signaling in the regulation of energy homeostasis

2010/1 - 2013/9 Xiaoyu Chen (Completed) , University of Manitoba  
 Academic Advisor Student Degree Start Date: 2012/4  
 Student Degree Received Date: 2013/8  
 Thesis/Project Title: The involvement of the neuropeptides orexins in the expression of fear and anxiety in rats exposed to a single episode of footshocks

- 2009/1 - 2009/12  
Academic Advisor Kevin Power (Completed) , University of Manitoba  
Student Degree Start Date: 2005/9  
Student Degree Received Date: 2009/12  
Thesis/Project Title: An investigation of voltage threshold hyperpolarization : mechanism to function  
Present Position: Assistant Professor, School of Human Kinetics and Recreation
- 2008/11 - 2012/9  
Principal Supervisor Wanda Snow (Completed) , University of Manitoba  
Student Degree Start Date: 2008/9  
Student Degree Received Date: 2012/10  
Thesis/Project Title: Cerebellar pathophysiology in a mouse model of duchenne muscular dystrophy  
Present Position: Post-doc at ST Boniface Research Centre
- 2008/9 - 2016/5  
Academic Advisor Esteli Vasquez (In Progress) , University of Manitoba  
Student Degree Start Date: 2009/9  
Student Degree Expected Date: 2014/5  
Thesis/Project Title: An investigation of the role of the intraspinal cholinergic system in the modulation of motoneuron voltage threshold  
Present Position: In Progress
- 2007/9 - 2009/9  
Academic Advisor Lourdes Martinez (Withdrawn) , University of Manitoba  
Thesis/Project Title: Regulation of spinal motor neurons

**Level Not Specified [n=3]**

- 2013/12 - 2014/9  
Principal Supervisor Darcy Childs, University of Manitoba  
Thesis/Project Title: Regulation of Nav1.3 mRNA expression in rat SFO neurons  
Project Description: Technician
- 2011/12 - 2012/3  
Principal Supervisor Shelly Rudsky, University of Manitoba  
Thesis/Project Title: Regulation of Nav1.3 mRNA expression in rat SFO neurons  
Project Description: Technician  
Present Position: Unknown
- 2008/12 - 2009/8  
Principal Supervisor Sara Kunkel, University of Manitoba  
Thesis/Project Title: Immunolocalization of Nav1.3 in subfornical organ neurons  
Project Description: Technician  
Present Position: Occupational Therapist

**Staff Supervision**

Number of Scientific and Technical Staff: 3

**Event Administration**

- 2012-10-22 -  
2013-06-10 Organizing Committee, Manitoba Neuroscience Network, 4th Annual Scientific Meeting, Conference, 2013-06-10 - 2013-06-10
- 2013-04-19 -  
2013-04-19 Event Organizer, Collections in the Department of Biological Sciences featuring curators Bruce Ford, Michele Piercey-Normore, Spencer Sealey, Margret Docker, Seminar, 2013-04-19 - 2013-04-19  
The University of Manitoba Department of Biological Sciences is home to a number of internationally recognized collections of biological specimens, including lichens, birds, vascular plants and preserved fish. The curators discuss ongoing teaching, research and outreach initiatives enabled by these collections.
- 2012-10-01 -  
2012-06-04 Program Committee, Manitoba Neuroscience Network, 3rd Annual Scientific Meeting, Conference, 2012-06-04 - 2012-06-04

## Editorial Activities

2014/11 - 2017/11 Editorial Board Member, International Journal of Neurology Research, Journal  
Editorial Board Member

## Graduate Examination Activities

2014-04-18 Examiner, Catherine Brandt, Biological Sciences BSc(Hon)

2012-04-20 Examiner, Murtaza Kapasi, Biological Sciences BSc(Hon)

## Research Funding Application Assessment Activities

2011-12-31 External Reviewer, Funder, Academic Reviewer, Natural Sciences and Engineering  
Research Council of Canada (NSERC)

2010-12-31 External Reviewer, Funder, Academic Reviewer, Natural Sciences and Engineering  
Research Council of Canada (NSERC)

2010-02-15 External Reviewer, Funder, Academic Reviewer

2009-12-31 External Reviewer, Funder, Academic Reviewer, Natural Sciences and Engineering  
Research Council of Canada (NSERC)

2009-02-16 External Reviewer, Funder, Academic Reviewer

2015-05-04 - Committee Member, Research Manitoba New investigator Grants, Funder, Academic  
2015-05-05 Reviewer, Manitoba Health Research Council

2015-04-20 - Committee Member, Research Manitoba Fellowship Committee, Funder, Academic  
2015-04-21 Reviewer, Manitoba Health Research Council

2014-05-08 - Committee Member, Manitoba Health Research Council, Operating and Establishment  
2014-05-09 Grants, Funder, Academic Reviewer, Manitoba Health Research Council

2013-05-07 - Committee Member, Manitoba Health Research Council Review Committee for  
2013-05-08 Establishment Grants and Research Grants, Funder, Academic Reviewer, Manitoba  
Health Research Council

## Promotion Tenure Assessment Activities

2014-09-01 - Biological Sciences Promotion Committee, The University of Manitoba  
2014-11-01

## International Collaboration Activities

2006-03-06 Investigator United Kingdom  
Part of an ongoing international collaboration using state of the art "gene expression tools" such as microarray and RNAseq to investigate how gene expression is altered in the CNS with disease and homeostatic challenges. Other investigators include Dr David Murphy (University of Bristol, UK), Dr Charlie Hindmarch (University of Bristol, UK) and Dr Alastair Ferguson (Queen's University in Kingston, ON). Furthering this collaboration I have recently submitted RNA samples for a deep sequencing/transcriptome analysis project, investigating the consequence of perinatal overnutrition of rats on patterns of gene expression in areas of the brain that regulate energy balance. This experiment will help shed light on the notion that becoming overweight early in life has long term consequences on areas of the brain that regulate appetite and body weight.

## Committee Memberships

2010/1	Committee Member, Education Subcommittee of the Committee on Animal care (Formerly known as the Senate Committee on Animal Care), The University of Manitoba Reports to the Committee on Animal Care concerning training of animal users, to comply with Canadian Council for Animal Care
2010/1 - 2016/1	Committee Member, Fort Garry Animal Care Committee (formerly known as Fort Garry Animal Protocol Management and Review Committee), The University of Manitoba Reviews protocols for experimental animal use by investigators at Fort Garry campus of the UofM, including Psychology Animal Holding Unit, TK Cheung for Animal Science Research, Glenlea Farms (dairy, beef and swine units) and Richardson Centre for Functional Foods. Conducts regular inspections of animal facilities and submits recommendations to their managers.
2010/1 - 2016/1	Chair, Science Local Animal User Committee (LAUC), The University of Manitoba Committee oversees activities within Biological Sciences Animal Housing Facility. Provides direction for management of facility. Liaises between departmental council members. Reports to Dean of Science and Associate VP Research and Department of Biological Sciences.
2011/1 - 2015/1	Committee Member, Committee on Animal care (formerly known as the Senate Committee on Animal Care), The University of Manitoba Provides advice and recommendations to Senate and the university administration regarding the university's animal care and use program.

## Other Memberships

2011-01-01 - 2015-07-01	Member, Manitoba Chapter of the Society for Neuroscience
2007-01-01 - 2015-07-01	Member, Canadian Association for Neuroscience
1995-09-01 - 2015-01-01	Member, Society for Neuroscience
2013-01-01 - 2014-01-01	Member, International Society for Neurochemistry
2013-01-01 - 2014-01-01	Member, Neurometabolic Club Holds a +1 day meeting before the Canadian Association for Neuroscience Meeting. Members have interests in neural regulation of metabolism. Second annual meeting in May 2014

## Presentations

1. Regulating electrical activity in identified subfornical organ neurons. Symposium - Bristol-São Paulo Research Summit. Autonomic and Neuroendocrine Dysfunction In Chronic Diseases. Universidade De São Paulo, Faculdade De Medicina De Ribeirão PretoSP, Ribeirao Presto, Brazil  
Main Audience: Researcher
2. Regulating electrical activity of subfornical organ neurons. Manitoba Neuroscience Network-5th Annual Scientific Meeting., Gimli, Canada  
Main Audience: Researcher
3. (2011). Roles of the subfornical organ in regulating energy balance. Manitoba Neuroscience Network Seminar, Winnipeg, Canada  
Main Audience: Researcher

4. (2010). Regulation of appetite by the gut hormone ghrelin: barriers and opportunities. Dept of Physiology, University of Manitoba weekly research seminar, Winnipeg, Canada  
Main Audience: Researcher
5. (2009). Regulation of voltage gated Na<sup>+</sup> channels in rat subfornical organ following food or water restriction. Laboratories for Integrative Neuroscience and Endocrinology at University of Bristol, Bristol, United Kingdom  
Main Audience: Researcher

## Broadcast Interviews

- 2013-04-29 Talking with a biologist, Department of Biological Sciences, University of Manitoba, <https://www.youtube.com/watch?v=syquFq64bdM>, Michael Shaw
- 2010-03-03 Ongoing Research Program of Dr Mark Fry at the UofM: "Biologist Mark Fry speaks about the neurobiology of obesity, or in cocktail party parlance, what fat does to our brains. Campus Cast is semi-weekly podcast produced by the University of Manitoba", Campus Cast: Mark Fry, University of Manitoba Podcast
- Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC)

## Text Interviews

- 2013-11-26 Food porn-sexualization of food, The Manitoban: University of Manitoba Student Newspaper
- 2013-08-24 "In the shadow of the bulge: The solution seems simple -- eat less, exercise more -- so why has obesity become a runaway train?" Obesity in modern times, Winnipeg Free Press By: Randy Turner

## Publications

### Journal Articles

1. Huang S, Oswald K, Lee S, Bailey M, Fry M. Ghrelin alters neurite outgrowth and electrophysiological properties of mouse ventrolateral arcuate tyrosine hydroxylase neurons in culture. International Journal of Biological Sciences.  
Submitted,  
Refereed?: Yes
2. Huang S, Lee S, Shute L, Fry M. (2014). Identification of neuronal subpopulations within the subfornical organ. Cellular and Molecular Neurobiology.  
Submitted,  
Refereed?: Yes
3. Snow, W.M, Anderson J.E., and Fry, M. (2014). Regional and Genotypic Differences in Intrinsic Electrophysiological Properties of Cerebellar Purkinje Neurons from Wild-type and Dystrophin-deficient mdx Mice. Neurobiology of Learning. 107: 19-31.  
Last Author  
Published,  
Refereed?: Yes
4. Huang S, Oswald K, Lee S, Bailey M, Fry M. (2014). Ghrelin alters morphological and electrical properties of arcuate nucleus dopaminergic neurons in culture. International Journal of Biological Sciences.  
Last Author  
Submitted,  
Refereed?: Yes

5. Snow WM , Fry M , Anderson JE. (2013). Increased density of dystrophin protein in the lateral versus the vermal mouse cerebellum. *Cellular and Molecular Neurobiology*. 33(4)  
Published,  
Refereed?: Yes
6. Lakhi S , Snow WM , Fry M. (2013). Insulin modulates the electrical activity of subfornical organ neurons. *Neuroreport*. 24(6)  
Published,  
Refereed?: Yes
7. Colombari DS , Colombari E , Freiria-Oliveira AH , Antunes VR , Yao ST , Hindmarch C , Ferguson AV , Fry M , Murphy D , Paton JF. (2011). Switching control of sympathetic activity from forebrain to hindbrain in chronic dehydration. *The Journal of Physiology*. 589(Pt 18)  
Published,  
Refereed?: Yes
8. Hindmarch CC , Fry M , Smith PM , Yao ST , Hazell GG , Lolait SJ , Paton JF , Ferguson AV , Murphy D. (2011). The transcriptome of the medullary area postrema: the thirsty rat, the hungry rat and the hypertensive rat. *Experimental physiology*. 96(5)  
Published,  
Refereed?: Yes
9. Alim I , Fry WM , Walsh MH , Ferguson AV. (2010). Actions of adiponectin on the excitability of subfornical organ neurons are altered by food deprivation. *Brain research*. 1330  
Published,  
Refereed?: Yes
10. Fry M , Ferguson AV. (2010). Ghrelin: central nervous system sites of action in regulation of energy balance. *International journal of peptides*. 2010  
Published,  
Refereed?: Yes
11. Fry M , Ferguson AV. (2009). Ghrelin modulates electrical activity of area postrema neurons. *American journal of physiology. Regulatory, integrative and comparative physiology*. 296(3)  
Published,  
Refereed?: Yes
12. Hindmarch C , Fry M , Yao ST , Smith PM , Murphy D , Ferguson AV. (2008). Microarray analysis of the transcriptome of the subfornical organ in the rat: regulation by fluid and food deprivation. *American journal of physiology. Regulatory, integrative and comparative physiology*. 295(6)  
Published,  
Refereed?: Yes
13. Fry M , Cottrell GT , Ferguson AV. (2008). Prokineticin 2 influences subfornical organ neurons through regulation of MAP kinase and the modulation of sodium channels. *American journal of physiology. Regulatory, integrative and comparative physiology*. 295(3)  
Published,  
Refereed?: Yes
14. Hoyda TD , Fry M , Ahima RS , Ferguson AV. (2007). Adiponectin selectively inhibits oxytocin neurons of the paraventricular nucleus of the hypothalamus. *The Journal of Physiology*. 585(Pt 3)  
Published,  
Refereed?: Yes
15. Fry M , Ferguson AV. (2007). Subthreshold oscillations of membrane potential of rat subfornical organ neurons. *Neuroreport*. 18(13)  
Published,  
Refereed?: Yes
16. Fry M , Ferguson AV. (2007). The sensory circumventricular organs: brain targets for circulating signals controlling ingestive behavior. *Physiology & Behavior*. 91(4)  
Published,  
Refereed?: Yes

17. Fry M , Boegle AK , Maue RA. (2007). Differentiated pattern of sodium channel expression in dissociated Purkinje neurons maintained in long-term culture. *Journal of Neurochemistry*. 101(3)  
Published,  
Refereed?: Yes
18. Fry M , Hoyda TD , Ferguson AV. (2007). Making sense of it: roles of the sensory circumventricular organs in feeding and regulation of energy homeostasis. *Experimental Biology and Medicine (Maywood, N.J.)*. 232(1)  
Published,  
Refereed?: Yes
19. Fry M. (2006). Developmental expression of Na<sup>+</sup> currents in mouse Purkinje neurons. *The European Journal of Neuroscience*. 24(9)  
Published,  
Refereed?: Yes
20. Fry M , Smith PM , Hoyda TD , Duncan M , Ahima RS , Sharkey KA , Ferguson AV. (2006). Area postrema neurons are modulated by the adipocyte hormone adiponectin. *The Journal of Neuroscience*. 26(38)  
Published,  
Refereed?: Yes
21. Pulman KJ , Fry WM , Cottrell GT , Ferguson AV. (2006). The subfornical organ: a central target for circulating feeding signals. *The Journal of Neuroscience*. 26(7)  
Published,  
Refereed?: Yes
22. Fry M , Maue RA , Moody-Corbett F. (2004). Properties of *Xenopus* Kv1.10 channels expressed in HEK293 cells. *Journal of Neurobiology*. 60(2)  
Published,  
Refereed?: Yes
23. Fry M , Paterno G , Moody-Corbett F. (2001). Cloning and expression of three K<sup>+</sup> channel cDNAs from *Xenopus* muscle. *Brain Research. Molecular Brain Research*. 90(2)  
Published,  
Refereed?: Yes
24. Fry M , Moody-Corbett F. (1999). Localization of sodium and potassium currents at sites of nerve-muscle contact in embryonic *Xenopus* muscle cells in culture. *Pflügers Archiv : European Journal of Physiology*. 437(6)  
Published,  
Refereed?: Yes

### Book Chapters

1. Fry W, Ferguson A. (2009). Circumventricular Organs. Squire L. *Encyclopedia of Neuroscience*. : 997-1002.  
Co-Author  
Accepted, Academic Press,  
Refereed?: No
2. (2002). Recording From Macropatches. *NeuroMethods: Patch Clamp Analysis, Advanced Techniques*. (35): 287-299.  
Published, Humana press,

### Dissertations

1. K<sup>+</sup> channels in *Xenopus* skeletal muscle. (2001). Memorial University of Newfoundland. Doctorate.
2. Isolation of cDNA encoding outward voltage gated K<sup>+</sup> channels from embryonic *Xenopus* skeletal muscle. (1995). Memorial University of Newfoundland. Bachelor's Honours.



## Conference Publications

1. Lee S, Shute S, and Fry M. Dopamine acts directly on arcuate nucleus neurons to alter expression of neuropeptide genes. Ninth Annual Canadian Neuroscience Meeting, Vancouver, Canada, 2015-05-24, Poster  
Co-Author  
Refereed?: No, Invited?: No  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC)
2. Shute L, Lee S, Ratnayake G, Halldorson T, Bestvater L, Tomy G, and Fry M. (2015). 4(5)-methylimidazole, found in caramel colouring, alters gene expression in arcuate. Ninth Annual Canadian Neuroscience Meeting, Vancouver, Canada, Poster
3. Huang S\*, Lakhi S\*, Lee S\*, Wong S\*, Childs D, and Fry M. (2014). Na<sup>+</sup> channel expression in rat subfornical organ is regulated by fasting and AMPK. Eighth Annual Canadian Neuroscience Meeting, Montreal, , 2014-05-20, Poster  
Last Author  
Submitted  
Refereed?: No, Invited?: No
4. Huang H\*, Oswald K\*, Bailey M\*, Fry M. (2014). Morphological and electrophysiological plasticity of tyrosine hydroxylase neurons in mouse arcuate nucleus. Eighth Annual Canadian Neuroscience Meeting, Montreal, , 2014-05-20, Poster  
Last Author  
Submitted  
Refereed?: No, Invited?: No
5. Huang S\*, Fry M.(2014). Electrophysiological properties of rat subfornical organ neurons expressing calbindin d28K. Eighth Annual Canadian Neuroscience Meeting, Montreal, , 2014-05-20, Poster  
Last Author  
Submitted  
Refereed?: No, Invited?: No
6. Huang S\*, Tough K\*, and Fry M. (2013). Ghrelin stimulates neurite outgrowth and changes in electrical properties of dopamine neurons from the arcuate nucleus of the hypothalamus. Manitoba Neuroscience Network - 4th Annual Scientific Meeting, Winnipeg, Canada, 2013-06-10, Poster  
Last Author  
Accepted  
Refereed?: No, Invited?: No
7. Snow W\*, Anderson J, and Fry M. (2013). Electrophysiological Properties of Dystrophin-Deficient Purkinje Neurons in the Mouse Cerebellum. Manitoba Student Research Poster Competition at Canadian Student Health Research Forum, Winnipeg, Canada, 2013-06-04, Poster  
Last Author  
Accepted  
Refereed?: No, Invited?: No
8. Snow W\*, Fry M, and Anderson J. (2013). Localization of Dystrophin in the Mouse Cerebellum: Implications for Duchenne Muscular Dystrophy. Manitoba Student Research Poster Competition at Canadian Student Health Research Forum, Winnipeg, Canada, 2011-06-07, Poster  
Co-Author  
Accepted  
Refereed?: No, Invited?: No

9. Huang S\*, and Fry M. (2013). Ghrelin Alters the Electrophysiological and Morphological Properties of Dopaminergic Neurons in Mouse Arcuate Nucleus. Prairie University Biology Symposium 2013, Winnipeg, Canada, 2013-02-21,  
Poster  
Last Author  
Accepted  
Refereed?: No, Invited?: No
10. Snow W\*, Anderson J, and Fry M.(2012). Electrophysiological Properties of Dystrophin-Deficient Purkinje Neurons in the Mouse Cerebellum. Annual Meeting of the Canadian Society for Brain, Behaviour and Cognitive Science, Kingston, Canada, 2012-06-07,  
Poster  
Last Author  
Accepted  
Refereed?: No, Invited?: No
11. Snow W\*, Anderson J, and Fry M. (2012). Electrophysiological properties of dystrophin-deficient Purkinje neurons in the mouse cerebellum. Canadian Journal of Experimental Psychology. Annual Meeting of the Canadian Society for Brain, Behaviour and Cognitive Science, Kingston, Canada, 2012-06-07 (301-301),  
Abstract  
Last Author  
Accepted  
Refereed?: No, Invited?: No
12. Lakhi S\*, Snow W\*, and Fry M. (2012). Insulin modulates the electrical activity of subfornical organ neurons. Sixth Annual Canadian Neuroscience Meeting, Vancouver, Canada, 2012-05-20,  
Poster  
Last Author  
Accepted  
Refereed?: No, Invited?: No
13. Snow W\*, Fry W, and Anderson J. (2012). A regional and subcellular examination of dystrophin localization in the mouse cerebellum. Sixth Annual Canadian Neuroscience Meeting, Vancouver, Canada, 2012-05-20,  
Poster  
Co-Author  
Accepted  
Refereed?: No, Invited?: No
14. Snow W\*, Anderson J, and Fry M. (2012). Electrophysiological properties of dystrophin-deficient Purkinje neurons in the mouse cerebellum. Sixth Annual Canadian Neuroscience Meeting, Vancouver, Canada, 2012-05-20,  
Poster  
Last Author  
Accepted  
Refereed?: No, Invited?: No
15. Oswald K\*, and Fry M. (2012). Ghrelin stimulates neurite outgrowth in tyrosine hydroxylase neurons of the arcuate nucleus. Sixth Annual Canadian Neuroscience Meeting, Vancouver, Canada, 2012-05-20,  
Poster  
Last Author  
Accepted  
Refereed?: No, Invited?: No
16. Lakhi S\*, Wong S\* and Fry M. (2012). Downregulation of Nav1.3 in subfornical organ neurons following a 48 hour fast. Sixth Annual Canadian Neuroscience Meeting, Vancouver, Canada, 2012-05-20,  
Poster  
Last Author  
Accepted  
Refereed?: No, Invited?: No

17. Snow W\*, Fry M, and Anderson J.(2011). Dystrophin Localization in the Mouse Cerebellum: Implications for Duchenne Muscular Dystrophy (Short-listed for Donald O. Hebb Graduate Student Award). Annual Meeting of the Canadian Society for Brain, Behaviour and Cognitive Science, Winnipeg, Canada, 2011-06-24,  
Poster  
Co-Author  
Accepted  
Refereed?: No, Invited?: No
18. Snow W\*, Fry M, and Anderson J. (2011). Dystrophin localization in the mouse cerebellum: implications for Duchenne muscular dystrophy. Canadian Journal of Experimental Psychology. Annual Meeting of the Canadian Society for Brain, Behaviour and Cognitive Science, Winnipeg, Canada, 2011-06-24 (294-294),  
Abstract  
Co-Author  
Accepted  
Refereed?: Yes, Invited?: No



**Date Submitted:** 2015-10-26 18:47:46

**Confirmation Number:** 439780

**Template:** NSERC\_Researcher

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## **Dr. Darren Michael Gillis**

Correspondence language: English

Sex: Male

## **Contact Information**

The primary information is denoted by (\*)

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Protected when completed

## Dr. Darren Gillis

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### Language Skills

Language	Read	Write	Speak	Understand	Peer Review
English	Yes	Yes	Yes	Yes	Yes

### Degrees

- 1993/6                    Doctorate, Fisheries / Behaviour / Fleet Dynamics, Simon Fraser University
- 1985/11                   Master's Thesis, Biology / Behavioural Ecology, McGill University  
Supervisors: Dr. D.L. Kramer, 1982/9 - 1985/11
- 1982/5                    Bachelor's Honours, Biology, Dalhousie University  
Supervisors: Dr. R.W. Doyle, 1981/9 - 1982/5

### User Profile

Research Specialization Keywords: fleet dynamics, fishery analysis, behav. ecology

Research Disciplines: Biology and Related Sciences

Areas of Research: Fishery Resources, Biological Behavior, Ecosystem (Aquatic and Terrestrial)

Fields of Application: Natural Resources

### Employment

- 2002/7                    Associate Professor  
Zoology / Biological Sciences, Faculty of Science, The University of Manitoba  
Full-time, Associate Professor  
Tenure Status: Tenure  
Course development, undergraduate teaching, graduate student teaching and supervision, research, university service
- 1994/9 - 2002/6           Assistant Professor  
Zoology, Faculty of Science, The University of Manitoba  
Full-time, Assistant Professor  
Tenure Status: Tenure Track  
Course development, undergraduate teaching, graduate student teaching and supervision, research, university service
- 1994/5 - 1994/8           NSERC Postdoctoral fellowship  
Oceanography, Dalhousie University  
Full-time  
Tenure Status: Non Tenure Track  
Conduct independent research into fleet dynamic aspects of the Scotian Shelf cod fishery.

- 1993/9 - 1994/4      Sessional Laboratory Instructor - 1st year Biology  
Biology, Saint Mary's University  
Part-time  
Tenure Status: Non Tenure Track  
Instruct and supervise students in the laboratory component of 1st year biology.  
Prepare and supervise teaching assistants for their duties in these laboratories.
- 1985/11 - 1986/9      Owner/Operator Gilldat: Data Analysis Consulting  
Sole proprietorship  
Solicit and fulfill contracts involving computer based quantitative analysis of natural resources.

## Leaves of Absence and Impact on Research

- 2009-05-05 -      Other Circumstances, The University of Manitoba  
2010-01-30      Though no formal leave from employment was taken, this period during this period my ability to perform research and my other duties was severely limited. My work was affected by activities associated with a major fire in 2009 (Duff Roblin Building at the University of Manitoba), the illness and death of my mother, and my subsequent poor personal health. In addition, during this time a PhD student had to suspend studies for medical reasons. These events impacted progress in my lab and ultimately caused an extension of the grant period by one year (2011 funds carried forward to 2012). Also note, only journal referee activities since 2009 are listed in this CV due to lack of records prior to that year.

## Research Funding History

### Awarded [n=2]

- 2014/5 - 2019/5      Advancing fisheries analysis through the application of ecological foraging principles,  
Principal Investigator Grant
- Funding Sources:**  
2014/5 - 2019/5      Natural Sciences and Engineering Research Council of Canada (NSERC)  
Discovery Grants  
Total Funding - 115,000  
Portion of Funding Received - 23,000  
Funding Competitive?: Yes
- 2007/5 - 2012/5      Behavioral and environmental patterns in fisheries data, Grant  
Principal Investigator
- Funding Sources:**  
2007/5 - 2012/5      Natural Sciences and Engineering Research Council of Canada (NSERC)  
Discovery Grant  
Total Funding - 120,000  
Portion of Funding Received - 120,000  
Funding Competitive?: Yes

## Student/Postdoctoral Supervision

### Bachelor's Honours [n=1]

2013/9 - 2014/4 Sam Fulton (Completed) , University of Manitoba  
Principal Supervisor Thesis/Project Title: Occurance and timing of targeting behaviour in the Lake Winnipeg gillnet fishery: implications for the estimation of abundance  
Present Position: student in program

### Master's Thesis [n=5]

2014/9 - 2016/9 Sam Fulton (In Progress) , University of Manitoba  
Principal Supervisor Thesis/Project Title: The impact of directed fishing effort on the population assessments of commercial fisheries.

2014/1 - 2016/1 Michelle Aljafary (In Progress) , University of Manitoba  
Principal Supervisor Student Degree Expected Date: 2016/5  
Thesis/Project Title: Nonlinear relationships between fishing effort and catch: identification and analysis

2012/9 - 2015/3 Marianne Geisler (Completed) , University of Manitoba  
Co-Supervisor Thesis/Project Title: Forecasting the effects of dreissenid invasion on habitat occupancy and production of walleye  
Present Position: Biologist, Manitoba Hydro

2011/1 - 2013/6 Colin Charles (Completed) , University of Manitoba  
Principal Supervisor Thesis/Project Title: An Examination of Predator Habitat Usage: Movement Analysis in a Marine Fishery and Freshwater Fish  
Present Position: Biologist (term) Fisheries and Oceans, Canada

2009/5 - 2012/6 Adam van der Lee (Completed) , University of Manitoba  
Principal Supervisor Thesis/Project Title: Fleet Dynamics around a Seasonal Regulatory Closure on the Scotian Shelf.  
Present Position: Biologist (term) DFO Burlington

### Doctorate [n=2]

2013/1 - 2014/1 Charlotte Giraud-Carrier (Withdrawn) , University of Manitoba  
Co-Supervisor Thesis/Project Title: Mathematical models of fish and fisheries: life history and fleet dynamics  
Present Position: Biologist, New Calidonia

2007/9 - 2012/9 (name withheld) (Withdrawn) , University of Manitoba  
Principal Supervisor Thesis/Project Title: Population biology of harvested arctic fish stocks  
Present Position: Biologist DFO (deceased)

## Event Administration

2014-02-08 - Noniminating Chair, Canadian Conference for Fisheries Research 2016, St. John's NL,  
2016-01-08 Conference, 2016-01-07 - 2016-01-10

2012-07-01 - Program Co-chair, Canadian Conference for Fisheries Research 2014, Yellowknife,  
2014-01-02 Conference, 2014-01-03 - 2014-01-05

2009-01-06 - Program Chair, Canadian Conference for Fisheries Research - 2010, Winnipeg,  
2009-12-31 Conference, 2010-01-07 - 2010-01-09

## Editorial Activities

2008/5 - 2015/12	Editorial Advisory Board / Associate Editor, Canadian Journal of Zoology, Journal
2015/6 - 2015/10	Reviewer, Lake and Reservoir Management (1 review & revisions), Journal
2015/5 - 2015/6	Reviewer, Reviews in Fish Biology and Fisheries (1 review), Journal
2013/10 - 2014/8	Referee, Progress in Oceanography (1 review & revisions), Journal
2009/1 - 2014/8	Referee, ICES Journal of Marine Science (3 reviews), Journal
2013/3 - 2013/3	Referee, Fish and Fisheries (1 review), Journal
2011/1 - 2013/2	Referee, Canadian Journal of Fisheries and Aquatic Sciences. (5 reviews), Journal
2012/8 - 2012/8	Referee, International Journal of Fisheries and Aquaculture (1 review), Journal
2011/9 - 2011/9	Referee, Ecological Applications (1 review), Journal
2011/2 - 2011/2	Referee, Marine Ecology Progress Series (1 review), Journal
2010/12 - 2010/12	Referee, Aquatic Living Resources (1 review), Journal
2010/2 - 2010/2	Referee, Great Lakes Research (1 review), Journal
2009/2 - 2009/2	Referee, Transactions of the American Fisheries Society (1 review), Journal
2009/1 - 2009/1	Referee, CCAMLR Science (1 review), Journal

## Expert Witness Activities

2015-02-18 - 2015-02-21	Expert in Fisheries Dynamics, Workshop hosted by Dr. R. Axtell ( George Mason University) and the Ocean Conservancy on "Better Understanding of Fisher Behavior for Improved Policies: Use of Agent-Based Models.", United States, Washington, DC Group discussions to support the integration of fisher behavior into the development of Agent Based Models for marine conservation and management.
2010-02-25 - 2010-02-27	External Expert in Fishery Dynamics, WKFLAT 2010 Workshop (International Council for the Exploration of the Sea), Denmark, Copenhagen As an external expert I was invited to provide input into discussions regarding the assessment methods employed in the flatfish fisheries of the North Sea by the International Council for the Exploration of the Sea in order to develop new benchmark standards.

## Organizational Review Activities

2015-07-02 - 2015-07-19	Reviewer, Natural Sciences and Engineering Research Council of Canada (NSERC) Review of application for NSERC Strategic Partnerships Grant
2015-02-21 - 2015-03-18	Reviewer, Government of Northwest Territories Review of the NWT Cumulative Impacts Monitoring Program (fish monitoring and research) for the Environment and natural Resources department of the territorial government.
2015-02-04 - 2015-03-06	Reviewer, NOAA - Fisheries (US Dept. of Commerce) Referee of an application for the Saltonstall-Kennedy Grant to provide financial assistance for research and development projects to strengthen and develop the U.S. fishing industry.
2014-12-01 - 2015-01-06	Reviewer, Natural Sciences and Engineering Research Council of Canada (NSERC) Referee for Discovery Grants (2 reviews)



- 2014-06-10 - External Expert, Fisheries and Oceans Canada  
2014-06-12 Workshop participants were asked to review Char assessments from Nunavut and to aid in the development of field sampling programs to support their management.
- 2014-06-04 - Reviewer, Wageningen Agricultural University  
2014-06-07 Review of Ph.D. proposal related to fisheries dynamics (directed fishing effort)
- 2013-04-25 - External Expert, Fisheries and Oceans Canada  
2013-07-26 Government of Canada Regional Assessment Process (RAP) on the Great Slave Lake Sustainable Fishery Plan. Participants were responsible for reviewing and providing comments on the drafts of the research document ( Res doc) and the stock assessment report (SAR) to be incorporated in the final documents.
- 2012-11-24 - Reviewer, Natural Sciences and Engineering Research Council of Canada (NSERC)  
2013-01-03 Discovery Grant Referee (2 reviews)
- 2012-01-25 - External Expert, Fisheries and Oceans Canada  
2012-01-26 Regional Advisory Process for Cambridge Bay Char. As an external expert I reviewed drafts of the Stock Status Report and working papers and provided comments and suggestions at the meeting.
- 2011-06-24 - Reviewer, Natural Sciences and Engineering Research Council of Canada (NSERC)  
2011-07-10 Strategic Projects Grant Program
- 2011-06-07 - Reviewer, West Coast Sea Grant (Washington, Oregon, California)  
2011-07-06 Review regional sea grant proposal relating to west coast US fisheries.
- 2011-02-02 - Reviewer, Canada Research Chairs  
2011-03-07 Review of Tier II position for renewal.
- 2008-11-04 - Task Force Member (Science), Ministry of Water Stewardship  
2011-01-11 Lake Winnipeg Quota Review Task Force consisted of a chair and 3 scientific, and 3 industry advisors. They were to review the evidence underlying the the limits in the quota fisheries of Lake Winnipeg and make management recommendations to the minister.
- 2009-01-01 - Reviewer, Natural Sciences and Engineering Research Council of Canada (NSERC)  
2009-01-22 Strategic Projects Program

## Knowledge and Technology Translation

- 2015/3 - 2015/3 Workshop developer and facilitator, Standards Development Group/Organization/Business Serviced: StanTec Consulting  
Target Stakeholder: Industry/Business (>500 employees)  
Outcome / Deliverable: Workshop instruction and code scripts to support the use of R in environmental analysis.  
Evidence of Uptake/Impact: StanTec is using the materials and instruction presented to support their own, internal national standards development program. Permission was granted after the workshop to do this.  
Activity Description: Workshop presentation and training for environmental analyses in the following: Day 1 A. R overview, philosophy, and general resources (tools for self learning) B. Data structures and data entry C. Data selection, manipulation, and editing D. Basic analysis: t-tests and power simulation Day 2 A. Preliminary data exploration - outliers and patterns B. Linear models - theory and parameter estimation C. Linear models - evaluating model quality and possible remedial measures D. R Graphics: some more useful visualization tools

2011/1 - 2011/3 Workshop developer and facilitator, Standards Development Group/Organization/Business Serviced: Fisheries and Oceans, Canada  
 Target Stakeholder: Government Personnel  
 Outcome / Deliverable: Attendees can perform basic data manipulations and analyses in the R statistical language.  
 Evidence of Uptake/Impact: Application of R in their respective units. Continued discussions and collaborations in data analysis.  
 Activity Description: I developed a series of weekly activities illustrating the use of R in basic data manipulation and analysis. I delivered introductory briefings and provided support for attendees who worked through the activities.

## International Collaboration Activities

2001-05-01 Collaborator, both as lead and contributor Netherlands  
 Developing fleet dynamic models for the analyses of the Dutch North Sea beam trawl fleet. This is an ongoing interaction that results professional development (developing and sharing methods), collaborative papers, and presentations as opportunities arise.

## Committee Memberships

1999/7 - 2025/7 Committee Member, Standing Committee on Information Systems (Faculty of Science), The University of Manitoba  
 To advise the Dean regarding the use and development of information technology in teaching and research.

2015/1 - 2015/12 Committee Member, Website Communications Group (Faculty of Science), The University of Manitoba  
 Advise and assist in communication and information exchange through the faculty website.

2008/9 - 2015/3 Committee Member, Scholarships and Awards Committee (Departmental), The University of Manitoba  
 Evaluate scholarship and award applications for departmental, faculty, university, and national scholarships and awards.

2011/9 - 2014/7 Co-chair, Ecology and Evolutionary Biology Theme Group (Departmental), The University of Manitoba  
 To administer various aspects of our Ecology and Environmental Biology theme (concentration) within the Biological Science degree programs. This involves student advising, course coordination, and program development.

2011/7 - 2014/7 Committee Member, Adjunct Committee (Departmental), The University of Manitoba  
 To advise the department head on the appointment of adjunct faculty (reviewing applications and making recommendations).

2005/7 - 2014/7 Committee Member, Faculty Executive Council (Faculty of Science), The University of Manitoba  
 To advise the Dean on academic and research matters, as requested. To vote on policy changes, special awards, and other items according to the regulations of the Faculty.

2009/7 - 2010/6 Committee Member, Water Chair Search Committee (University), The University of Manitoba  
 To advise the vice-president on applicants for the University's research chair in watershed systems.

## Presentations

1. \*Sam Fulton (presenter) Darren Gillis. (2015). Quantifying Targeting Behaviour And Catch Trends In The Lake Winnipeg Commercial Fishery. Canadian Conference for Fisheries Research, Ottawa, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
2. (2015). Assumptions In Fishing Effort: Tests And Consequences. Canadian Conference for Fisheries Research, Ottawa, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
3. \*Marianne Geisler (Presenter) Mike Rennie Darren Gillis. (2015). Development of a Manitoba-Specific Walleye Habitat Model. Canadian Conference for Fisheries Research, Ottawa, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
4. \*Michelle Aljafary (Presenter) Darren Gillis. (2015). Meta-Analysis On Standardization Of Catch And Effort Data. Canadian Conference for Fisheries Research, Ottawa, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
5. Darren Gillis. (2014). Catch, Effort, and Hidden Fleet Dynamic Effects (Poster). American Fisheries Society, Quebec City, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
6. \*Geisler, M.E (presenting) Rennie, M. Gillis, D.(2014). Dreissenid mussels: potential threat to walleye (*Sander vitreus*) habitat?. Canadian Conference for Fisheries Research, Yellowknife, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
7. \* Charles,C. (presenting), Gillis,D., Wade, E.(2013). Using hidden Markov models to identify behaviour in the Gulf of St. Lawrence snow crab (*Chionoecetes opilio*) fixed gear fishery.Canadian Conference for Fisheries Research, Windsor, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
8. Gillis, D. (presenting), \* van der Lee, A.(2012). An isodar approach to quantifying the ideal free distribution in commercial fisheries.Canadian Conference for Fisheries Research, Moncton, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
9. \* Charles, C. (poster, presenting), Gillis, D., Wade, E.(2012). Relating the foraging strategy to catch rates in the Gulf of St. Lawrence snow crab fishery (poster). Canadian Conference for Fisheries Research, Moncton, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
10. \* van der Lee, A. (presenting), Gillis, D.(2012). Comparative analysis of the spatial distribution of fishing effort utilizing the ideal free distribution and discrete choice models.Canadian Conference for Fisheries Research, Moncton, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
11. Gillis, D. (presenting). (2011). Vessel Associations and Fishing Success. in Ecosystem Modeling: Joint Modeling of Human Behavior and Fish Populations.American Fisheries Society Annual Meeting, Seattle, United States  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No

12. Gillis, D. (presenting), Rijnsdorp, A. and Poos, J.J.(2011). Inferred information networks in a commercial fishery using vessel monitoring data: fishing performance and vessel association.Canadian Conference for Fisheries Research, Toronto, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
13. \* van der Lee, A. (presenting), Gillis D., Comeau, P., Hurley, P., and Black, J.(2011). "Fishing the line" around regulatory closures: an examination of fishing effort around the Brown's Bank spawning closure on the Scotian Shelf.Canadian Conference for Fisheries Research, Toronto, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
14. Gillis, D. (presenting). (2010). Information in fisheries data: a tale of two sources.IMARES (Institute for Marine Resources & Ecosystem Studies, IJmuiden, The Netherlands) (Research Visit), IJmuiden, Netherlands  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
15. \* Pawlychyn, Z. A. (presenting), R.F. Tallman, K.L. Howland, Gillis, D.(2010). Identifying the migration timing and type of a Canadian arctic fish – Broad Whitefish (*Coregonus nasus*, Pallas).Canadian Conference for Fisheries Research, Winnipeg, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
16. \* van der Lee, A. (presenting), Gillis, D.(2009). "Fishing the line" around regulatory closures. (poster). Canadian Conference for Fisheries Research, Winnipeg, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No

## Publications

### Journal Articles

1. Charles, C. Gillis, D.M. Hrenchuck, L.E. Blanchfield, P.J.(2015). A method of spatial correction for acoustic positioning biotelemetry. *Animal Biotelemetry*.  
Submitted  
Refereed?: Yes
2. Kissinger, B.C. Gartner, N. Anderson, W.G. Gillis, D.M. Halden, N.M. Harwood, L.A. Reist, J.D.(2015). Brackish-water residency and semi-anadromy in Arctic lake trout (*Salvelinus namaycush*) inferred from otolith microchemistry.*Journal of Great Lakes Research*.  
In Press  
Refereed?: Yes, Open Access?: No
3. \*Charles, C., Gillis, D., Wade, E.(2014). Using hidden Markov models to infer vessel activities in the snow crab (*Chionoecetes opilio*) fixed gear fishery and their application to catch standardization. *Canadian Journal of Fisheries and Aquatic Sciences*. 71(12): 1817-1829.  
Published  
Refereed?: Yes
4. \* van der Lee, A., Gillis, D., Comeau, P.(2014). Comparative analysis of the spatial distribution of fishing effort utilizing the ideal free distribution and discrete choice models.*Canadian Journal of Fisheries and Aquatic Sciences*. 71(1): 141-150.  
Published  
Refereed?: Yes, Open Access?: No
5. \* van der Lee, A., Gillis, D., Comeau, P., and Hurley P.(2013). Fishing the Line: Catch and effort distribution around the seasonal haddock (*Melanogrammus aeglefinus*) spawning closure on the Scotian Shelf.*Canadian Journal of Fisheries and Aquatic Sciences*. 70(7): 973-981.  
Published  
Refereed?: Yes, Open Access?: No

6. Gillis, D., and \* van der Lee, A.(2012). Advancing the application of the ideal free distribution to spatial models of fishing effort: the isodar approach.Can. J. Fish. Aquatic Sci.69: 1610-1620.  
Published  
Refereed?: Yes, Open Access?: No
7. \* VanGerwen-Toyne, M., Tallman, M., and Gillis, D.(2012). Comparison of life history traits between anadromous and lacustrine stocks of broad whitefish (*Coregonus nasus*): An intra-specific test of Roff's hypothesis: Biology and Management of Coregonid Fishes – 2008.Advanc. Limnol.63: 159-173.  
Published  
Refereed?: Yes, Open Access?: No
8. \* Speers, J., and Gillis, D.(2012). Catch and effort variation in the commercial gillnet fishery of Lake Winnipeg, Canada in relation to environmental factors.Journal of Great Lakes Research.38: 26-34.  
Published  
Refereed?: Yes, Open Access?: No
9. \* Loewen, T., Gillis, D., and Tallman, R.(2010). Maturation, growth and fecundity of Arctic charr, *Salvelinus alpinus* (L.), life-history variants co-existing in lake systems of Southern Baffin Island,. *Hydrobiologia*. 650: 193-202.  
Published  
Refereed?: Yes, Open Access?: No
10. Poos, J.-J., Bogaards, J., Quirijns, F., Gillis, D., and Rijnsdorp, A.(2010). Individual quotas, fishing effort allocation, and over-quota discarding in mixed fisheries.ICES Journal of Marine Science. 67: 323-333.  
Published  
Refereed?: Yes
11. \* Loewen, T., Gillis, D., and Tallman, R.(2009). Ecological niche specialization inferred from morphological variation and otolith strontium of Arctic charr *Salvelinus alpinus* L. found within open lake systems of southern Baffin Island, Nunavut, Canada.Journal of Fish Biology. 75: 1473-1495.  
Published  
Refereed?: Yes, Open Access?: No

## Reports

1. Ayles, B.A., Campbell, K., Gillis, D., Saunders, L., Scott, K.J., Tallman, R., Traverse, N.(2011). Technical Assessment of the Status, Health and Sustainable Harvest Levels of the Lake Winnipeg Fisheries Resource. (Prepared for: Manitoba Minister of Water Stewardship by the Lake Winnipeg Quota Review Task Force.). 196. Government of Manitoba

CURRICULUM VITAE  
**L. Gordon Goldsborough**

***Personal data***

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***Home:***

2021 Loudoun Road  
Winnipeg, Manitoba R3S 1A3  
Canada  
(204) 885-3969

***Work:***

Department of Biological Sciences  
University of Manitoba  
Winnipeg, Manitoba R3T 2N2  
Office: (204) 474-7469  
E-mail: gordon.goldsborough@umanitoba.ca

***Citizenship:*** Canadian

***Marital Status:*** married (2 children)

***Employment History***

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- 1996 - **Associate Professor (tenured 1998)**  
present Department of Biological Sciences, University of Manitoba
- 1996 - **Director**  
2010 Delta Marsh Field Station, University of Manitoba
- 1996 - **Associate Professor**  
2004 Environmental Science Program, University of Manitoba
- 1993 - **Associate Professor (tenured 1995)**  
1995 Department of Botany, Brandon University
- 1992 - **Adjunct Professor**  
1995 Department of Botany, University of Manitoba
- 1989 - **Assistant Professor**  
1993 Department of Botany, Brandon University
- 1988 - **NSERC Postdoctoral Fellow**  
1989 Department of Botany, University of Alberta
- 1986 - **Killam Postdoctoral Fellow**  
1987 Department of Botany, University of Alberta
- 1985 **Research Scientist**  
Water Quality Management Section, Manitoba Department of Environment

***Education***

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- 1985 ***Doctor of Philosophy (Department of Botany, University of Manitoba)***  
Thesis: Effects of two triazine herbicides on the structure and metabolism of freshwater marsh periphyton. 288pp.
- 1981 ***Bachelor of Science, Honours (Department of Botany, University of Manitoba)***  
Thesis: The effect of phytoplankton dynamics in a eutrophic prairie reservoir and in a receiving stream. 128pp.

CURRICULUM VITAE  
**L. Gordon Goldsborough**

***Research Interests***

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- ecology of algae and plants in freshwater lakes and wetlands
- lake and wetland water quality as affected by agricultural and forestry practises
- response of coastal wetlands to introduced exotic species, pollutants, and altered hydrology
- ecosystem structure and function in freshwater wetlands
- reconstruction of past environmental conditions via stratigraphic analysis of diatom microfossils and plant pigments in lake sediment cores
- environmental history of prairie Canada, focusing on impacts of aquatic dredging and channeling, land use and social changes

***Research Awards***

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- |      |  |
|------|--|
| 2015 | Environment Canada<br>"Historical analysis of changes in connectivity and plant cover in Netley-Libau Marsh"   |
| 2015 | Ducks Unlimited Canada<br>"Delta Marsh Restoration"  |
| 2014 | Manitoba Conservation and Water Stewardship<br>"Delta Marsh Restoration"   |
| 2013 | Manitoba Conservation and Water Stewardship<br>"Delta Marsh Restoration"   |
| 2012 | Manitoba Conservation and Water Stewardship<br>"Delta Marsh Restoration"   |
| 2012 | Ducks Unlimited Canada / Jewish National Fund of Canada<br>"A comparative study of macrophyte nutrient uptake processes in altered wetland ecosystems for optimal management practices in the watersheds of Lake Kinneret, Israel and Lake Winnipeg, Canada" |
| 2012 | Canada Summer Jobs Student Employment Program<br>"Invasive species research assistant"   |
| 2011 | Manitoba Conservation<br>"Delta Marsh Restoration"   |
| 2011 | Ducks Unlimited Canada / Manitoba Water Stewardship<br>"Evaluation of experimental carp fishing by the Manitoba Metis Federation"  |
| 2011 | Canada Summer Jobs Student Employment Program<br>"Invasive species research assistant"   |
| 2011 | Manitoba Water Stewardship Fund<br>"Fisheries and water quality studies leading to the restoration of Delta Marsh by exclusion of Common Carp ( <i>Cyprinus carpio</i> )"  |

CURRICULUM VITAE  
**L. Gordon Goldsborough**

- 2010 Manitoba Conservation  
“Delta Marsh Scientific Data Collection”
- 2010 Ducks Unlimited Canada  
“Delta Marsh Restoration”
- 2009 Manitoba Water Stewardship / Ducks Unlimited Canada  
“Netley-Libau Marsh Survey”
- 2009 Manitoba Conservation  
“Delta Marsh Scientific Data Collection”
- 2009 Ducks Unlimited Canada, Research Grant  
“Vegetation and water chemistry in the Summerberry Marsh complex of the Saskatchewan River delta”
- 2009 Murphy Foundation  
“Restoring Netley-Libau Marsh: A Prescription for Action”
- 2009 Lake Winnipeg Basin Stewardship Fund (Environment Canada)  
“Modeling Water Quality in the South Basin of Lake Manitoba”
- 2008 Murphy Foundation  
“A summit to evaluate restoration options for the Netley-Libau Marsh on Lake Winnipeg”
- 2007 Ducks Unlimited Canada  
“Vegetation and water chemistry in the Summerberry Marsh complex of the Saskatchewan River Delta”
- 2007 Manitoba Conservation, Wildlife Branch  
“Studies on water chemistry, vegetation and fisheries of Delta Marsh”
- 2007 Manitoba Water Stewardship Fund (Cicek and Goldsborough)  
“Improving water quality in Lake Winnipeg through Netley-Libau Marsh – Year 2: Using a natural wetland for nutrient removal and biopower/carbon emission credits”
- 2007 Environment Canada, Water Science and Technology Directorate  
“Studies on coastal wetlands of Manitoba large lakes”
- 2006-2007 Canadian Space Agency (plus 4 co-applicants)  
“Investigation of the East German Creek, Manitoba Mars analog site”
- 2005-2006 Manitoba Conservation, Research Partnership  
“Aquatic vegetation analysis and mapping at Lake Francis and Fish Lake, Manitoba”
- 2005-2007 Manitoba Conservation, Sustainable Development Innovations Fund, Research Grant  
“Livestock effects on farm pond water quality in south-central Manitoba”
- 2005-2007 Manitoba Conservation, Sustainable Development Innovations Fund, Research Grant  
“Water quality in Lake Manitoba”
- 2005- Manitoba Hydro



CURRICULUM VITAE  
**L. Gordon Goldsborough**

- 2006 "Measurements of water exchange between Lake Manitoba and Delta Marsh using conservative ions and stable isotopes"
- 2004-2007 Natural Sciences and Engineering Research Council, Major Facilities Access Grant (plus 6 co-applicants)  
"Delta Marsh Field Station (University of Manitoba)"
- 2004-2005 Manitoba Model Forest  
"Watershed management planning tools - Effects of forest management practices on lake water quality"
- 2002-2003 Delta Waterfowl Foundation  
"Hydrological influence of a large lake on nutrient dynamics of Delta Marsh"
- 2002 Manitoba Conservation  
"Land use study at Delta Marsh"
- 2002-2004 Manitoba Conservation, Sustainable Development Innovations Fund, Research Grant  
"Studies on the occurrence and cause of nuisance algae growth in Whiteshell lakes"
- 2001-2002 Manitoba Environment, Sustainable Development Innovations Fund, Research Grant (plus 1 co-applicant)  
"Development of detailed landscape and vegetation maps of Netley-Libau Marsh"
- 2001 Natural Sciences and Engineering Research Council, Equipment Grant (plus 3 co-applicants)  
"High performance liquid chromatography for agricultural, food, and environmental studies"
- 2001 - 2005 Natural Sciences and Engineering Research Council, Research Grant  
"The role of algae in prairie wetland ecosystems"
- 2001 Institute for Wetland and Waterfowl Research, Ducks Unlimited Canada  
"Effects of common carp on water quality, sediment chemistry, submerged macrophytes and the benthic community in six experimental cells in Delta Marsh"
- 2001 - 2004 Manitoba Hydro (plus 2 co-applicants)  
"Coastal wetlands of Manitoba great lakes"
- 2000 Natural Sciences and Engineering Research Council, Equipment Grant (plus 2 co-applicants)  
"Aquatic environmental monitoring equipment"
- 1999 - 2004 Natural Sciences and Engineering Research Council, Major Facilities Access Grant (plus 6 co-applicants)  
"University Field Station (Delta Marsh)"
- 1999 Ducks Unlimited Canada, Equipment Grant  
"Purchase of computer workstation for analysis of remote sensing data"
- 1999 Natural Sciences and Engineering Research Council, Equipment Grant

CURRICULUM VITAE  
**L. Gordon Goldsborough**

- “Scanning spectrophotometer for aquatic ecology studies”
- 1999 - Institute for Wetland and Waterfowl Research, Ducks Unlimited Canada  
2002 “Biotic and abiotic determinants of adsorption and degradation of agricultural pesticides in prairie wetlands”
- 1999 - Global Forest, Vancouver  
2000 “Water quality at the mouth of Omand’s Creek as compared to other small waterways in the City of Winnipeg”
- 1999 - Friends of Bruce Park, Inc., Winnipeg  
2000 “Water quality at the mouth of Omand’s Creek as compared to other small waterways in the City of Winnipeg”
- 1999 - Institute for Wetland and Waterfowl Research, Ducks Unlimited Canada  
2000 “Environmental controls of algal-derived turbidity in Delta Marsh”
- 1998 University of Manitoba Research Grants Program  
“Detection of vegetation change in Delta Marsh due to water level regulation of Lake Manitoba”
- 1997 - Institute for Wetland and Waterfowl Research, Ducks Unlimited Canada  
1998 “Environmental controls on benthic algal production in Oak Hammock Marsh, Manitoba”
- 1997 - Natural Sciences and Engineering Research Council, Research Grant  
2001 “*The role of algae in prairie wetland ecosystems*”
- 1997 University of Manitoba Research Grants Program  
“*Is metaphytic algae consumed by wetland grazers: a stable carbon isotope approach*”
- 1996 - Institute for Wetland and Waterfowl Research, Ducks Unlimited Canada  
1997 “*Algal production in Oak Hammock Marsh, Manitoba*”
- 1996 - Natural Sciences and Engineering Research Council, Major Facilities Access Grant (plus  
1999 6 co-applicants)  
“University Field Station (Delta Marsh)”
- 1996 Canadian Parks Service, Riding Mountain National Park  
“*Analysis of past lake production in Riding Mountain National Park*”
- 1994 - Brandon University Research Committee  
1995 “*The significance of waterfowl feces as a source of nutrients to plants in a prairie wetland*”
- 1993 - Brandon University Research Committee (A.O. Bush, co-holder)  
1994 “*Purchase of a portable computer to support off-campus research activities*”
- 1993 - Natural Sciences and Engineering Research Council, Research Grant  
1997 “*Ecology and ecotoxicology of freshwater algal communities*”
- 1993 Canadian Parks Service, Riding Mountain National Park  
“*Analysis of sediment cores from Clear Lake*”

CURRICULUM VITAE  
**L. Gordon Goldsborough**

- 1993 Geological Survey of Canada, Palliser Triangle Global Change Program  
*"Paleolimnology of Killarney Lake in southwestern Manitoba"*
- 1993 Manitoba Environment, Sustainable Development Innovations Fund  
*"Analysis of recent changes in water quality of lakes in southwestern Manitoba"*
- 1992 - Brandon University Research Committee  
1993 *"Analysis of historical changes in the primary production of lakes in southwestern Manitoba (Killarney, Pelican and Rock Lakes)"*
- 1992 - Canada / Manitoba Partnership in Forestry Agreement (D.J. Brown, co-holder)  
1993 *"Indirect effects of aerial spraying of glyphosate (Vision) on aquatic forest ecosystems"*
- 1991 Natural Sciences and Engineering Research Council, Equipment Grant  
*"Purchase of phase-contrast compound microscope"*
- 1991 Manitoba Environmental Innovations Fund  
*"Algae and water quality of Killarney Lake, Manitoba"*
- 1991 Rural Municipality of Turtle Mountain / Town of Killarney  
*"Sediment sampling in Killarney Lake, Manitoba"*
- 1990 - Natural Sciences and Engineering Research Council, Operating Grant  
1993 *"Structure and function of periphytic algal communities: the impact of stress"*
- 1990 - Environment Canada Pestfund  
1991 *"An assessment of the impact of the herbicides difenzoquat and sethoxydim on the biomass and productivity of freshwater periphytic algal communities"*
- 1990 - Brandon University Research Committee  
1991 *"The impact of a herbicide on periphytic algal photosynthesis as affected by community architectural development"*
- 1989 - Brandon University Research Committee  
1990 *"The impact of herbicide stress on the structure and function of attached algal communities"*
- 1987 - Boreal Institute for Northern Studies, University of Alberta, Grant-in-Aid for Northern  
1989 Studies  
*"Paleolimnology of Upper Pierre Grey and Fickle Lakes, Alberta"*
- 1987 - University of Alberta Central Research Fund  
1989 *"Paleolimnology of Upper Pierre Grey and Fickle Lakes, Alberta"*
- 1986 - Manitoba Department of Natural Resources, Logistics Contract  
1989 *"Effects of aerial spraying of forestry herbicides on aquatic ecosystems"*
- 1984 University of Manitoba Northern Studies Committee, Logistics Grant  
*"Freshwater diatom communities in the estuary of the Churchill River, Manitoba"*

CURRICULUM VITAE  
**L. Gordon Goldsborough**

***Research skills***

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- use of spectrophotometric, chromatographic, gravimetric and other techniques for routine water chemistry
- light microscopic techniques for the taxonomic identification and enumeration of extant and fossil plant micromaterials, with particular emphasis on diatoms
- use of radioisotopes for the measurement of aquatic primary production
- environmental chemistry methods and application techniques in the use of chemical herbicides
- use and development of biological assays for pesticide toxicity based on inorganic carbon uptake, in vivo chlorophyll fluorescence, elemental analysis (C,N,P), quantitative pigment concentrations and light microscopy
- techniques for the isolation and cultivation of freshwater microalgae

***Research Publications***

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***1. Refereed Papers in print or in press***

- Badiou, P. H. and L. G. Goldsborough. 2015. Ecological impacts of an exotic benthivorous fish, the Common Carp (*Cyprinus carpio* L.), on water quality, sedimentation, and submerged macrophyte biomass in small wetland mesocosms. *Hydrobiologia* 755:107-121.
- Gerard, G., D. Applin, E. Cloutis, J. Stromberg, R. Sharma, P. Mann, S. Grasby, R. Bezys, B. Horgan, K. Londry, M. Rice, B. Last, F. Last, P. Badiou, G. Goldsborough and J. Bell. 2013. A hypersaline spring analogue in Manitoba, Canada for potential ancient spring deposits on Mars. *Icarus* 224:399-412.
- Baschuk, M. S., Ervin, M. D., Clark, W. R., Armstrong, L. M., Wrubleski, D. A. and Goldsborough, L. G. 2012. Using satellite imagery to assess macrophyte response to water-level manipulations in the Saskatchewan River Delta, Manitoba. *Wetlands DOI* 10.1007/s13157-012-0339-z.
- Baschuk, M. S., Koper, N., Wrubleski, D. A., and Goldsborough, L. G. 2012. Effects of water depth, cover, and food resources on marsh birds and waterfowl in boreal wetlands of Manitoba, Canada. *Waterbirds* 35(1): 44-55.
- Hobson, K. A., Norris, D. R., Goldsborough, G. and Sealy, S. G. 2012. Requiem for a field station: The loss of a Canadian ornithological treasure. *Avian Conservation and Ecology* 7(2):7.
- Goldsborough, L. G. 2013. Book review: Bruce D. J. Batt: *The Marsh Keepers Journey: The Story of Ducks Unlimited Canada*. *Wetlands DOI* 10.1007/s13157-013-0427-8.
- Goldsborough, L. G. 2013. Book review: Stunden-Bower, S: *Wet Prairie: People, Land, and Water in Agricultural Manitoba*. *Wetlands* 33(3):573-574. <http://dx.doi.org/10.1007/s13157-013-0426-9>
- Badiou, P. H. and Goldsborough, L. G. 2010. Ecological impacts of an exotic benthivorous fish, in large experimental wetlands, Delta Marsh, Canada. *Wetlands* 30(4):657-667.
- Badiou, P. H. and Goldsborough, L. G. Ecological impacts of an exotic benthivorous fish, the Common Carp (*Cyprinus carpio* L.) and nutrient additions in small experimental mesocosms. II. Planktonic and benthic communities. In preparation.

CURRICULUM VITAE  
**L. Gordon Goldsborough**

- Badiou, P. H., Goldsborough, L. G. and Malley, D. F. Quantitative and qualitative assessment of dissolved organic carbon (DOC) in wetlands of central North America using scanning UV spectroscopy and multivariate statistics. In preparation.
- Badiou, P., L. G. Goldsborough and D. Wrubleski 2011. Impacts of the Common Carp (*Cyprinus carpio*) on freshwater ecosystems: A review. Chapter 4 in *Carp: Habitat, Management and Diseases*, J. D. Saunders and S. B. Peterson (editors), Nova Science Publishers.
- Watchorn, E., L. G. Goldsborough, D. A. Wrubleski, and B. Mooney. 2012. An inventory of coastal wetlands of Lakes Winnipeg, Manitoba, and Winnipegosis: the "Manitoba Great Lakes", *Journal of Great Lakes Research* 38:115-122.
- Ross, L. C. M., D. A. Lobb, D. J. Pennock, L. G. Goldsborough and L. A. Armstrong. 2009. The vegetation of prairie wetlands in native and agricultural landscapes: implications for wetland health and restoration. *Biodiversity*: in press (July 2009).
- Badiou, P. H. J. and L. G. Goldsborough. 2006. Northern range extension and invasion by the common carp (*Cyprinus carpio* L.) of the Churchill River system in Manitoba, Canada. *Canadian Field-Naturalist* 120(1):83-86.
- Goldsborough, L. G., R. L. McDougal and A. K. North. 2005. Periphyton in freshwater lakes and wetlands, Chapter 5, pages 71 to 89 in *Periphyton: Ecology, Exploitation and Management*. Azim, M. E. *et al.* (editors), CABI Publishing, UK.
- Weidman, P., M. A. Turner and L. G. Goldsborough. 2005. Limitations on the effects of ultraviolet radiation on benthic algae in a clear boreal forest lake. *Journal of the North American Benthological Society* 24:820-831.
- Friesen-Pankratz, B., C. Doebel, A. Farenhorst and L. G. Goldsborough. 2003. Interactions between algae (*Selenastrum capricornutum*) and pesticides: Implications for managing constructed wetlands for pesticide removal. *Journal of Environmental Science and Health Part B. Pesticides, Food Contaminants, and Agricultural Wastes*. B38:147-155.
- Zrum, L., B. J. Hann and L. G. Goldsborough. 2002. Invertebrates associated with submersed macrophytes in a prairie wetland: Effects of organophosphorus insecticide and inorganic nutrients. *Archiv für Hydrobiologie* 154:413-445.
- Mundy, C. J., B. J. Hann and L. G. Goldsborough. 2001. Snail-periphyton interactions in a prairie lacustrine wetland. *Hydrobiologia* 457:167-175.
- Goldsborough, L. G. 2001. Sampling algae in wetlands. pp. 263-295. Rader, R. B., D. P. Batzer and S. Wissinger (eds.) *Biomonitoring and Management of North American Freshwater Wetlands*. Academic Press.
- Sandilands, K. A., B. J. Hann and L. G. Goldsborough. 2000. The impact of nutrients and submersed macrophytes on invertebrates in a prairie wetland, Delta Marsh, Manitoba. *Archiv für Hydrobiologie* 148:441-459.
- Zrum, L., Hann, B. J., L. G. Goldsborough and Stern, G.A. 2000. Effects of organophosphorus insecticide and inorganic nutrients on the planktonic microinvertebrates and algae in a prairie wetland. *Archiv für Hydrobiologie* 147:373-399.
- Robinson, G. G. C., S. E. Gurney and L. G. Goldsborough. 2000. Algae in prairie wetlands. pp. 163-199 H. Murkin, A. van der Valk, and W. R. Clark (eds.), *Prairie Wetland Ecology: The Contribution of the Marsh Ecology Research Program*. Ames: Iowa State University Press.
- Murkin, H. R., A. G. van der Valk, W. R. Clark, D. A. Wrubleski and L. G. Goldsborough. 2000. *Marsh Ecology Research Program: Management Implications for Prairie Wetlands*. pp. 317-

CURRICULUM VITAE  
**L. Gordon Goldsborough**

344. H. Murkin, A. van der Valk, and W. R. Clark (eds.) *Prairie Wetland Ecology: The Contribution of the Marsh Ecology Research Program*. Ames: Iowa State University Press.
- Richmond, K-A. and L. G. Goldsborough. 1999. Late Holocene paleolimnology of Killarney Lake, Manitoba. In: D. S. Lemmen and R. E. Vance (eds), *Holocene climate and environmental change in the Palliser Triangle: a geoscientific context for evaluating the impacts of climate change on the southern Canadian Prairies*. Geological Survey of Canada Bulletin 534.
- Goldsborough, L. G. and W. G. Crumpton. 1998. Distribution and environmental fate of pesticides in prairie wetlands. *Great Plains Research* 8:73-95.
- Crumpton, W. G. and L. G. Goldsborough. 1998. Nitrogen transformation and fate in prairie wetlands. *Great Plains Research* 8:57-72.
- Pettigrew, C. T., B. J. Hann and L. G. Goldsborough. 1997. Waterfowl feces as a source of nutrients to a prairie wetland: responses of microinvertebrates to experimental additions. *Hydrobiologia* 362:55-66.
- Timoney, K., S. Zoltai and L. G. Goldsborough. 1997. Boreal diatom ponds: a rare wetland associated with nesting whooping cranes. *Wetlands* 17:539-551.
- McDougal, R.L., L. G. Goldsborough and Hann, B. J. 1997. Responses of a prairie wetland to press and pulse additions of nitrogen and phosphorus: production by planktonic and benthic algae. *Archiv für Hydrobiologie* 140:145-167.
- Hann, B. J. and L. G. Goldsborough. 1997. Responses of a prairie wetland to press and pulse additions of nitrogen and phosphorus: invertebrate community structure and interactions. *Archiv für Hydrobiologie* 140:169-194.
- Robinson, G. G. C., S. E. Gurney and L. G. Goldsborough 1997. Response of benthic and planktonic algal biomass to water level manipulation in a prairie wetland. *Wetlands* 17:167-181.
- Robinson, G. G. C., S. E. Gurney and L. G. Goldsborough 1997. The primary productivity of benthic and planktonic algae in a prairie wetland under controlled water-level regimes. *Wetlands* 17:182-194.
- Goldsborough, L. G. and G. G. C. Robinson 1996. Pattern in wetlands, Chapter 4. In: *Algal Ecology in Freshwater Benthic Ecosystems*. R. J. Stevenson, M. L. Bothwell, R. L. Lowe (eds.) Academic Press, pp. 77-117.
- Goldsborough, L. G. 1994. Heterogeneous spatial distribution of periphytic diatoms on vertical artificial substrata. *Journal of the North American Benthological Society* 13:223-236.
- Goldsborough, L. G. 1993. Diatom ecology in the phyllosphere of the common duckweed (*Lemna minor* L.). *Hydrobiologia* 269/270:463-471.
- Goldsborough, L. G. and D. J. Brown 1993. Dissipation of glyphosate and aminomethylphosphonic acid in water and sediments of three small boreal forest ponds. *Environmental Toxicology and Chemistry* 12:1139-1147.
- Goldsborough, L. G. and D. J. Brown 1991. Periphyton production in a small, dystrophic pond on the Canadian Precambrian Shield. *Internationale Vereinigung für Theoretische und Angewandte Limnologie Verhandlungen* 24:1497-1502.
- Goldsborough, L. G. and M. Hickman 1991. Periphytic algal biomass and community structure on *Scirpus validus* and on a morphologically similar artificial substratum. *Journal of Phycology* 27:196-206.

CURRICULUM VITAE  
**L. Gordon Goldsborough**

- Goldsborough, L. G. and A. E. Beck 1989. Rapid dissipation of glyphosate in small forest ponds. *Archives of Environmental Contamination and Toxicology* 18:537-544.
- Goldsborough, L. G. 1989. Examination of two dimensional spatial pattern of periphytic diatoms using an adhesive surficial peel technique. *Journal of Phycology* 25:133-143.
- Goldsborough, L. G. and G. G. C. Robinson 1988. Functional responses of freshwater periphyton to short simazine exposures. *Internationale Vereinigung für Theoretische und Angewandte Limnologie Verhandlungen* 23:1586-1593.
- Goldsborough, L. G. and D. J. Brown 1988. Effects of glyphosate (Roundup formulation) on periphytic algal photosynthesis. *Bulletin of Environmental Contamination and Toxicology* 41:253-260.
- Goldsborough, L. G. and G. G. C. Robinson 1986. Changes in periphytic algal community structure as a consequence of short herbicide exposures. *Hydrobiologia* 139:177-192.
- Goldsborough, L. G., G. G. C. Robinson and S. E. Gurney 1986. An enclosure/substratum system for in situ ecological studies of periphyton. *Archiv für Hydrobiologie* 106:373-393.
- Goldsborough, L. G. and G. G. C. Robinson 1985. Seasonal succession of diatom epiphyton on dense mats of *Lemna minor* L. *Canadian Journal of Botany* 63:2332-2339.
- Goldsborough, L. G. and G. G. C. Robinson 1985. Effect of an aquatic herbicide on sediment nutrient flux in a freshwater marsh. *Hydrobiologia* 122:121-128.
- Shames, J. J., G. G. C. Robinson and L. G. Goldsborough 1985. The structure and comparison of periphytic and planktonic algal communities in two eutrophic prairie lakes. *Archiv für Hydrobiologie* 103:99-116.
- Goldsborough, L. G. and G. G. C. Robinson 1984. A simple bioassay for photosystem II inhibitors in water using in vivo chlorophyll fluorescence. *Weed Research* 24:351-358.
- Goldsborough, L. G. and G. G. C. Robinson 1983. The effect of two triazine herbicides on the productivity of freshwater marsh periphyton. *Aquatic Toxicology* 4:95-112.

**2. Refereed Papers in review**

- Parks, C. R., D. A. Wrubleski, and L. G. Goldsborough. Pond connectivity affects the small fish community of a large coastal wetland in south-central Manitoba, Canada. *Journal of Great Lakes Research* (submitted November 2014).

**3. Papers in preparation**

- Lindeman, D. H. and L. G. Goldsborough. Winter is critical: seasonal changes in water chemistry, algae and invertebrates in prairie pothole wetlands of central Saskatchewan. *Hydrobiologia*
- Badiou, P. H., L. G. Goldsborough, B. Friesen-Pankratz, S. Hnatiuk, T. L. Bortoluzzi, and D. F. Malley. Quantitative and qualitative assessment of dissolved organic carbon (DOC) in wetlands of central North America using scanning ultraviolet spectrophotometry and multivariate statistics. *Limnology and Oceanography Methods*
- Bortoluzzi, T. L., R. L. McDougal and L. G. Goldsborough. Inorganic nitrogen supply limits periphytic algal growth in three large prairie wetlands in south-central Canada. *Inland Waters*

CURRICULUM VITAE  
**L. Gordon Goldsborough**

- Goldsborough, L. G., D. A. Wrubleski, and R. E. Grosshans. Long term changes in the emergent vegetation communities of two freshwater coastal marshes, Delta and Netley-Libau, Manitoba, Canada. *Wetlands*
- McDougal, R. L. and L. G. Goldsborough. Macrophyte exclusion and inorganic nutrient loading affects planktonic and benthic algal production in a lacustrine prairie wetland. *Hydrobiologia*
- Friesen-Pankratz, B., L. G. Goldsborough and A. Farenhorst. Influence of water column and sediment organic matter on the persistence of atrazine in wetland microcosms. *Journal of Environmental Science and Health Part B. Pesticides, Food Contaminants, and Agricultural Wastes*
- Friesen-Pankratz, B., L. Smith, A. Farenhorst and L. G. Goldsborough. The influence of suspended solids, light, and nitrate on the persistence of pesticides in prairie wetlands. *Wetlands*
- Goldsborough, L. G. and G. G. C. Robinson. Wetland algal production in response to spiked additions of inorganic nitrogen and phosphorus. *Wetlands*
- Goldsborough, L. G. Effects of a herbicidal stressor on the biomass and productivity of periphyton communities in wetland enclosures. *Canadian Journal of Fisheries and Aquatic Sciences*.
- Hawryliuk, Y., L. G. Goldsborough and S. E. Gurney. Water quality along four small creeks in the City of Winnipeg. *Canadian Water Resources Journal*.
- Goldsborough, L. G. and M. J. Forster. Do pre-exposure duration and architectural development affect the toxicity of a herbicide to a periphyton community? *Aquatic Toxicology*.
- Badiou, P. H., L. G. Goldsborough. Combined impacts of an exotic benthivorous fish, the common carp (*Cyprinus carpio*) and nutrient additions in small experimental mesocosms. II. Effects on algal, invertebrate, and fish communities. *Canadian Journal of Fisheries and Aquatic Sciences*.
- Purcell, S. L., and L. G. Goldsborough. Waterfowl feces additions do not stimulate algal production in a large prairie marsh. *Wetlands*
- Goldsborough, L. G. and D. A. Wrubleski. A 50-year photographic record of morphometric change in Delta Marsh, Canada. *Wetlands*
- North, A. D. K. and L. G. Goldsborough. Effects of simultaneous insecticide and nutrient additions on algal production in a prairie coastal wetland. *Canadian Journal of Fisheries and Aquatic Sciences*
- Bourne, A. L. E. and L. G. Goldsborough. Biomass determination of sediment-associated algae at three sites in a shallow prairie marsh. *Archiv für Hydrobiologie*

**4. Presented Papers (\* - invited)**

- Peterson, H. M. and L. G. Goldsborough, 2014. *Typha x glauca* growth and nutrient uptake as a function of water depth in Oak Hammock Marsh, Canada. Society of Wetland Scientists, 2014 Annual Meeting, Portland, Oregon.
- Wasko, J., T. McGonigle, and L. G. Goldsborough 2014. *Typha* species and hybrid distribution and generalized linear model of *T x glauca* and environment in Canada's prairie pothole region. Society of Wetland Scientists, 2014 Annual Meeting, Portland, Oregon.



CURRICULUM VITAE  
**L. Gordon Goldsborough**

- Goldsborough, L. G. 2010. A history of wetland science in prairie Canada. Society of Wetland Scientists, 2010 Annual Meeting, Salt Lake City, Utah. (\*)
- Grosshans, R. E., L. G. Goldsborough, N. Cicek, D. A. Wrubleski, and H. D. Venema 2010. The efficient cattail: harvesting the eggs benefits of cattail for nutrient abatement in the watershed. Society of Wetland Scientists, 2010 Annual Meeting, Salt Lake City, Utah.
- Geard, N., L. G. Goldsborough, D. A. Wrubleski, G. Ball and J. Wasko 2010. Evaluation of methods for invasive cattail management in Delta Marsh, Manitoba, Canada. Society of Wetland Scientists, 2010 Annual Meeting, Salt Lake City, Utah.
- Watchorn, E., L. G. Goldsborough, and D. A. Wrubleski 2010. Effects of water level management on water chemistry and primary production in boreal marshes of northern Manitoba, Canada. Society of Wetland Scientists, 2010 Annual Meeting, Salt Lake City, Utah.
- Goldsborough, L. G. 2010. Legacy of the Stinking River: Wetland loss and restoration on Manitoba's southern prairies. Prairie Conservation and Endangered Species Workshop, Winnipeg, Manitoba, 2010.
- Goldsborough, L. G. 2007. A review of the limnology of Lake Manitoba: a large, shallow lake in south-central Canada. North American Lake Management Society, 27<sup>th</sup> Annual Meeting, Orlando, FL.
- Ackerman, J., N. Cicek, R. Grosshans, M. Paetkau, L. G. Goldsborough and M. Tenuta. 2007. Phosphorus removal potential from surface water through yearly harvesting of cattails in a delta marsh. Water Environment Federation Annual Exhibition and Conference, 13-17 October, San Diego, USA.
- Bortoluzzi, T. L. and L. G. Goldsborough. 2007. The influence of Lake Manitoba on the hydrology, water chemistry, and algal nutrient status of a coastal freshwater marsh, Delta Marsh, located in south-central Canada. XXX SIL Congress, Montreal.
- Goldsborough, L. G. 2007. A review of the limnology of Lake Manitoba: a large, shallow lake in south-central Canada. XXX SIL Congress, Montreal.
- Dyszy, K. A., D. A. Wrubleski, J. R. Spence and L. G. Goldsborough. 2006. Effects of pond connectedness on three anuran life stages at Delta Marsh, Manitoba, Canada. Society of Wetland Scientists, 27<sup>th</sup> Annual Meeting, Cairns, Australia.
- Goldsborough, L. G. and B. Kotak. 2006. Wide-spread occurrence of total microcystins in lakes throughout Manitoba, Canada. North American Lake Management Society, 26<sup>th</sup> Annual Meeting, Indianapolis, IN.
- Goldsborough, L. G., R. E. Grosshans and D. A. Wrubleski. 2006. Long term changes in the emergent vegetation of two freshwater coastal marshes in Manitoba, Canada. Society of Wetland Scientists, 27<sup>th</sup> Annual Meeting, Cairns, Australia.
- Goldsborough, L. G. and M. W. Zbigniewicz. 2006. Tree composition in a pristine riverbank forest of south-central Manitoba. Ecological Monitoring and Assessment Network of Environment Canada, National Science Meeting, Winnipeg.
- Grosshans, R. E., L. G. Goldsborough, N. Cicek, D. A. Wrubleski, H. D. Venema and E. Bibeau. 2006. Potential water quality improvement in Lake Winnipeg, Canada, through Netley-Libau Marsh. Society of Wetland Scientists, 27<sup>th</sup> Annual Meeting, Cairns, Australia.
- Jacobs, K. and L. G. Goldsborough. 2006. Landscape level influences on water quality in the boreal region of Manitoba: a lakes survey. Canadian Society of Limnologists, Calgary, 5-7 January.

CURRICULUM VITAE  
**L. Gordon Goldsborough**

- Kolochuk, J. S., L. G. Goldsborough and D. Flaten. 2006. Effects of agricultural land use on water quality in farm ponds of south-central Manitoba, Canada. North American Lake Management Society, 26<sup>th</sup> Annual Meeting, Indianapolis, IN.
- Shiple, E. and L. G. Goldsborough. 2006. Spatial and temporal variation in water quality in Lake Manitoba. North American Lake Management Society, 26<sup>th</sup> Annual Meeting, Indianapolis, IN.
- Shiple, E. and L. G. Goldsborough. 2006. Spatial and temporal variation in water quality in a large shallow lake of central Canada (Lake Manitoba, Canada). 5<sup>th</sup> International Conference on Reservoir Limnology and Water Quality, Brno, Czech Republic.
- Bortoluzzi, T. L. and L. G. Goldsborough. 2005. Spatial variability in the water chemistry, nutrient status and hydrology of a coastal freshwater water marsh in south-central Canada, as influenced by its adjoining large lake. Society of Wetland Scientists, 26<sup>th</sup> Annual Meeting, Charleston, SC.
- Dyszy, K. A., D. A. Wrubleski, J. R. Spence, J. R. and L. G. Goldsborough. 2005. Who's calling where: anuran breeding site selection at Delta Marsh, Manitoba. Society of Wetland Scientists, 26<sup>th</sup> Annual Meeting, Charleston, SC.
- Goldsborough, L. G., D. A. Wrubleski, R. E. Grosshans, R. Hempel, T. L. Bortoluzzi, and C. R. Parks. 2005. Studies on the dynamics of Lake Winnipeg coastal marshes. Society of Wetland Scientists, 26<sup>th</sup> Annual Meeting, Charleston, SC.
- Grosshans, R. E., L. G. Goldsborough, D. A. Wrubleski, N. Cicek and H. D. Venema. 2005. Using a natural wetland for nutrient removal and biopower/carbon emission credits: improving water quality in Lake Winnipeg through Netley-Libau Marsh in Manitoba, Canada. Society of Wetland Scientists, 26<sup>th</sup> Annual Meeting, Charleston, SC.
- Kolochuk, J. S. and L. G. Goldsborough. 2005. Effects of agricultural land use on water quality in farm ponds of south-central Manitoba, Canada. North American Lake Management Society, 25<sup>th</sup> Annual Meeting, Madison, WI.
- Shiple, E., L. G. Goldsborough and P. Sellers. 2005. Spatial and temporal variation in water quality in Lake Manitoba, one of the "Manitoba Great Lakes" of central Canada. North American Lake Management Society, 25<sup>th</sup> Annual Meeting, Madison, WI.
- Bortoluzzi, T. L. and L. G. Goldsborough. 2004. Spatial patterns in the water chemistry and nutrient status of a coastal freshwater marsh in south-central Canada, as influenced by its adjoining lake. Society of Wetland Scientists, 25<sup>th</sup> Annual Meeting, Seattle, WA.
- Dyszy, K. A., D. A. Wrubleski, J. Spence and L. G. Goldsborough. 2004. Impacts of introduced benthivorous common carp (*Cyprinus carpio*) on amphibian life stages at Delta Marsh, Manitoba. Society of Wetland Scientists, 25<sup>th</sup> Annual Meeting, Seattle, WA.
- Goldsborough, L. G. and D. A. Wrubleski. 2004. Effects of stabilized water levels in Lake Manitoba on the natural history of Delta Marsh in south-central Manitoba, Canada. American Fisheries Society, 134<sup>th</sup> Annual Meeting, Madison, WI. (\*)
- Goldsborough, L. G. and D. A. Wrubleski. 2004. Effects of stabilized water levels in Lake Manitoba on the natural history of Delta Marsh in south-central Manitoba, Canada. Society of Wetland Scientists, 25<sup>th</sup> Annual Meeting, Seattle, WA.
- Hempel, R., L. G. Goldsborough and D. A. Wrubleski. 2004. The use of GIS in understanding changes in wetland complexes in the south basin of Lake Winnipeg, Canada. Society of Wetland Scientists, 25<sup>th</sup> Annual Meeting, Seattle, WA.

CURRICULUM VITAE  
**L. Gordon Goldsborough**

- Hertam, S., L. G. Goldsborough and D. A. Wrubleski. 2004. The effects of large benthivorous fish activity on nutrient dynamics in a natural marsh ecosystem. Society of Wetland Scientists, 25<sup>th</sup> Annual Meeting, Seattle, WA.
- Jacobs, K., L. G. Goldsborough and B. Kotak. 2004. Landscape influences on water quality in boreal region of Manitoba: a lakes survey. North American Lake Management Society, 24<sup>th</sup> Annual Meeting, Victoria, BC.
- Badiou, P. and L. G. Goldsborough. 2003. The impacts of the common carp (*Cyprinus carpio*) in large experimental wetlands and small enclosures. Society of Wetland Scientists, 24<sup>th</sup> Annual Meeting, New Orleans, LA.
- Bortoluzzi, T. L. and L. G. Goldsborough. 2003. The hydrological influence of a large lake on the nutrient dynamics of an adjoining coastal wetland in south-central Manitoba. Society of Wetland Scientists, 24<sup>th</sup> Annual Meeting, New Orleans, LA.
- Friesen-Pankratz, B. and L. G. Goldsborough. 2003. Landscape-level variability of wetlands in the prairie pothole region of North America. Society of Wetland Scientists, 24<sup>th</sup> Annual Meeting, New Orleans, LA.
- Hnatiuk, S., L. G. Goldsborough and D. A. Wrubleski. 2003. Effects of common carp on water quality and primary producers in Delta Marsh, a coastal wetland in south central Canada. Society of Wetland Scientists, 24<sup>th</sup> Annual Meeting, New Orleans, LA.
- Mooney, B. G., L. G. Goldsborough, D. A. Wrubleski and H. R. Murkin. 2003. Classification and inventory of coastal wetlands of three large lakes in central Canada. Society of Wetland Scientists, 24<sup>th</sup> Annual Meeting, New Orleans, LA.
- Parks, C. R., D. A. Wrubleski and L. G. Goldsborough. 2003. Experimental manipulation of common carp (*Cyprinus carpio*) in a coastal wetland: effects on native fish and amphibians. Society of Wetland Scientists, 24<sup>th</sup> Annual Meeting, New Orleans, LA.
- Wrubleski, D. A., R. E. Grosshans and L. G. Goldsborough. 2003. Changes in the emergent vegetation community of Netley-Libau Marsh over a 22-year period (1979 to 2001). Society of Wetland Scientists, 24<sup>th</sup> Annual Meeting, New Orleans, LA.
- Badiou, P. H. and L. G. Goldsborough 2002. Effects of the common carp (*Cyprinus carpio*) on five experimental wetland cells. 45<sup>th</sup> Conference on Great Lakes Research, International Association of Great Lakes Research. University of Manitoba, Winnipeg, MB, 2-6 June.
- Friesen-Pankratz, B., L. G. Goldsborough and A. Farenhorst. 2002. The role of light and suspended solids in determining pesticide persistence in a coastal wetland. International Association for Great Lakes Research, 45<sup>th</sup> Annual Meeting, Winnipeg, Manitoba.
- Friesen-Pankratz, B., Smith, L., Farenhorst, A. and L. G. Goldsborough 2002. The influence of suspended solids, light, and nitrate on the persistence of pesticides in prairie wetlands. Manitoba Society of Soil Science, 45<sup>th</sup> Annual Meeting, Winnipeg, Manitoba.
- Badiou, P. H., D. F. Malley and L. G. Goldsborough. 2001. Star Trek technology for the analysis of wetland sediments. North American Benthological Society, 49<sup>th</sup> Annual Meeting, Lacrosse, WI.
- Friesen-Pankratz, B. and L. G. Goldsborough. 2001. The effects of nutrient enrichment on insecticide fate in prairie wetlands. North American Benthological Society, 49<sup>th</sup> Annual Meeting, Lacrosse, Wisconsin.

CURRICULUM VITAE  
**L. Gordon Goldsborough**

- Friesen-Pankratz, B., L. G. Goldsborough and A. Farenhorst. 2001. Impacts of nutrient enrichment on the fate of insecticides in prairie wetlands. Manitoba Society of Soil Science, 44<sup>th</sup> Annual Meeting, Winnipeg, Manitoba.
- Wrubleski, D. A. and L. G. Goldsborough. 2000. Delta Marsh: the decline of an internationally significant wetland. Society of Wetland Scientists, 21<sup>st</sup> Annual Meeting, Québec City, Québec, 6 - 12 August.
- Lindeman, D. and L. G. Goldsborough. 2000. Seasonal changes in water chemistry, algal and invertebrate biomass in prairie wetlands of central Saskatchewan. Society of Wetland Scientists, 21<sup>st</sup> Annual Meeting, Québec City, Québec, 6 - 12 August.
- Goldsborough, L. G. and D. A. Wrubleski. 2000. Correlates of water clarity for assessing degradation of a large lacustrine wetland in central Canada. Society of Wetland Scientists, 21<sup>st</sup> Annual Meeting, Québec City, Québec, 6 - 12 August.
- Weidman, P., M. L. Turner, L. G. Goldsborough and H. Kling. 2000. Distribution of ultraviolet light effects on periphyton in the littoral zone of an oligotrophic boreal forest lake. North American Benthological Society, 48<sup>th</sup> Annual Meeting, Keystone, Colorado, 28 May - 1 June.
- McDougal, R. L. and L. G. Goldsborough 2000. Wetland algal responses to macrophyte exclusion and inorganic nutrient loading. North American Benthological Society, 48<sup>th</sup> Annual Meeting, Keystone, Colorado, 28 May - 1 June.
- Goldsborough, L. G. and D. A. Wrubleski. 2000. Correlates of water clarity for assessing degradation of a large lacustrine wetland in central Canada. North American Benthological Society, 48<sup>th</sup> Annual Meeting, Keystone, Colorado, 28 May - 1 June.
- Friesen-Pankratz, B. and L. G. Goldsborough 2000. Determinants of herbicide dissipation in great plains wetlands. North American Benthological Society, 48<sup>th</sup> Annual Meeting, Keystone, Colorado, 28 May - 1 June.
- Bourne, A.L.E. and L. G. Goldsborough 2000. Sediment-associated algal biomass in a prairie wetland. North American Benthological Society, 48<sup>th</sup> Annual Meeting, Keystone, Colorado, 28 May - 1 June.
- Wrubleski, D. A. and L. G. Goldsborough 1999. Changes in submersed vegetation and water quality in Delta Marsh, 1973-74 and 1997-98. North American Benthological Society, 47<sup>th</sup> Annual Meeting, Duluth, Minnesota, 25 - 28 May.
- McDougal, R. L. and L. G. Goldsborough 1999. A comparison of algal and macrophyte primary production in Oak Hammock Marsh, Canada. North American Benthological Society, 47<sup>th</sup> Annual Meeting, Duluth, Minnesota, 25 - 28 May.
- North, A. K. and L. G. Goldsborough 1999. The effects of inorganic nutrients and insecticide on planktonic algal biomass in a prairie wetland. North American Benthological Society, 47<sup>th</sup> Annual Meeting, Duluth, Minnesota, 25 - 28 May.
- Goldsborough, L. G. and Wrubleski, D.A. 1999. A 50-year photographic record of morphometric change in Delta Marsh, Canada. North American Benthological Society, 47<sup>th</sup> Annual Meeting, Duluth, Minnesota, 25 - 28 May.
- Bourne, A. L. E. and L. G. Goldsborough 1999. Sediment-associated algae in a prairie wetland: a comparison of three sampling techniques. North American Benthological Society, 47<sup>th</sup> Annual Meeting, Duluth, Minnesota, 25 - 28 May.
- Goldsborough, L. G. and Muir, D.C.G. 1997. Distribution of toxic chemicals in prairie wetlands. Society of Wetland Scientists, 18<sup>th</sup> Annual Meeting, Bozeman, Montana.

CURRICULUM VITAE  
**L. Gordon Goldsborough**

- McDougal, R. L. and L. G. Goldsborough 1997. The effects of macrophyte exclusion and inorganic nutrient loading on prairie wetland algae. Society of Wetland Scientists, 18<sup>th</sup> Annual Meeting, Bozeman, Montana.
- McDougal, R. L. and L. G. Goldsborough 1997. The effects of macrophyte exclusion and inorganic nutrient loading on prairie wetland algae. 14<sup>th</sup> North American Diatom Symposium, Pellston, Michigan.
- Purcell, S. L. and L. G. Goldsborough 1997. The significance of waterfowl feces as a source of nutrients to algae in a prairie wetland. Society of Wetland Scientists, 18<sup>th</sup> Annual Meeting, Bozeman, Montana.
- Goldsborough, L. G. and B. J. Hann 1996. Experimental additions of nitrogen and phosphorus to a freshwater prairie marsh: primary productivity, nutrient fate, and implications for a wetland model. Fourth Symposium on Biogeochemistry of Wetlands, New Orleans, Louisiana, 4 - 6 March.
- Goldsborough, L. G. 1996. Nutrient cycling in wetlands. Water Resources Association of Canada Workshop on Wetlands, Oak Hammock Marsh, Manitoba, 21 March. (\*)
- Goldsborough, L. G. and B. J. Hann 1996. Enclosure affects trophic structure of a freshwater prairie wetland. North American Benthological Society, 44<sup>th</sup> Annual Meeting, Kalispell, Montana, 2 - 7 June.
- McDougal, R. L. and L. G. Goldsborough 1996. Responses of wetland algae to macrophyte harvesting and inorganic nutrient enrichment. North American Benthological Society, 44<sup>th</sup> Annual Meeting, Kalispell, Montana, 2 - 7 June.
- Purcell, S. L. and L. G. Goldsborough 1996. Waterfowl feces as a nutrient source to plants in a prairie wetland. North American Benthological Society, 44<sup>th</sup> Annual Meeting, Kalispell, Montana, 2 - 7 June.
- Richmond, K-A. and L. G. Goldsborough 1996. Paleolimnological analysis of sediments from Killarney Lake, Manitoba. Canadian Association of Geographers Annual Meeting, Saskatoon, Saskatchewan, 11 - 16 May.
- Goldsborough, L. G., R. L. McDougal and T. Henderson 1995. A (paleo-) tale of two lakes. XIII North American Diatom Symposium, Lakeside, Iowa, 27 - 30 September.
- Richmond, K-A. and L. G. Goldsborough 1995. Paleolimnological analysis of sediments from Killarney Lake, Manitoba. XIII North American Diatom Symposium, Lakeside, Iowa, 27 - 30 September.
- Purcell, S.L. and L. G. Goldsborough 1995. Waterfowl feces as a nutrient source to benthic algae in a prairie wetland. XIII North American Diatom Symposium, Lakeside, Iowa, 27 - 30 September.
- McDougal, R. L. and L. G. Goldsborough 1995. Responses of wetland algae to macrophyte harvesting and inorganic nutrient enrichment. XIII North American Diatom Symposium, Lakeside, Iowa, 27 - 30 September.
- Goldsborough, L. G. 1995. Evaluating a four-state model of wetland development. Faculty of Science, University of Manitoba, 8 September. (\*)
- Robinson, G. G. C, S. E. Gurney, and L. G. Goldsborough 1995. The production of algal assemblages in a prairie wetland under controlled water level regimes. The Wildlife Society 1995 Annual Conference, Portland, Oregon, 12 - 17 September.

CURRICULUM VITAE  
**L. Gordon Goldsborough**

- Goldsborough, L. G., G. G. C. Robinson, and S. E. Gurney 1995. The comparative biomass of benthic algae of a prairie wetland under controlled water-level regime. North American Benthological Society, 43<sup>rd</sup> Annual Meeting, Keystone, Colorado, 30 May - 2 June.
- McDougal, R.L. and L. G. Goldsborough 1995. Responses of wetland algae to controlled nitrogen and phosphorus enrichment. North American Benthological Society, 43<sup>rd</sup> Annual Meeting, Keystone, Colorado, 30 May - 2 June.
- Goldsborough, L. G. 1994. Effects of agricultural and forestry herbicides on aquatic plant communities. University of Regina, Department of Biology, 4 February. (\*)
- Goldsborough, L. G. and G. G. C. Robinson 1994. Controls of algal primary production and biomass in a prairie marsh. Society of Canadian Limnologists Annual Meeting, Saskatoon, Saskatchewan, 4-5 January.
- Richmond, K-A. and L. G. Goldsborough 1994. Paleolimnology of Killarney Lake in southwestern Manitoba. Society of Canadian Limnologists Annual Meeting, Saskatoon, Saskatchewan, 4-5 January.
- Richmond, K-A. and L. G. Goldsborough 1993. Paleolimnology of Killarney Lake in southwestern Manitoba. Twelfth North American Diatom Symposium, Delta Marsh, Manitoba, 23-25 September.
- Goldsborough, L. G. and G. G. C. Robinson 1993. Algal associations in wetlands: a review. North American Benthological Society, 41<sup>st</sup> Annual Meeting, Calgary, Alberta, 25-28 May.
- Richmond, K-A. and L. G. Goldsborough 1992. Paleolimnology of Killarney Lake in southwestern Manitoba: preliminary results. Palliser Triangle Global Change Project, Second Conference / Workshop, Regina, Saskatchewan, 13-15 November.
- Goldsborough, L. G. 1992. Chemically-induced stress responses of freshwater periphyton: hexazinone and other herbicides. Freshwater Institute, Winnipeg, Manitoba, 8 October. (\*)
- Goldsborough, L. G. 1992. Studies on the ecology and toxicology of aquatic plant communities. University of Manitoba, Department of Botany, 28 September. (\*)
- Goldsborough, L. G. 1992. Microdistribution of diatoms in the phyllosphere of the common duckweed (*Lemna minor* L.). International Diatom Symposium, Renesse, The Netherlands, 30 August - 5 September.
- Goldsborough, L. G. 1992. Do pre-exposure duration and architectural development affect the toxicity of a herbicide to a periphyton community? XXV SIL Congress, Barcelona, Spain, 21-27 August.
- Goldsborough, L. G. 1992. Studies on the impact of agricultural and forestry herbicides on non-target aquatic plant communities. Third Prairie Conservation and Endangered Species Workshop, Brandon, Manitoba, 15 February. (\*)
- Goldsborough, L. G. 1991. Chemically-induced stress responses of freshwater periphytic algae: hexazinone and other agricultural herbicides. University of Alberta, Department of Botany, 28 November (\*)
- Goldsborough, L. G. 1991. Microdistribution of diatoms on linear artificial substrata. XI North American Diatom Symposium, Clemson, South Carolina, 25 October.
- Goldsborough, L. G. and R. A. Kent. 1991. The fate and effects of the herbicides difenzoquat and sethoxydim in prairie wetland enclosures. Society of Environmental Toxicology and Chemistry, 12th Annual Meeting, Seattle, Washington, 5 November.

CURRICULUM VITAE  
**L. Gordon Goldsborough**

- Goldsborough, L. G. and M. Hickman. 1989. Comparison of periphyton biomass and community structure on a natural and an artificial substratum. X North American Diatom Symposium, Itasca, Minnesota, 11-14 October.
- Goldsborough, L. G. 1988. Assessing some effects of glyphosate on aquatic plant communities. Brandon University, Department of Botany, 16 December. (\*)
- Goldsborough, L. G. and M. R. T. Dale 1988. Empirical simulation of two dimensional spatial dispersion of periphytic algae. Annual Meeting of the Canadian Botanical Association, Victoria, British Columbia, 5-9 June.
- Goldsborough, L. G. 1988. Responses of aquatic plant communities to glyphosate: site characterization and the first experimental treatment. Simon Fraser University, Department of Biology, 21 April. (\*)
- Goldsborough, L. G. 1987. Diatom autecology in the phyllosphere of *Lemna minor*. IX North American Diatom Symposium, Tomahawk, Wisconsin, 7-10 October.
- Goldsborough, L. G. 1987. Algal autecology in the phyllosphere of *Lemna minor*. University of Calgary, Department of Biology, 2 April. (\*)
- Robinson, G. G. C. and L. G. Goldsborough 1987. Functional responses of freshwater periphyton to short simazine exposures. XXIII SIL Congress, Hamilton, New Zealand, 8-14 February.
- Goldsborough, L. G. and G. G. C. Robinson 1985. Some effects of triazine herbicides on the structure and metabolism of freshwater marsh periphyton. Symposium on Toxicology and Nutrition in the Ecology of Freshwater Algae. Annual Meeting of the Canadian Botanical Association, London, Ontario, 24 June.
- Robinson, G. G. C. and L. G. Goldsborough 1984. An investigation of the impact of triazine herbicides upon periphytic algae. 11<sup>th</sup> Annual Aquatic Toxicology Workshop, Vancouver, 13 November.
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**5. Other Presentations**

- Goldsborough, L. G. The mucks stops here: a history of early Red River dredging. Canadian Water Resources Association, Manitoba Chapter, 12 September 2006.
- Goldsborough, L. G. Toxic algae in Manitoba water. Progressive Conservative Party Caucus, 30 August 2006.
- Goldsborough, L. G. Biological concerns in the Lake Winnipeg watershed, Legislators Forum, St. Paul, Minnesota. 25 May 2006.
- Goldsborough, L. G. Some studies on invasive aquatic plants in Manitoba. Manitoba Association of Plant Biologists, 22 April 2006.

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**L. Gordon Goldsborough**

- Goldsborough, L. G. The Lake Manitoba Regulation Review Advisory Committee: Experiences in a Multi-stakeholder Resource Management. Manitoba Wildlife Society, 4 February 2006.
- Goldsborough, L. G. Delta Marsh: Playground for the rich and famous (1880-1940). Manitoba Wildlife Society, 1 December 2005.
- Goldsborough, L. G. Studies on the coastal marshes of the Manitoba “Great Lakes.” North Dakota State University, Department of Biology, 21 October 2005.
- Goldsborough, L. G. Delta Marsh: Playground for the rich and famous (1880-1940). Manitoba Crop Insurance Corporation, 14 April 2005.
- Goldsborough, L. G. Coarse black algae in lakes of Whiteshell Provincial Park. Whiteshell Cottagers Association, 16 March 2005.
- Goldsborough, L. G. Lake Manitoba: A neglected “Great Lake”. Manitoba Water Caucus, 17 January 2005.
- Goldsborough, L. G. Results of farm pond water quality survey – 2004. Portage Grazing Club, 2 December 2004.
- Goldsborough, L. G. The spirits narrows: Lament of a late, great lake. Manitoba Association of Cottage Owners, Winnipeg, Manitoba. 23 October 2004.
- Goldsborough, L. G. Coarse black algae in lakes of Whiteshell Provincial Park. Red River Basin Commission, North Chapter, 14 October 2004.
- Goldsborough, L. G. Farm pond water quality as affected by livestock access on the Portage Plains of central Manitoba. Living With Livestock – Environment and Change Conference. Winnipeg, Manitoba. 7 October 2004.
- Goldsborough, L. G. The science and history of Delta Marsh. Lakewood Country Club, 1 October 2004.
- Goldsborough, L. G. Farm pond water quality monitoring project – 2003. Delta Agricultural Conservation Cooperative, 19 April 2004.
- Goldsborough, L. G. Biology, ecology and management of cattails. Manitoba Weed Supervisors Association, Spring Training Seminar, Russell, Manitoba. 5 April 2004.
- Goldsborough, L. G. Dugout water quality for livestock. Portage Livestock Grazing Club. Portage la Prairie, Manitoba. 29 March 2004.
- Goldsborough, L. G. The rise and fall of Delta Marsh. LaSalle Redboine Conservation District, Annual General Meeting. Starbuck, Manitoba. 27 February 2004.
- Goldsborough, L. G. The rise and fall of Delta Marsh. Manitoba Lions Club, Annual General Meeting. Portage la Prairie, Manitoba. 21 February 2004.
- Goldsborough, L. G. Water quality on pasture: Results of local water surveys from 2002 and 2003. Is your water quality affecting livestock performance? Beef & Forage Production Day, Manitoba Agriculture and Food. Austin, Manitoba. 6 February 2004.
- Goldsborough, L. G. Dugout water quality for livestock. Manitoba Ag Days. Brandon, Manitoba. 22 January 2004.
- Goldsborough, L. G. Identification of aquatic plants. Manitoba Weed Supervisors, Winter Training Seminar. Winnipeg, Manitoba. 5 December 2003.
- Goldsborough, L. G. The rise and fall of Delta Marsh. Manitoba Public Library Services, Annual General Meeting. Portage la Prairie, Manitoba. 7 October 2003.



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- Goldsborough, L. G. The spirits' narrows: The lament of a late, great lake. Water Wisdom presentation. Winnipeg, Manitoba. 18 March 2003.
- Goldsborough, L. G. The life and science of Delta Marsh. Winnipeg Rotary Club. 22 February 2003.
- Goldsborough, L. G. Water quality, nutrients, and algae in samples from Delta Marsh and vicinity. Manitoba Agriculture and Food. Portage la Prairie, Manitoba. 14 February 2003.
- Goldsborough, L. G. and A. Macbeth. Studies on coarse black algae (*Lyngbya wollei*) in Whiteshell lakes. Winnipeg Rotary Club. 6 January 2003.
- Goldsborough, L. G. and A. Macbeth. Studies on coarse black algae (*Lyngbya wollei*) in Whiteshell lakes. Manitoba Conservation. Winnipeg, Manitoba. 10 October 2002.
- Goldsborough, L. G. Coarse black algae (*Lyngbya wollei*) in Whiteshell lakes. Whiteshell Cottager Association, Annual General Meeting. Winnipeg, Manitoba. 20 March 2002.
- Goldsborough, L. G. Delta Marsh. Lake Manitoba Regulation Review Advisory Committee. Delta Marsh Field Station. 7 December 2001.
- Goldsborough, L. G. Studies on the occurrence and cause of nuisance algae growth in Whiteshell lakes. Whiteshell Cottage Association, Board Meeting. Winnipeg, Manitoba. 21 November 2001.
- Goldsborough, L. G. The rise and fall of Delta Marsh. Portage 4H Club. Portage la Prairie, Manitoba. 9 November 2001.
- Goldsborough, L. G. The rise and fall of Delta Marsh. University of Manitoba Retirees. Winnipeg, Manitoba. 20 October 2001.
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- Goldsborough, L. G., R. L. McDougal and A. K. North. Nutrient limitation of algal growth in two Ramsar wetlands in south-central Canada. Institute for Wetland and Waterfowl Research, Staff-Student Symposium. Stonewall, Manitoba. August 2001.
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- Goldsborough, L. G. Delta Marsh: Playground for the rich and famous (1880-1940). Manitoba History Conference, Labour Temple. Winnipeg, Manitoba. 18 March 2001.
- Goldsborough, L. G. and D. A. Wrubleski. The decline of Delta Marsh, an internationally significant wetland in south-central Manitoba. Prairie Endangered Species Workshop. Winnipeg, Manitoba. 20 February 2001.
- Goldsborough, L. G. The rise and fall of Delta Marsh. Charleswood Rotary Club. Winnipeg, Manitoba. 17 November 2000.
- Goldsborough, L. G. Delta Marsh Field Station position on Yuill hog barn development proposal. Macdonald, Manitoba. 15 November 2000.
- Goldsborough, L. G. Responses of wetland algae to experimental nutrient additions. Environment Canada Nutrient Workshop. Winnipeg, Manitoba. 10 May 2000.

CURRICULUM VITAE  
**L. Gordon Goldsborough**

**6. Other Reports**

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- Wrubleski, D. A. and L. G. Goldsborough. 2006. "Netley-Libau Marsh" for *Encyclopedia of Manitoba*. Great Plains Publications.
- Grieff, P., D. A. Wrubleski and L. G. Goldsborough. 2006. "Oak Hammock Marsh" for *Encyclopedia of Manitoba*. Great Plains Publications.
- Goldsborough, L. G. and D. A. Wrubleski. 2006. "Wetlands" for *Encyclopedia of Manitoba*. Great Plains Publications.
- Goldsborough, L. G. 2006. Review: Ted Stone, The Story Behind Manitoba Names: How Cities, Towns, Villages and Whistle Stops Got Their Names. *Time Lines* 39(1):5-6.
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**L. Gordon Goldsborough**

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- Goldsborough, L. G. 1994. Responses of marsh algal communities to controlled nitrogen and phosphorus enrichment. University Field Station (Delta Marsh) Annual Report 28:35-40.
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- McDougal, R. L. and L. G. Goldsborough 1994. Analyses of Gull Lake sediments. Report to Manitoba Department of Environment, Water Quality Management Section. 8pp.
- Goldsborough, L. G. 1993. Studies on the impact of agricultural and forestry herbicides on non-target aquatic plant communities. Proceedings of the Third Prairie Conservation and Endangered Species Workshop. Provincial Museum of Alberta, Natural History Occasional Paper No. 19, p. 49-57.

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- Goldsborough, L. G. 1993. 1992 weather and water quality data summary, University Field Station (Delta Marsh). University Field Station (Delta Marsh) Annual Report 27:11-28.
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- Goldsborough, L. G. 1991. An assessment of the impact of the herbicides difenzoquat and sethoxydim on the biomass and productivity of freshwater periphytic algal communities. University Field Station (Delta Marsh) Annual Report 25:68-78.
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- Goldsborough, L. G. 1990. Tenth North American Diatom Symposium. *Diatom Research* 5(1):213-214.
- Goldsborough, L. G. and G. G. C. Robinson. 1990. 1989 weather summary, University Field Station (Delta Marsh). University Field Station (Delta Marsh) Annual Report 24:14-28.
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- Goldsborough, L. G. 1983. Assessment of some effects of simazine on the structure and metabolism of periphyton. University Field Station (Delta Marsh) Annual Report 18:32-43.
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- Goldsborough, L. G. 1982. Effect of two herbicides on periphytic algal productivity. University Field Station (Delta Marsh) Annual Report 17:30-37.
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**7. Newspaper Articles**

- "Netley-Libau loses ecological luster." *Interlake Spectator*, 14 January 2005.
- "Netley Marsh loses ability to filter pollutants." *Winnipeg Free Press*, 6 January 2005, page B8.
- "'Black algae' infest Manitoba lakes." *Winnipeg Free Press*, 7 September 2004, page A3.
- "Dugout water worse than realized, survey reveals" *The Manitoba Co-operator*, 12 February 2004, page 3.
- "Water level a source of conflict" *Winnipeg Free Press*, 10 February 2004, page B12.
- "U of M botanist calls for improved stewardship" *Winnipeg Free Press*, 10 February 2004, page B12.
- "Black algae is no cause for grave concern" *Winnipeg Free Press*, 5 August 2003, page A?.
- "Black plague at lakes" *Winnipeg Free Press*, 27 July 2003, page A1.
- "Lake Manitoba needs help too: prof; U of M scientist warns of neglect based on politics" *Winnipeg Free Press*, 18 March 2003.
- "Delta Marsh near death: Traditional plant, animal species in dramatic decline" *Winnipeg Free Press*, 4 March 2001, page A1.
- "Wetland wonder: Scientists probe mysteries of Delta Marsh to determine dangers posed by pollution" *Winnipeg Free Press*, 11 September 1995, page C1.

CURRICULUM VITAE  
**L. Gordon Goldsborough**

**8. Other Manuscripts in preparation**

- Goldsborough, L. G. The impact of the herbicides difenzoquat and sethoxydim on the biomass and productivity of freshwater periphytic algal communities.
- Goldsborough, L. G. Sediment nutrient efflux as influenced by epipelagic algal assemblages in small wetland enclosures.
- Goldsborough, L. G. Vertical zonation of diatom abundance below a duckweed mat.
- Goldsborough, L. G. Diatoms of the Churchill River Estuary.

**9. Student theses**

- Geard, N. 2015. Acquisition of bathymetric, substrata and vegetation distributions during an extreme flood event in a northern prairie marsh. MSc thesis, University of Manitoba, 212 pp.
- Peterson, H. M. 2015. Hybrid cattail (*Typha x glauca*) growth and nutrient content along a water depth gradient in two prairie marshes. MSc thesis, University of Manitoba, 153 pp.
- Stanley, M. 2015. Evaluation of floating cattail bioplatforms for remediation of water quality in lakes at FortWhyte Alive. BSc thesis, University of Manitoba, 76 pp.
- Bortoluzzi, T. 2013. Spatial and temporal patterns in the hydrology, water chemistry and algal nutrient status of a coastal freshwater marsh, Delta Marsh, as influenced by the hydrology of adjoining Lake Manitoba, located in south-central Manitoba, Canada. PhD thesis, University of Manitoba, 409 pp.
- Fred, D. 2013. Internal nutrient loading of the Lake Manitoba south basin. MSc thesis, University of Manitoba, 147 pp.
- Grosshans, R. E. 2013. Cattail (*Typha* spp.) biomass harvesting for nutrient capture and sustainable bioenergy for integrated watershed management. PhD thesis, University of Manitoba, 274 pp.
- Wasko, J. 2013. Distribution and environmental associations throughout southwestern Manitoba and southeastern Saskatchewan for the cattail species *Typha latifolia*, and *T. angustifolia*, and for the hybrid, *T. x glauca*. MSc thesis, University of Manitoba, 286 pp.
- Berke, K. 2012. Water quality in Lake Manitoba during the flood of 2011. BSc thesis, University of Manitoba, 67 pp.
- Bjornson, F. 2012. Delta Marsh and the effects of a one-in-four-hundred year flood on the fish community, BSc thesis, University of Manitoba, 81 pp.
- Ewacha, M. 2012. Bioassay of glyphosate toxicity tested on taxonomic algae with cell density and chlorophyll-a as endpoints. BSc thesis, University of Manitoba, 60 pp.
- Nicholson, M. 2012. Phosphorus loading and sequestration in Lake Manitoba from 2009 to 2011. BSc thesis, University of Manitoba, 44 pp.
- Tarleton, P. 2012. Algal blooms in Moon Lake, past and present. BSc thesis, University of Manitoba, 47 pp.
- Page, E. C. M. 2011. A water quality assessment of Lake Manitoba, a large shallow lake in central Canada. MSc thesis, University of Manitoba, 177 pp.

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**L. Gordon Goldsborough**

- Watchorn, K. E. 2011. Effects of water level management on water chemistry and primary Production of boreal marshes in northern Manitoba, Canada. MSc thesis, University of Manitoba, 187 pp.
- Hertam, S. C. 2010. The effects of common carp (*Cyprinus carpio* L.) water quality, algae and submersed vegetation in Delta Marsh, Manitoba. MSc thesis, University of Manitoba, 186 pp.
- Zanzerl, H. 2010. A decade of change: Studies on the Common Carp (*Cyprinus carpio*) population in Delta Marsh, Manitoba. BSc thesis, University of Manitoba, 49 pp.
- Pernerowski, R. 2010. The Portage Diversion and its impact on Lake Manitoba's water quality. Bsc thesis, University of Manitoba, 44 pp.
- Baschuk, M. S. 2010. Effects of water-level management on the abundance and habitat use of waterfowl and marsh birds in the Saskatchewan River Delta, Manitoba, Canada. MSc thesis, University of Manitoba, 241 pp.
- Hille, K. A. 2008. Does aquaculture impact benthic algal ecology? A study on the effects of an experimental cage aquaculture operation on epilithic biofilms. MSc thesis, University of Manitoba, 338 pp.
- Kolochuk, J. S. 2008. Landscape and land use impacts on farm pond water quality in the Portage Plains of south-central Manitoba. MSc thesis, University of Manitoba, 246 pp.
- Atchison, S. 2008. Water quality on the Saskatchewan River, The Pas region, Manitoba: Potential influences on water quality from the Carrot River, Pasquia River, and outflow from the Tolko kraft paper mill. BSc thesis, University of Winnipeg, 34 pp.
- Hnatiuk, S. D. 2006. Experimental manipulation of ponds to determine the impact of common carp (*Cyprinus carpio* L.) in Delta Marsh, Manitoba: effects on water quality, algae, and submersed vegetation. MSc thesis, University of Manitoba, 174 pp.
- Jacobs, K. 2006. The effects of watershed characteristics and disturbance history on lake water quality of the boreal region of south eastern Manitoba. MSc thesis, University of Manitoba, 266 pp.
- Parks, C. R. 2006. Experimental manipulation of connectivity and common carp: The effects of native fish, water-column invertebrates, and amphibians in Delta Marsh, Manitoba. MSc thesis, University of Manitoba, 184 pp.
- Badiou, P. H. 2005. Ecological impacts of an exotic benthivorous fish in wetlands: A comparison between common carp (*Cyprinus carpio* L.) additions in large experimental wetlands and small mesocosms in Delta Marsh, Manitoba. PhD dissertation, University of Manitoba, 251 pp.
- Friesen-Pankratz, B. 2004. Descriptive and experimental studies on the biotic and abiotic determinants of selected pesticide concentrations in prairie wetland water columns. PhD dissertation, University of Manitoba, 327 pp.
- Leclair, C. 2004. The effects of varying densities of cattle on water quality of farm ponds on the Portage Plains. BSc thesis, University of Manitoba, 79 pp.
- Macbeth, A. 2004. Investigation of an introduced subtropical alga (*Lyngbya wollei*) in Whiteshell Provincial Park, Manitoba. MSc thesis, University of Manitoba, 185 pp.
- Brown, S. 2003. Land use practices in the vicinity of Delta Marsh as they may be affecting water quality. Master of Environmental Design (Environmental Science), University of Calgary, 248 pp.

CURRICULUM VITAE  
**L. Gordon Goldsborough**

- Owens, C. 2003. Impact of land use practices on the water quality of southern Lake Manitoba and Delta Marsh. BSc thesis, Acadia University.
- Kuharski, S. 2002. Potential effects of livestock on wetland water quality. BSc (Agric) thesis, University of Manitoba, 45 pp.
- Macbeth, A. 2002. Paleolimnology of five lakes in Whiteshell Provincial Park. BSc thesis, University of Manitoba, 72 pp.
- McDougal, R. L. 2001. Algal primary production in prairie wetlands: The effects of nutrients, irradiance, temperature and aquatic macrophytes. PhD dissertation, University of Manitoba, 285 pp.
- Bourne, A. L. E. 2000. Factors influencing the abundance of sediment-associated algae in two isolated ponds and a turbid channel of Delta Marsh. MSc thesis, University of Manitoba, 152 pp.
- North, A. D. K. 2000. Impacts of nutrients and insecticide on algal production in a prairie wetland. MSc thesis, University of Manitoba, 117 pp.
- Weidman, P. 2000. Distribution of ultraviolet light effects on periphyton in the littoral zone of an oligotrophic boreal forest lake. BSc thesis, University of Manitoba, 54 pp.
- Purcell, S. L. 1999. The significance of waterfowl feces as a source of nutrients to algae in a prairie wetland. MSc thesis, University of Manitoba, 118 pp.
- Richmond, K.-A. 1997. The paleolimnology of Killarney Lake, Manitoba. MSc thesis, University of Manitoba.
- McDougal, R. L. 1995. An analysis of historical trends of primary production in Crawford Lake, Manitoba using an intact sediment core. BSc undergraduate research project, Brandon University, 58 pp.
- Henderson, T. A. 1995. A paleolimnological analysis of Max Lake, Manitoba. BSc thesis, Brandon University, 54 pp.
- McDougal, R. L. 1995. Responses of a wetland ecosystem to “press” and “pulse” additions of nitrogen and phosphorus. BSc thesis, Brandon University.
- Forster, M. J. 1993. Manipulation of invertebrate community size-structure and responses of periphyton biomass. BSc thesis, Brandon University, 65 pp.
- Forster, M. J. 1991. Effect of periphyton architectural development on short-term hexazinone toxicity to freshwater periphyton. BSc undergraduate research project, Brandon University, 41 pp.

**10. Current Students**

- Dyck, C. Evaluation the effectiveness of harvesting and pathogen control on floating cattail bioplatforms for remediation of water quality in lakes and wetlands. BSc thesis, University of Manitoba.
- Hope, C. Temporal and spatial trends in phosphorus accumulation in the sediments of Delta Marsh, MSc candidate, University of Manitoba.
- Kowal, P. Historical analysis of changes in connectivity and plant cover in Netley-Libau Marsh, MSc candidate, University of Manitoba.



CURRICULUM VITAE  
**L. Gordon Goldsborough**

Stanley, M., Sources of nutrients and factors leading to cyanobacterial blooms in Delta Marsh, MSc candidate, University of Manitoba.

**Other Awards & Scholarships**

- 2012      Queen Elizabeth II Diamond Jubilee Medal
- 2001      University of Manitoba Outreach Award
- 1995      Brandon University Senate Award for Excellence in Research (sole recipient)
- 1995      Brandon University Alumni Association Award for Excellence in Teaching (sole recipient)
- 1994      Brandon University Innovations and Development Fund (D. Kines, co-holder)  
*“Interactive information retrieval system”*
- 1994      Employment and Immigration Canada, Challenge Summer Employment Subsidy Program  
*“Student programmer”*
- 1993      Natural Sciences and Engineering Research Council, Conference Grant  
*“Twelfth North American Diatom Symposium”*
- 1992 -      Brandon University Innovations and Development Fund  
1993      *“Development of a program proposal in Environmental Sciences”*
- 1991 -      Brandon University Innovations and Development Fund  
1992      *“Development of a program proposal in Environmental Sciences”*
- 1988 -      Natural Sciences and Engineering Research Council (Postdoctoral Scholarship)  
1989
- 1986 -      Izaak Walton Killam Memorial Postdoctoral Scholarship  
1987
- 1982 -      Natural Sciences and Engineering Research Council (Postgraduate Scholarship)  
1985
- 1981      University of Manitoba Fellowship
- 1977      Governor-General's Medal (Manitoba)
- 1977      Queen Elizabeth II Silver Jubilee Award

**Referee**

- Analytical: Standard Methods for the Examination of Water and Wastewater (18<sup>th</sup> edition onwards): Joint Task Group on Periphyton, Joint Task Group on Aquatic Rooted Plants
- Book: *Algal Ecology in Freshwater Benthic Ecosystems*, R. J. Stevenson, M. L. Bothwell and R. L. Lowe, eds., Academic Press

## CURRICULUM VITAE

### L. Gordon Goldsborough

- Grants: Delta Waterfowl Foundation, Michigan Sea Grant College Program, Ontario Innovation Trust, Natural Sciences and Engineering Research Council of Canada (Research Grant Competition), United States National Science Foundation (Research Grant Competition), United States Geological Survey (North Central Region), South Florida Water Management District
- Journals: *Aquaculture*, *Aquatic Sciences*, *Archiv für Hydrobiologie*, *Archives of Environmental Contamination and Toxicology*, *Canadian Journal of Botany*, *Canadian Journal of Fisheries and Aquatic Sciences*, *Canadian Water Resources Journal*, *Diatom Research*, *Ecology*, *Écoscience*, *Environmental Pollution*, *International Review of Hydrobiology*, *Journal of Paleolimnology*, *Journal of Phycology*, *Journal of the American Water Resources Association*, *Vegetation Science*, *Wetlands*
- Personnel: United States Environmental Protection Agency (Staff Review Committee, 2000), Faculty of Graduate Studies (University of Regina)
- Regulatory: Canadian Water Quality Guidelines: Glyphosate, Simazine (Environment Canada)

#### **Professional Affiliations**

- International Society of Limnology
- Society of Wetland Scientists

#### **Other activities**

- Chair, Manitoba Water Council (2014 - present)
- Chair of Canadian Chapter, Society of Wetland Scientists (2002 - 2005, 2014 - present)
- Technical Advisor, Manitoba Clean Environment Commission (2014 - 2015)
- Member, International Red River Board (2003 - present)
- Member, Lake Manitoba Lake St. Martin Regulation Review Advisory Committee (2011 - 2013)
- Chair, Lake Manitoba Stewardship Board (2007 - 2012)
- Technical Advisor and Committee Member, Lake Manitoba Regulation Review Advisory Committee, Province of Manitoba (2001 - 2004)
- Member of Editorial Board, *Environmental Pollution*, Elsevier Publishing (1999 - 2001)
- Co-editor (with R. G. Wetzel), *SIL Periphyton Methods Manual* (1996 - 2004)
- Consultant, Manitoba Department of Environment (Water Quality Management) (1986 - 2001)
- Organizer, 12th North American Diatom Symposium, University Field Station (Delta Marsh), 23-25 September 1993
- Editor, Delta Marsh Field Station (University of Manitoba) Annual Reports (1989 - 1998)
- Member of the Board of Directors, Manitoba Model Forest Inc. (1994 - 1995, 1997 - 2002)
- Webmaster, International Association of Applied and Theoretical Limnology ([www.limnology.org](http://www.limnology.org))
- Webmaster, Manitoba Historical Society ([www.mhs.mb.ca](http://www.mhs.mb.ca))

CURRICULUM VITAE  
**L. Gordon Goldsborough**

- Member of the Board of Directors, Canadian Water Resources Association, Manitoba Chapter (1998 - 2001)
- Member, Lake Winnipeg Research Consortium Inc. (2001 - present)
- Member, Editorial Board of "Freshwater Systems" (2000 - 2003)
- Co-organizer, "Ecology of wetlands and shallow lakes: alternative stable states, anthropogenic influences, and management options" (Delta Marsh, 15-19 August 2001)
- President, Manitoba Historical Society (2004 - 2006)
- Selection Committee for the Lieutenant-Governor of Manitoba's Greenwing Conservation Award (2005 - present)
- Program Committee, Canadian Heritage Rivers Conference, Winnipeg (2006)

## CURRICULUM VITAE - BRENDA J. HANN

Department of Biological Sciences  
University of Manitoba  
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### Education:

- 1980 Ph.D. Zoology/Limnology, Indiana University. Thesis title: Population differentiation in the *Eurycercus (Bullatifrons)* species complex (Chydoridae, Cladocera) in eastern North America.
- 1975 M.Sc. Biology, University of Waterloo. Thesis title: Taxonomy of Chydoridae in Ontario and genus *Chydorus* (Worldwide).
- 1972 B.Sc. (Hons.) Biology, University of Waterloo

### Academic appointments:

September 2009 – June 2014: Associate Dean, Faculty of Graduate Studies, University of Manitoba

July 2011- October 2011: Acting Dean, Faculty of Graduate Studies, University of Manitoba

April 2000 - present: Professor, Department of Biological Sciences, University of Manitoba.

July 1986 - March 2000: Associate Professor, Department of Zoology, University of Manitoba.

July 1982 - June 1986: NSERC University Research Fellow and Assistant Professor, Department of Zoology, University of Manitoba.

### Research funding in the past 6 years:

Manitoba Hydro, Research and Development Grant (\$82,000 for 2 years)

NSERC Discovery Grant (\$11,750 per year)

NSERC Equipment Grant (DNA sequencer) with 8 others

DFO Stewardship-in-Action Grant, "Lakes for the Future", in collaboration with Fort Whyte Centre (\$7500 per year)

### Refereed Journal Publications:

- Hann, B.J. and A. Salki. 2015. Seasonal variation in zooplankton in Lake Winnipeg. *Journal of Great Lakes Research* (submitted)
- Hann, B.J., M. Wishart, S.-L. Kowalchuk and S. Watson. 2015. Long-term patterns of change in the zoobenthos community in Lake Winnipeg. *Journal of Great Lakes Research* (submitted)
- Hann, B.J. and A. Salki. 2015. Detection of pattern of long-term change in the zooplankton community in Lake Winnipeg. *Journal of Great Lakes Research* (submitted)
- Olynyk, A.J., G.K. Davoren and B.J. Hann. 2015. Dietary niche overlap between two zooplanktivores in Lake Winnipeg, Manitoba: Rainbow Smelt (*Osmerus mordax*) and Cisco (*Coregonus artedii*). *Journal of Great Lake Research* (in revision)
- Sheppard, K.T., G.K. Davoren and B.J. Hann. 2015. Diet of walleye and sauger and morphological characteristics of their prey in Lake Winnipeg. *Journal of Great Lakes Research* (accepted 20 May 2015).
- Sheppard, K.T., B.J. Hann and G.K. Davoren. 2015. Variation in growth rate and condition of walleye, dwarf walleye and sauger in Lake Winnipeg. *Journal of Great Lakes Research* (in review).
- Dupuis, L.V., M.J. Paterson and B.J. Hann. 2015. Littoral cladoceran community reassembly following cessation of disturbance. *Journal of Paleolimnology* 54:121-135 (DOI: 10.1007/s10933-015-9841-7)
- Sheppard, K.T., A. Olynyk, G.K. Davoren and B.J. Hann. 2012. Summer diet analysis of the invasive rainbow smelt (*Osmerus mordax*) in Lake Winnipeg, Manitoba. *Journal of Great Lakes Research* 38:66-71.
- Suchy, K.D., A. Salki, and B.J. Hann. 2010. Investigating the early stages of invasion of the non-indigenous zooplankter, *Eubosmina coregoni*, in Lake Winnipeg, Manitoba, Canada. *Journal of Great Lakes Research* 36:159-166.
- Dupuis, A.P. and B.J. Hann. 2009. Warm spring and summer water temperatures in small eutrophic lakes of the Canadian prairies: potential implications for phytoplankton and zooplankton population dynamics. *Journal of Plankton Research* 31:489-502.
- Dupuis, A.P. and B.J. Hann. 2009. Climate change, diapause termination and zooplankton population dynamics: an experimental and modeling approach. *Freshwater Biology* 54:221-235.
- Suchy, K.D. and B.J. Hann. 2007. Using microfossil remains in lake sediments to examine the invasion of *Eubosmina coregoni* (Cladocera, Bosminidae) in Lake of the Woods, Ontario, Canada. *Journal of Great Lakes Research* 33:867-874.
- McLaughlin, P.A., Hann, B.J. and others. 2005. Common and Scientific Names of Aquatic Invertebrates from the United States and Canada. Checklist of Species of Cladocera in North America. Special Publication of the American Fisheries Society 31. Bethesda, MD. 545 pp.
- Hann, B.J., C.J. Mundy and L.G. Goldsborough. 2001. Snail-periphyton interactions in a prairie lacustrine wetland. *Hydrobiologia* 457:167-175.
- Vinebrooke, R.D., M.A. Turner, K.A. Kidd, B.J. Hann and D.W. Schindler. 2001. Truncated foodweb effects of omnivorous minnows in a recovering acidified lake. *J. N. Am. Benth. Soc.* 20:629-642.

- Sandilands, K.A., B.J. Hann and L.G. Goldsborough. 2000. The impact of nutrients and submersed macrophytes on invertebrates in a prairie wetland, Delta Marsh, Manitoba. *Arch. Hydrobiol.* 148:441-459.
- Zrum, L., B.J. Hann, L.G. Goldsborough and G.A. Stern. 2000. Effects of organophosphorus insecticide and inorganic nutrients on the planktonic microinvertebrates and algae in a prairie wetland. *Arch. Hydrobiol.* 147:373-399.
- Hann, B.J. and M.A. Turner. 2000. Littoral microcrustacea in Lake 302S in the Experimental Lakes Area of Canada: acidification and recovery. *Freshw. Biol.* 43:133-146.
- Hann, B.J. and M.A. Turner. 1999. Exploitation by microcrustacea of a new littoral habitat in an acidified lake. *Hydrobiologia* 416:65-75.
- Pettigrew, C.T., B.J. Hann and L.G. Goldsborough. 1998. Waterfowl feces as a source of nutrients to a prairie wetland: responses of microinvertebrates to experimental additions. *Hydrobiologia* 362: 55-66.
- Hann, B.J. and L. Zrum. 1997. Littoral zooplankton in a prairie coastal wetland: seasonal abundance and community structure. *Hydrobiologia* 357:37-52.
- Hann, B.J. and L.G. Goldsborough. 1997. Responses of a prairie wetland to press and pulse additions of inorganic nitrogen and phosphorus: invertebrate community structure and interactions. *Arch. Hydrobiol.* 140:169-194.
- McDougal, R.L., L.G. Goldsborough and B.J. Hann. 1997. Responses of a prairie wetland to press and pulse additions of inorganic nitrogen and phosphorus: production by planktonic and benthic algae. *Arch. Hydrobiol.* 140:145-167.
- Turner, M.A., G.G.C. Robinson, B.E. Townsend, B.J. Hann and J.A. Amaral. 1995. Ecological effects of blooms of filamentous green algae in the littoral zone of an acid lake. *Can. J. Fish. Aquat. Sci.* 52:2264-2275.
- Hann, B.J. 1995. Population differentiation in *Simocephalus* (Anomopoda, Daphniidae): patterns and consequences. *Hydrobiologia* 307:9-14.
- Hann, B.J., P.R. Leavitt and P.S. Chang. 1994. Cladocera community response to experimental eutrophication in Lake 227, Experimental Lakes Area, Ontario, as recorded in annually laminated sediments. *Can. J. Fish. Aquat. Sci.* 51:2312-2321.
- Leavitt, P.R., B.J. Hann, J.P. Smol, B.A. Zeeb, C.C. Christie, B. Wolfe and H.J. Kling. 1994. Paleolimnological analysis of whole-lake experiments: an overview of results from Experimental Lakes Area Lake 227. *Can. J. Fish. Aquat. Sci.* 51:2322-2332.
- Grantham, B.A. and B.J. Hann. 1994. Leeches (Annelida: Hirudinea) in the Experimental Lakes Area, northwestern Ontario, Canada: patterns of species composition in relation to environment. *Can. J. Fish. Aquat. Sci.* 51:1600-1607.
- Hann, B.J. and P.F. Karrow. 1993. Comparative analysis of cladoceran microfossils in the Don and Scarborough Formations, Toronto, Canada. *J. Paleolimnology* 9:223-241.
- Hann, B.J., B.G. Warner, and W.F. Warwick. 1992. Aquatic invertebrates and climate change: a comment on Walker et al. (1991). *Can. J. Fish. Aquat. Sci.* 49:1274-1276.
- Hann, B.J. 1991. Microinvertebrate grazer-periphyton interactions in a eutrophic marshland pond. *Freshwater Biology* 26:87-96.
- Hann B.J. and B. Lonsberry. 1991. Influence of temperature on hatching of eggs of *Lepidurus couesii* (Crustacea, Notostraca). *Hydrobiologia* 212:61-66.
- Hann, B.J. 1990. Redescription of *Eurycercus (Teretifrons) glacialis* (Cladocera, Chydoridae), and description of a new species, *E. (T.) nigracanthus* from Newfoundland, Canada. *Canadian Journal of Zoology* 68:2146-2157.

- Laberge, S.T. and B.J. Hann. 1990. Acute temperature and oxygen stress among genotypes of *Daphnia pulex* and *Simocephalus vetulus* (Cladocera, Daphniidae) in relation to environmental conditions. *Canadian Journal of Zoology* 68:2257-2263.
- Hann, B.J. 1989. Methods in Quaternary Ecology #6. Cladocera. *Geoscience Canada* 16:17-26.
- Hann, B.J. and B.G. Warner. 1987. Late Quaternary Cladocera from coastal British Columbia, Canada: a record of climatic or limnologic change? *Archiv für Hydrobiologie* 110: 161-177.
- Warner, B.G. and B.J. Hann. 1987. Aquatic invertebrates as climatic indicators? *Quaternary Research* 28: 427-430.
- Hann, B.J. 1987. Naturally occurring interspecific hybridization in *Simocephalus* (Daphniidae, Cladocera): its potential significance. *Hydrobiologia* 145: 219-224.
- Hann, B.J. and P.D.N. Hebert. 1986. Genetic variation and population differentiation in the genus *Simocephalus* (Daphniidae, Cladocera) in southern Ontario. *Canadian Journal of Zoology* 64: 2246-2256.
- Hann, B.J. 1986. Revision of the genus *Daphniopsis* Sars, 1903 (Cladocera, Daphniidae) and a description of *Daphniopsis chilensis* n. sp. from South America. *Journal of Crustacean Biology* 6: 246-263.
- Hebert, P.D.N. and B.J. Hann. 1986. Patterns in the composition of arctic tundra pond microcrustacean communities. *Canadian Journal of Fisheries and Aquatic Sciences* 43(7): 1416-1425.
- Hann, B.J. 1985. Influence of temperature on life history characteristics of two sibling species of *Eurycerus* (Cladocera, Chydoridae). *Canadian Journal of Zoology* 63: 891-898.
- Frey, D.G. and B.J. Hann. 1985. Growth in Cladocera. pp. 315-335. In: *Crustacean Growth: Factors in Adult Growth* (A.M. Wenner, Ed.), *Crustacean Issues* (F.R. Schram, General Ed.), A.A. Balkema, Rotterdam.
- Hann, B.J. and P.F. Karrow. 1984. Pleistocene paleoecology of the Don and Scarborough Formations, Toronto, Canada, based on cladoceran microfossils at the Don Valley Brickyard. *Boreas* 13: 377-391.
- Warner, B.G., R.J. Hebda and B.J. Hann. 1984. Postglacial paleoecological history of a cedar swamp, Manitoulin Island, Ontario, Canada. *Palaeogeography, Palaeoclimatology, Palaeoecology* 45: 301-345.
- Schwartz, S.S., B.J. Hann and P.D.N. Hebert. 1983. The feeding ecology of *Hydra* and possible implications in the structuring of pond zooplankton communities. *Biological Bulletin* 164: 136-142.
- Hann, B.J. and P.D.N. Hebert. 1982. Re-interpretation of genetic variation in *Simocephalus* (Cladocera, Daphniidae). *Genetics* 102: 101-107.
- Hann, B.J. 1982. Two new species of *Eurycerus* (*Bullatifrons*) from eastern North America (Chydoridae, Cladocera). *Taxonomy, Ontogeny and Biology. Internationale Revue der gesamten Hydrobiologie* 67: 585-610.
- Hann, B.J. and R. Chengalath. 1981. Redescription of *Alonella pulchella* Herrick, 1884 (Chydoridae, Cladocera), and a description of the male. *Crustaceana* 41: 249-262.
- Hann, B.J. 1981. Distribution of littoral Chydoridae (Cladocera) in Ontario and taxonomic notes on some species. *Canadian Journal of Zoology* 59: 1465-1474.
- Chengalath, R. and B.J. Hann. 1981. A new species of *Chydorus* (Chydoridae, Cladocera) from Ontario, Canada. *Transactions of the American Microscopical Society* 100: 229-238.
- Chengalath, R. and B.J. Hann. 1981. Two new species of *Alona* (Chydoridae, Cladocera) from western Canada. *Canadian Journal of Zoology* 59: 377-389.

Michael, R.G. and B.J. Hann. 1979. On the resurrection of the cladoceran species *Chydorus reticulatus* Daday, 1898 (Chydoridae, Cladocera) and its relationship to *Chydorus ventricosus* Daday, 1898. *Hydrobiologia* 65: 225-232.

#### **Book Chapters:**

Rogers, D.C. and B.J. Hann. 2015. Class Branchiopoda. In: Thorp, J., Rogers, D.C. (Eds.), *Ecology and General Biology: Thorp and Covich's Freshwater Invertebrates*, Academic Press, 687–708. ISBN: 9780123850263 Page proofs returned to editor 12 October 2015.

Hann, B.J. 1999. A prairie coastal wetland (Lake Manitoba's Delta Marsh): organization of the invertebrate community. Pp. 1013-1039. In: Batzer, D., R.B. Rader and S.A. Wissinger (eds.), *Invertebrates in Freshwater Wetlands of North America. Ecology and Management*. John Wiley & Sons, Inc. NY.

#### **Conference Proceedings (last 6 years):**

Lobson, C., D. Seburn, H. Vu, B. Hann, M. White, C. Wong and M. Hanson. 2014. Response of a zooplankton community following exposure to insecticide thiamethoxam in wetland mesocosms. Poster session presented at: SETAC- North American Conference. 9-13 Nov. 2014; Vancouver, BC.

Hann, B., M. Wishart and S. Watson. 2014. Long-term changes in benthic invertebrates in Lake Winnipeg. Lake Winnipeg Research Consortium Annual Science Workshop, Winnipeg, Manitoba, February 18-19, 2014. Oral presentation.

Fetterly, M. and B.J. Hann. 2014. The response of zooplankton to changing diet in the summer on Lake Winnipeg. Lake Winnipeg Research Consortium Annual Science Workshop, Winnipeg, Manitoba, February 18-19, 2014. Oral presentation.

Lobson, C., D. Seburn, H. Vu, B. Hann, C. Wong and M. Hanson. 2014. Response of a zooplankton community following exposure to insecticide thiamethoxam in wetland mesocosms. Poster session presented at: SETAC- Prairie northern chapter annual meeting "pesticides on the prairies". 2014 Jun 13; Saskatoon SK.

Lobson, C., D. Seburn, H. Vu, B. Hann, C. Wong and M. Hanson. 2013. Response of a zooplankton community following exposure to insecticide thiamethoxam in wetland mesocosms. Poster session presented at: University of Manitoba, Undergraduate Research Poster Competition. 2013 Oct 30; Winnipeg, MB.

Lobson, C., D. Seburn, H. Vu, B. Hann, C. Wong and M. Hanson. 2013. Response of a zooplankton community following exposure to insecticide thiamethoxam in wetland mesocosms. Poster session presented at: University of Manitoba, Clayton H. Riddell Faculty of Environment, Earth, and Resources Student Research Poster Competition. 2013 Sept 6; Winnipeg, MB.

Bryan, M.G. and B.J. Hann. 2013. The implications of cyanobacteria blooms on the base of the food web in Lake Winnipeg as determined by stable isotope analysis. International Association for Great Lakes Research, Annual Meeting, Purdue University, June 2013.

Bryan, M.G. and B.J. Hann. 2013. The implications of cyanobacteria blooms on the base of the food web in Lake Winnipeg as determined by stable isotope analysis. Lake Winnipeg Research Consortium Annual Science Workshop. Winnipeg, Manitoba, March 20-21, 2013. Oral presentation.



- Hann, B.J. and D. Kamada. 2013. Zooplankton in Lake Winnipeg: an update. Lake Winnipeg Research Consortium Annual Science Workshop. Winnipeg, Manitoba, March 20-21, 2013. Oral presentation.
- Olynyk, A.J., B.J. Hann and G.K. Davoren. 2013. A diet analysis of two zooplanktivores, the non-indigenous rainbow smelt (*Osmerus mordax*) and the native cisco (*Coregonus artedii*), in Lake Winnipeg, Manitoba. Lake Winnipeg Research Consortium Annual Science Workshop. Winnipeg, Manitoba, March 20-21, 2013. Oral presentation.
- Sheppard, K.T., Hann, B.J., and Davoren, G.K. 2013. Spatial and seasonal variation in diet, growth and condition of walleye (*Sander vitreus*), sauger (*Sander canadensis*) and dwarf walleye (*Sander vitreus*) in Lake Winnipeg, Manitoba. Lake Winnipeg Research Consortium Annual Science Workshop. Winnipeg, Manitoba, March 20-21, 2013. Oral presentation.
- Olynyk, A.J., B.J. Hann and G.K. Davoren. 2012. Seasonality of diet selectivity of an invasive population of rainbow smelt (*Osmerus mordax*) in Lake Winnipeg, Manitoba, Canada. 32nd International Symposium of the North American Lake Management Society, Madison, Wisconsin, November 7-9, 2012. Oral Presentation.
- Sheppard, K.T., Davoren, G.K., and Hann, B.J. 2012. Spatial variation in growth and condition of commercially important walleye (*Sander vitreus*) and sauger (*Sander canadensis*) in Lake Winnipeg, Manitoba. 32<sup>nd</sup> International Symposium of the North American Lake Management Society. 7-9 November 2012, Madison, Wisconsin. Oral presentation
- Olynyk, A.J., B.J. Hann and G.K. Davoren. 2012. Seasonality of diet selectivity of an invasive population of rainbow smelt (*Osmerus mordax*) in Lake Winnipeg, Manitoba, Canada. 97th Annual Meeting of Ecological Society of America, Portland, Oregon, August 5-10, 2012. Poster presentation.
- Sheppard, K.T., Davoren, G.K., and Hann, B.J. 2012. Food web related spatial variation in growth of commercially important walleye (*Sander vitreus*) and sauger (*Sander canadensis*) in Lake Winnipeg, Manitoba: The impact of an invasive species, rainbow smelt (*Osmerus mordax*). 97<sup>th</sup> Annual Meeting of the Ecological Society of America (International). 5-10 August 2012, Portland Oregon. Poster presentation.
- Sheppard, K., G. Davoren, and B.J. Hann. 2010. Trophic Study of Invasive Rainbow Smelt (*Osmerus mordax*) and Native Walleye (*Sander vitreus*) in the North Basin of Lake Winnipeg, Manitoba. Canadian Conference for Fisheries Research (CCFFR) Annual Meeting, Winnipeg, 7-9 Jan. 2010
- Olynyk, A., G. Davoren and B.J. Hann. 2010. A summer diet analysis of an invasive population of rainbow smelt (*Osmerus mordax*) in Lake Winnipeg. Canadian Conference for Fisheries Research (CCFFR) Annual Meeting, Winnipeg, 7-9 Jan. 2010
- Friesen, O. and B. Hann. 2010. Development of a Rapid Bioassessment Protocol to Detect Impacts of Cottage Development using Zooplankton Communities from Boreal Shield Lakes. Prairie Universities Biology Symposium, Brandon University, Brandon, MB. 19 Feb. 2010.
- Sheppard, K., G. Davoren, and B.J. Hann. 2010. Trophic Study of Invasive Rainbow Smelt (*Osmerus mordax*) and Native Walleye (*Sander vitreus*) in the North Basin of Lake Winnipeg, Manitoba. Lake Winnipeg Research Consortium Symposium, 24 March 2010.
- DeSellas, A.M., A.M. Paterson and B.J. Hann. 2009. Long-term changes in Cladoceran size and assemblage composition in Lake of the Woods, Ontario, Canada. Society of Canadian Limnologists, Annual Meeting, Ottawa, Jan. 2009.

- Olynyk, A. and B.J. Hann. 2009. A summer diet analysis of an invasive population of rainbow smelt (*Osmerus mordax*) in Lake Winnipeg. Lake Winnipeg Research Consortium Symposium, 16 March 2009.
- Hann, B.J. and T. Mosindy. 2008. Status of invasive species (spiny waterflea, *Eubosmina*) in Lake of the Woods, Ontario. Lake of the Woods (LOW) Water Quality Forum, International Falls, MN, 12-13 March 08.
- Hann, B.J. 2008. Lake Winnipeg Zoobenthos: Are any patterns or trends emerging from the mud? Lake Winnipeg Research Consortium Symposium, Winnipeg, MB, 17-19 March 08.
- Frazer, L. and B.J. Hann. 2008. Assessing temporal change in community structure using cladoceran microfossils: a paleolimnological approach. PUBS, University of Manitoba, Winnipeg, MB, 21-23 February 2008.
- Frazer, L. and B.J. Hann. 2008. Assessing temporal change in community structure using cladoceran microfossils: A paleolimnological approach. 10<sup>th</sup> Cladocera Microfossil Workshop. Hungary. 21-25 August 2008.
- Dupuis, A. and B.J. Hann. 2007. An emerging issue: differential hatching response of *Daphnia* and rotifers to a warm spring. SIL International meeting, Montreal, QC, 12-18 August 2007 (abstract).
- Frazer, L., B.J. Hann, and M. Paterson. 2007. Calibration of the cladoceran paleorecord during an acidification manipulation of a boreal shield lake, Canada. SIL International meeting, Montreal, QC, 12-18 August 2007 (abstract).
- Hann, B.J. 2007. Compound effects of eutrophication, stratification and hypolimnetic hypoxia on zoobenthos in Lake Winnipeg. SIL International meeting, Montreal, QC, 12-18 August 2007 (abstract).
- Hann, B.J. 2007. Effects of stratification and hypoxia on zoobenthos in Lake Winnipeg. Third International Water Conference, International Water Institute, Grand Forks, ND. 14 March 2007 (abstract)
- Hann, B.J. 2007. Effects of stratification and hypoxia on zoobenthos in Lake Winnipeg. Lake Winnipeg Research Consortium Annual Meeting, 19-20 February 2007 (abstract)
- Salki, A., B.J. Hann, D. Watkinson and H. Kling. 2007. Is watershed phosphorus the sole cause of Lake Winnipeg N-fixing algal blooms? Chemical Society of Canada, Winnipeg, MB; May 2007 (abstract)
- Dupuis, A. and B.J. Hann. 2007. Driving a shift from clear to turbid water states: biological implications of climate change in shallow eutrophic lakes in the Canadian prairies. ASLO annual meeting, Santa Fe, NM, 4-9 February 2007 (abstract).
- Hann, B.J. 2007. Effects of stratification and hypoxia on zoobenthos in Lake Winnipeg. ASLO annual meeting, Santa Fe, NM, 4-9 February 2007 (abstract).
- Suchy, K. and B.J. Hann. 2006. The invasion pathway of an exotic zooplankton species, *Bosmina (Eubosmina) coregoni*, into Lake Winnipeg. Lake of the Woods Water Quality Forum, International Falls, MN, 8-9 March 2006.
- Frazer, L., A. Dupuis and B.J. Hann. 2005. Characteristics of the spring clear-water phase and its variability in shallow prairie lakes. North American Lakes Management Society, Annual Meeting, Madison, WI, 9-11 Nov. 2005.
- Hann, B.J., G. McCullough and M. Stainton. 2005. Effects of stratification and hypolimnetic hypoxia on zoobenthos of Lake Winnipeg. International Association of Great Lakes Research, Ann Arbor, MI. 23-27 May 2005.
- Suchy, K. and B.J. Hann. 2005. The invasion pathway of an exotic zooplankton species, *Bosmina (Eubosmina) coregoni*, into Lake Winnipeg. International Association of Great Lakes Research, Ann Arbor, MI. 23-27 May 2005.

- Kowalchuk, S.M. and B.J. Hann. 2005. Community composition and distribution of zoobenthos in Lake Winnipeg. International Association of Great Lakes Research, Ann Arbor, MI. 23-27 May 2005.
- Suchy, K. and B.J. Hann. 2005. The invasion pathway of an exotic zooplankton species, *Bosmina (Eubosmina) coregoni*, into Lake Winnipeg. Lake of the Woods Water Quality Forum, Fort Frances, Ontario, 30-31 March 2005.
- Suchy, K. and B.J. Hann. 2005. The invasion pathway of an exotic zooplankton species, *Bosmina (Eubosmina) coregoni*, into Lake Winnipeg. Canadian Conference for Fisheries Research, Windsor, Ontario, 6-8 January 2005.

**Theses supervised (last 10 years):**

- Lobson, C. 2014. Response of a zooplankton community following exposure to the insecticide thiamethoxam in wetland mesocosms. Honours thesis. Department of Biological Sciences, University of Manitoba, Winnipeg, MB.
- Fetterly, M. 2014. The response of zooplankton to changing diet in Lake Winnipeg in summer. Honours Thesis, Department of Biological Sciences, University of Manitoba.
- Bryan, M. G. 2013. The implications of cyanobacterial blooms on the base of the food web in Lake Winnipeg. M.Sc. thesis, Department of Biological Sciences, University of Manitoba, MB.
- Sheppard, K.T. 2013. Spatial and seasonal variation in diet, growth and condition of walleye (*Sander vitreus*), sauger (*Sander canadensis*) and dwarf walleye (*Sander vitreus*) in Lake Winnipeg, Manitoba. M.Sc. thesis, Department of Biological Sciences, University of Manitoba, Winnipeg, MB.
- Olynyk, A.J. 2013. A diet analysis of two zooplanktivores, the non-indigenous rainbow smelt (*Osmerus mordax*) and the native cisco (*Coregonus artedii*), in Lake Winnipeg, Manitoba. M.Sc. thesis. Department of Biological Sciences, University of Manitoba, Winnipeg, MB.
- Kamada, Daigo. 2012. Response of the Zooplankton Community to Environmental Changes in Lake Winnipeg. M.Sc. thesis, Department of Biological Sciences, University of Manitoba, Winnipeg, MB.
- Sheppard, K. 2010. Trophic Study of Invasive Rainbow Smelt (*Osmerus mordax*) and Native Walleye (*Sander vitreus*) in the North Basin of Lake Winnipeg, Manitoba. Honours Thesis, Department of Biological Sciences, University of Manitoba.
- Friesen, O. 2010. Development of a Rapid Bioassessment Protocol to Detect Impacts of Cottage Development using Zooplankton Communities from Boreal Shield Lakes. Honours Thesis, Department of Biological Sciences, University of Manitoba.
- Friesen, H. M. 2010. Spiny Water Flea (*Bythotrephes longimanus* Leydig) Invasion of Lake of the Woods and Beyond: Susceptibility in Terms of Suitability and Accessibility. Honours Thesis, Department of Biological Sciences, University of Manitoba.
- Frazer, L.V. 2009. Paleolimnological reconstruction of cladoceran community reassembly following experimental manipulation of two boreal shield lakes. M.Sc. Thesis, Department of Biological Sciences, University of Manitoba. 149 pp.
- Olynyk, A. 2009. A summer diet analysis of an invasive population of rainbow smelt (*Osmerus mordax*) in Lake Winnipeg. Honours Thesis, Department of Biological Sciences, University of Manitoba. 49 pp.
- Dupuis, A.P. 2008. The effects of a warm spring on phytoplankton and zooplankton population dynamics in small eutrophic lakes in the Canadian prairies: Implications of a changing

- climate. M.Sc. Thesis, Department of Biological Sciences, University of Manitoba. 157 pp.
- Turko, P.W. 2007. Nutrient limitation of *Daphnia pulicaria* in a eutrophic prairie lake. Honours Thesis, Department of Zoology, University of Manitoba. 45 pp.
- Suchy, K.D. 2006. Invasion dynamics of a nonindigenous zooplankton species, *Eubosmina coregoni* (Cladocera, Bosminidae), in Central Canada. M.Sc. Thesis, Department of Zoology, University of Manitoba. 96 pp.
- Frazer, L. 2006. The importance of pelagic zooplankton-phytoplankton interactions in determining the length of the clear-water phase in shallow prairie lakes. Honours Thesis, Department of Environment and Geography, University of Manitoba. 79 pp.
- Wilson, M.A. 2004. The effects of discharge of effluent from small-diameter mineral exploration drilling to arctic lakes. M.Sc. Thesis, Department of Zoology, University of Manitoba. 215 pp.
- Smith, E.L. 2004. Diel vertical and horizontal migration of zooplankton in a shallow lake. Honours Thesis, Department of Zoology, University of Manitoba.
- Legary, M. 2003. Effects on zoobenthos from nutrient and carp (*Cyprinus carpio*) addition in a marsh environment. Honours Thesis, Department of Zoology, University of Manitoba.

#### **Service activities:**

##### University of Manitoba

- Senate, June 2006-2009 (Science), 2010- June 2014 (FGS assessor)
- University Discipline Committee, Oct. 06-
- University Discipline Committee, Vice-chair, July 2010 -
- Ad-Hoc sub-committee of UDC, revisions of University Discipline By-law, 2008-09
- Senate Admission Appeals Committee, May 08 –
- Senate Admission Appeals Committee, Vice-Chair, July 2010 --
- Senate Committee on Animal Care, Jan. 10 – June 2014
- Presidential Advisory Committee for VP (Academic) and Provost, member, Dec. 2008-09
- Faculty of Engineering, Promotions and Tenure Committee, external core member, 2008-
- Faculty of Architecture, undergraduate program review, internal committee reviewer, June 2014

##### Faculty of Graduate Studies

- Associate Dean, Sept. 09 – June 2014
- Committee on Guidelines and Policy, Sept. 04 – June 2014
- Committee on Programs and Planning, Sept. 09 – June 2014
- Faculty Council, Sept. 09 – June 2014
- Faculty Executive, Sept. 09 – June 2014
- Electrical and Computer Engineering, graduate program review, internal committee reviewer, October 1-2, 2015

##### Faculty of Science

- Faculty of Science, Committee on Student Standing, 1986-
- Faculty of Science, Local Discipline Committee, 2006-

##### Professional and Community

International Joint Commission (IJC), Panel leader, Lake of the Woods Basin Water Quality Plan of Study, ON, 2014  
External examiner, PhD thesis, University of New England, Australia, 2014  
External examiner, PhD thesis, University of Alberta, Edmonton, 2012  
External examiner, PhD thesis, University of Alberta, Edmonton, 2001  
Aquatic Biology Research Group, Director, 2008-2012  
Aquatic Biology Research Group, member, 2006-2012  
ELA Fellowship Selection committee, 1997-  
Lake Winnipeg Foundation, Science Advisory Council, member, 2012-  
Lake Winnipeg Basin Science Sub-Committee, member, 2008-09  
Peer reviewer: NSERC Discovery grants, NSERC Strategic Project grant, Limnology & Oceanography, Hydrobiologia, CJFAS, JNABS, Wetlands, Arch. Hydrobiol., International Journal of Hydrobiology, EcoScience, Environmental Reviews, Journal of Crustacean Biology

**Date Submitted:** 2014-12-17 15:04:09  
**Confirmation Number:** 331996  
**Template:** NSERC\_Researcher

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## **Professor James Frederick Hare**

Correspondence language: English

### **Contact Information**

The primary information is denoted by (\*)

#### **Address**

Primary Affiliation (\*)

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University of Manitoba  
50 Sifton Road  
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Winnipeg Manitoba R3T 2N2  
Canada

#### **Telephone**

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#### **Email**

Work (*)	james.hare@ad.umanitoba.ca
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Protected when completed

## Professor James Hare

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### Language Skills

Language	Read	Write	Speak	Understand	Peer Review
English	Yes	Yes	Yes	Yes	Yes
French	Yes	No	Yes	Yes	No
Italian	No	No	Yes	Yes	No

### Degrees

- 1992/6 Post-doctorate, Neurobiology & Behavior/Chemical Ecology, Cornell University  
Supervisors: Thomas Eisner, 1992/4 - 1993/8
- 1992/6 Doctorate, Zoology, University of Alberta  
Supervisors: Jan O. Murie, 1987/7 - 1992/3
- 1987/11 Master's Thesis, Zoology, University of Toronto  
Supervisors: Tom M. Alloway, 1985/6 - 1987/7
- 1985/6 Bachelor's Honours, Animal Behaviour, University of Toronto  
Supervisors: Tom M. Alloway, 1981/9 - 1985/6

### Recognitions

- 2014/5 Award for Excellence in Teaching at the 3000/4000 Level  
University of Manitoba Science Students Association  
Prize / Award  
Award given by the University of Manitoba Science Students Association for "excellence in teaching" by a Professor teaching senior courses in the Faculty of Science
- 2014/5 Student's Choice Award (Biological Sciences)  
University of Manitoba Science Students Association  
Prize / Award  
Award given by the University of Manitoba Science Students Association for the "best" Professor in the Department of Biological Sciences
- 2010/5 Students' Teacher Recognition Award for Excellence in University Teaching  
The University of Manitoba  
Prize / Award  
Awarded by University of Manitoba, University Teaching Services, based on selection by Undergraduate student with the highest cumulative grade point average in each Faculty.

### User Profile

Research Specialization Keywords: Animal Communication, Behavioural Ecology, Bioacoustics, Cognitive Ethology, Ground Squirrels, Sociality, Social Parasitism

Research Disciplines: Biology and Related Sciences

Areas of Research: Biological Behavior

Fields of Application: Foundations and Knowledge Acquisition

## Employment

- 2012/7 Professor & Associate Head  
Biological Sciences, Science/ Fort Garry Campus, The University of Manitoba  
Full-time, Professor  
Tenure Status: Tenure  
Conducting Research, Teaching Undergraduate & Graduate Courses, Graduate Student Supervision, Administrative Responsibilities, Other Service.
- 2012/1 - 2012/7 Professor & Acting Head  
Biological Sciences, Science/ Fort Garry Campus, The University of Manitoba  
Full-time, Professor  
Tenure Status: Tenure  
As above.
- 2009/9 - 2012/1 Professor & Associate Head  
Biological Sciences, Science/ Fort Garry Campus, The University of Manitoba  
Full-time, Professor  
Tenure Status: Tenure  
As above.
- 2002/9 - 2009/8 Associate Professor  
Zoology, Science/ Fort Garry Campus, The University of Manitoba  
Full-time, Associate Professor  
Tenure Status: Tenure  
Conducting Research, Teaching Undergraduate & Graduate Courses, Graduate Student Supervision, Other Service.
- 1999/7 - 2002/8 Assistant Professor  
Zoology, Science/ Fort Garry Campus, The University of Manitoba  
Full-time, Assistant Professor  
Tenure Status: Tenure Track  
Conducting Research, Teaching Undergraduate & Graduate Courses, Graduate Student Supervision, Other Service.
- 1998/7 - 1999/7 Associate Professor & Chair  
Zoology, Science, Brandon University  
Full-time, Associate Professor  
Tenure Status: Tenure  
Conducting Research, Teaching Undergraduate Courses, Undergraduate Thesis Student Supervision, Administrative Responsibilities, Other Service.
- 1996/9 - 1998/7 Associate Professor  
Zoology, Science, Brandon University  
Full-time, Associate Professor  
Tenure Status: Tenure  
Conducting Research, Teaching Undergraduate Courses, Undergraduate Thesis Student Supervision, Other Service.
- 1993/8 - 1996/8 Assistant Professor  
Zoology, Science, Brandon University  
Full-time, Assistant Professor  
Tenure Status: Tenure Track  
As above.



## Leaves of Absence and Impact on Research

2013-01-01 - 2013-06-30	Sabbatical, Universita Degli Studi (Palermo) During this 6-month Research Study Leave, I divided my time between service on NSERC Discovery EG 1503, research activities at my home institution, and work with research collaborators at Universita Degli Studi Palermo (2.5 months). This period resulted in increased productivity in terms of publication.
2009-03-28 - 2012-08-31	Other Circumstances, The University of Manitoba On 28 March 2009, a fire broke out in the Duff Roblin Building, which at that time housed 23 Faculty, 11 Staff, 28 Graduate Students, and 7 Undergraduate Research Students from the Department of Biological Sciences. Damage to the building and its contents was extensive, necessitating not only relocation of all personnel and labs, recovery, repair and replacement of equipment, but also complete reconstruction of 3 of the 7 floors and partial reconstruction and restoration on the remaining floors of the building. Not only was my own office and lab displaced 3 times in the course of the fire recovery process, but as Associate Head, I was intimately involved in coordinating relocation, recovery, replacement and reconstruction efforts. Indeed, while we reoccupied the building during the summer of 2012, tasks related to the fire recovery process continue to the present day. In the immediate aftermath of the fire, my research productivity declined precipitously, but is rebounding steadily.

## Research Funding History

### Awarded [n=5]

2014/6 - 2015/5 Principal Applicant	University of Manitoba Faculty Association Release Time Payout for Service as Faculty Association Grievance Officer (for use in support of research expenses outside the context of NSERC DG funding, or to supplement lab infrastructure/HQP training), Contract  <b>Funding Sources:</b> 2014/6 - 2015/5    University of Manitoba Faculty Association Buyout for Service as Faculty Association Grievance Officer Total Funding - 15,066 Portion of Funding Received - 15,066 Funding Competitive?: No
2007/5 - 2015/4 Principal Investigator	Sociality, communication and animal cognitive abilities, Grant  <b>Funding Sources:</b> 2007/5 - 2015/4    Natural Sciences and Engineering Research Council of Canada (NSERC) Discovery Grants Total Funding - 200,160 Portion of Funding Received - 200,160 Funding Competitive?: Yes
2014/2 - 2015/1 Principal Applicant	Hare Graduate Student Field Work at Delta Marsh Manitoba 2014, Grant  <b>Funding Sources:</b> 2014/2 - 2015/1    University of Manitoba Field Work Support Program Total Funding - 5,812 Portion of Funding Received - 5,812 Funding Competitive?: Yes
2014/1 - 2014/12 Principal Applicant	Graduate Enhancement of Tri-Council Support (GETS) funding for graduate student stipend for Andreea Ciobota, Grant

**Funding Sources:**

2014/1 - 2014/12 University of Manitoba  
 Graduate Enhancement of Tri-council Support  
 Total Funding - 7,000  
 Portion of Funding Received - 7,000  
 Funding Competitive?: Yes

: Andreea Ciobota

2014/1 - 2014/12 Graduate Enhancement of Tri-Council Support (GETS) funding for graduate student  
 Principal Applicant stipend for Ellen Pero, Grant

**Funding Sources:**

2014/1 - 2014/12 University of Manitoba  
 Graduate Enhancement of Tri-council Support  
 Total Funding - 7,000  
 Portion of Funding Received - 7,000  
 Funding Competitive?: Yes

: Ellen Pero

**Completed [n=8]**

2013/4 - 2014/3 Northern Scientific Training Program support for Ph.D. Student K.H. Elliott, Grant  
 Co-applicant

**Funding Sources:**

2013/4 - 2014/3 Aboriginal Affairs and Northern Development Canada (AANDC)  
 Northern Scientific Training Program  
 Total Funding - 2,966  
 Portion of Funding Received - 2,966  
 Funding Competitive?: Yes

Co-applicant : Kyle Hamish Elliott

2012/4 - 2013/3 Northern Scientific Training Program support for Ph.D. Student K.H. Elliott, Grant  
 Co-applicant

**Funding Sources:**

2012/4 - 2013/3 Aboriginal Affairs and Northern Development Canada (AANDC)  
 Northern Scientific Training Program  
 Total Funding - 2,885  
 Portion of Funding Received - 2,885  
 Funding Competitive?: Yes

Co-applicant : Kyle Hamish Elliott

2012/3 - 2013/2 Western hognose snake (Heterodon nasicus) Death Feigning, Grant  
 Principal Applicant

**Funding Sources:**

2012/3 - 2013/4 University of Manitoba  
 Field Work Support Program  
 Total Funding - 6,051  
 Portion of Funding Received - 6,051  
 Funding Competitive?: Yes

Co-investigator : Pamela Rutherford

2011/4 - 2012/3 Northern Scientific Training Program support for Ph.D. Student K.H. Elliott, Grant  
 Co-applicant

**Funding Sources:**

2011/4 - 2012/3 Aboriginal Affairs and Northern Development Canada (AANDC)  
 Northern Scientific Training Program  
 Total Funding - 3,243  
 Portion of Funding Received - 3,243  
 Funding Competitive?: Yes

- 2010/4 - 2011/3  
Co-applicant  
Co-applicant : Kyle Hamish Elliott  
Northern Scientific Training Program support for Ph.D. Student K.H. Elliott, Grant  
**Funding Sources:**  
2010/4 - 2011/3     Aboriginal Affairs and Northern Development Canada (AANDC)  
Northern Scientific Training Program  
Total Funding - 3,285  
Portion of Funding Received - 3,285  
Funding Competitive?: Yes
- 2009/4 - 2010/3  
Co-applicant  
Co-applicant : Kyle Hamish Elliott  
Northern Scientific Training Program Support for Ph.D. Student K.H. Elliott & Undergraduate Lauren Bessey, Grant  
**Funding Sources:**  
2009/4 - 2010/3     Aboriginal Affairs and Northern Development Canada (AANDC)  
Northern Scientific Training Program  
Total Funding - 4,031  
Portion of Funding Received - 4,031  
Funding Competitive?: Yes
- 2008/5 - 2009/5  
Principal Investigator  
Co-applicant : Kyle Hamish Elliott; Lauren Bessey  
Infrasonic Mate Attraction in Indian Peafowl (*Pavo cristatus*): An Acoustic Tale?, Grant  
**Funding Sources:**  
2008/5 - 2009/5     University of Manitoba  
University Research Grants Program  
Total Funding - 7,700  
Portion of Funding Received - 7,700  
Funding Competitive?: Yes
- 2008/5 - 2009/5  
Co-investigator  
Azione D – Bando CoRI 2008, Grant  
**Funding Sources:**  
2008/5 - 2009/5     Government of Italy  
CoRI  
Total Funding - 12,000  
Portion of Funding Received - 4,000  
Funding Competitive?: Yes
- Principal Applicant : Maurizio Sarà
- Under Review [n=2]**
- 2015/5 - 2020/4  
Principal Applicant  
Ground squirrel sociality: life history, communication and cognition, Grant  
**Funding Sources:**  
2015/5 - 2020/4     Natural Sciences and Engineering Research Council of Canada (NSERC)  
Discovery Grants  
Total Funding - 208,045  
Portion of Funding Received - 0  
Funding Competitive?: Yes
- 2015/6 - 2016/5  
Collaborator  
Dissertation Research: Arginine Vasopressin and Social Communication in Richardson's Ground Squirrels, Grant

**Funding Sources:**

2015/6 - 2016/5      National Science Foundation (USA)  
 Doctoral Dissertation Improvement Grant  
 Total Funding - 19,370  
 Portion of Funding Received - 0  
 Funding Competitive?: Yes

Co-applicant : Ms. Angela Freeman;

Principal Applicant : Dr. Heather Caldwell

**Student/Postdoctoral Supervision**

- 2014/5 - 2014/8      Kaitlin Downs, Bachelor's (Completed) , University of Manitoba  
 Principal Supervisor Thesis/Project Title: NSERC USRA - Referential alarm communication in Richardson's ground squirrels.  
 Present Position: Education After Degree Student, University of Manitoba
- 2014/5 - 2015/4      Kevin Bairos-Novak, Bachelor's Honours (In Progress) , University of Manitoba  
 Principal Supervisor Student Degree Expected Date: 2015/5  
 Thesis/Project Title: Heritability of stress axis reactivity in Richardson's ground squirrels.  
 Present Position: B.Sc. Hons. Student, University of Manitoba
- 2014/5 - 2014/8      Melanie Fetterly, Bachelor's (In Progress) , University of Manitoba  
 Principal Supervisor Student Degree Expected Date: 2015/5  
 Thesis/Project Title: NSERC USRA - Referential alarm communication in Richardson's ground squirrels.  
 Present Position: B.Sc. Hons. Student, University of Manitoba
- 2014/5 - 2015/4      Taylor Connolly, Bachelor's Honours (In Progress) , University of Manitoba  
 Principal Supervisor Student Degree Expected Date: 2015/5  
 Thesis/Project Title: Breeding synchrony impacts survivorship of juvenile Richardson's ground squirrels.  
 Present Position: B.Sc. Hons. Student, University of Manitoba
- 2014/5 - 2014/8      Jillian St. George, Bachelor's (In Progress) , University of Manitoba  
 Principal Supervisor Student Degree Expected Date: 2016/5  
 Thesis/Project Title: Field Assistant working with M.Sc. student Ellen Pero on Franklin's ground squirrel nest relocations and space use.  
 Present Position: B.Sc. Hons. Student, University of Manitoba
- 2014/1 - 2014/9      Andreea Ciobota, Master's Thesis (Withdrawn) , University of Manitoba  
 Principal Supervisor Thesis/Project Title: Stress and survivorship implications of adult female mortality on juvenile offspring and neighbouring Richardson's ground squirrel colony members.  
 Present Position: Returning to home in Romania
- 2013/9 - 2015/5      Lisa Kalkhoven, Master's Thesis (In Progress) , University of Manitoba  
 Principal Supervisor Student Degree Expected Date: 2015/5  
 Thesis/Project Title: Chemosensory cues stimulating excessive allogrooming in mice (Mus musculus).  
 Present Position: M.Sc. Student, University of Manitoba
- 2013/9 - 2015/12      Ellen Pero, Master's Thesis (In Progress) , University of Manitoba  
 Principal Supervisor Student Degree Expected Date: 2015/12  
 Thesis/Project Title: Franklin's ground squirrel (Poliocitellus franklinii) nest movements and space use.  
 Present Position: M.Sc. Student, University of Manitoba

- 2013/5 - 2014/4  
Principal Supervisor Thomas Wood, Bachelor's Honours (Completed) , University of Manitoba  
Thesis/Project Title: Blue jay (*Cyanocitta cristata*) eavesdropping on the aggressive calls of red squirrels (*Tamiasciurus hudsonicus*).  
Present Position: M.Sc. Applicant, University of Manitoba
- 2013/5 - 2014/4  
Principal Supervisor Garnet Ball, Bachelor's Honours (Completed) , University of Manitoba  
Thesis/Project Title: The effects of litter dynamics on Richardson's ground squirrel (*Urocitellus richardsonii*) juvenile survivorship.  
Present Position: Education After Degree Program, University of Manitoba
- 2013/5 - 2013/12  
Co-Supervisor Calen Ryan, Research Associate (Completed) , University of Manitoba  
Thesis/Project Title: Physiological basis of adaptive sex allocation among Richardson's ground squirrels.  
Present Position: Ph.D. Student, Northwestern University
- 2012/11 - 2012/11  
Principal Supervisor Jenna Vandal, Bachelor's (In Progress) , University of Manitoba  
Thesis/Project Title: Work Study student - coding videotaped tree swallow parent-offspring interactions.  
Present Position: B.Sc. Student, University of Manitoba
- 2012/11 - 2013/3  
Principal Supervisor Camille Glidden, Bachelor's (In Progress) , University of Manitoba  
Thesis/Project Title: Work-study student coding videotaped thick-billed murre parent-offspring interactions  
Present Position: B.Sc. Student, University of Manitoba
- 2012/11 - 2013/3  
Principal Supervisor Kaman Choi, Bachelor's (In Progress) , University of Manitoba  
Thesis/Project Title: Work-study student coding videotaped thick-billed murre parent-offspring interactions  
Present Position: B.Sc. Student, University of Manitoba
- 2012/9 - 2016/5  
Co-Supervisor Angela Freeman, Doctorate (In Progress) , Kent State University  
Student Degree Expected Date: 2016/5  
Thesis/Project Title: Neurobiology of Richardsdon's Ground Squirrel Social Communication.  
Present Position: Ph.D. Candidate, Kent State University
- 2012/5 - 2013/5  
Co-Supervisor Thierry Marchildon-Lavoie, Bachelor's Honours (Completed) , University of Manitoba  
Thesis/Project Title: Antipredator behaviour and refuge use by smooth green snakes.  
Present Position: Conductor, Via Rail Canada
- 2012/5 - 2012/8  
Principal Supervisor Kevin Bairos-Novak, Bachelor's (In Progress) , University of Manitoba  
Student Degree Expected Date: 2015/5  
Thesis/Project Title: NSERC USRA - Receiver integration of information from multiple Richardson's ground squirrel alarm signalers.  
Present Position: B.Sc. Hons. Student, University of Manitoba
- 2012/5 - 2012/8  
Principal Supervisor Thomas Wood, Bachelor's (Completed) , University of Manitoba  
Thesis/Project Title: Senescence in black-legged kittiwakes.  
Present Position: Applying to M.Sc. Program, University of Manitoba
- 2012/5 - 2012/8  
Principal Supervisor Taylor Connolly, Bachelor's (In Progress) , University of Manitoba  
Student Degree Expected Date: 2015/5  
Thesis/Project Title: Faculty of Science Summer Scholarship-Receiver integration of information from multiple Richardson's ground squirrel alarm signalers.  
Present Position: B.Sc. Hons. Student, University of Manitoba
- 2011/11 - 2012/3  
Principal Supervisor Sheena Banh, Bachelor's (Completed) , University of Manitoba  
Thesis/Project Title: Work-study Assistant coding videotaped tree swallow parent-offspring interactions.  
Present Position: Lab Technician, University of Manitoba

- 2011/9 - 2015/8  
Principal Supervisor Jill Newediuk, Master's Thesis (In Progress) , University of Manitoba  
Student Degree Expected Date: 2015/8  
Thesis/Project Title: Ground squirrel burrowing effects on the vertical seed bank distribution impacts pastureland plant communities  
Present Position: M.Sc. Student (on leave), University of Manitoba
- 2011/7 - 2011/8  
Principal Supervisor Ashleigh Westphal, Bachelor's (Completed) , University of Manitoba  
Thesis/Project Title: Field research assistant working on thick-billed murre on Coats Island, Nunavut, with graduate student Kyle Elliott  
Present Position: Traveling in Europe
- 2011/6 - 2011/7  
Principal Supervisor Cole Robson-Hyska, Bachelor's (Completed) , University of Manitoba  
Thesis/Project Title: Temporary Field Assistant live-trapping and marking juvenile Richardson's ground squirrels.  
Present Position: M.Sc. Student, University of Manitoba
- 2011/6 - 2011/7  
Principal Supervisor Holly McCullough, Bachelor's (Completed) , University of Manitoba  
Thesis/Project Title: Temporary Field Assistant live-trapping and marking juvenile Richardson's ground squirrels.  
Present Position: Traveling in South America
- 2011/6 - 2011/8  
Principal Supervisor Gabrielle Macklin, Bachelor's (Completed) , University of Manitoba  
Thesis/Project Title: Field Assistant with Assiniboine Park Zoo Indian Peafowl study of M.Sc. Angela Freeman  
Present Position: Assistant Project Officer, Cardigan Bay Marine Wildlife Centre
- 2010/9 - 2011/2  
Principal Supervisor Holly McCullough, Research Associate (Completed) , University of Manitoba  
Thesis/Project Title: Volunteer Data Coding of Videotaped seabird parent-offspring interactions  
Present Position: Traveling in South America
- 2010/5 - 2010/9  
Principal Supervisor Peter Tarleton, Bachelor's (Completed) , University of Manitoba  
Thesis/Project Title: NSERC USRA - Fine scale effects of Richardson's ground squirrel burrowing activity on plant communities.  
Present Position: Resource Management Officer, Riding Mountain National Park
- 2010/5 - 2012/8  
Principal Supervisor Angela Freeman, Master's Thesis (Completed) , University of Manitoba  
Thesis/Project Title: Infrasonic and Audible Signals in Male Peafowl (*Pavo cristatus*) Mating Displays  
Present Position: Ph.D. Candidate, Kent State University
- 2009/9 - 2013/12  
Co-Supervisor Kyle Elliott, Doctorate (Completed) , University of Manitoba  
Thesis/Project Title: How can birds live long and hard? Patterns in the physiology and behaviour of aging wild birds  
Present Position: Assistant Professor, McGill University
- 2009/5 - 2009/10  
Principal Supervisor Lindsay Skyner, Post-doctorate (Completed) , University of Manitoba  
Thesis/Project Title: Personality variation and stress responses of Richardson's ground squirrels  
Present Position: Assistant Professor, Bay of Plenty Polytechnic, NZ
- 2009/5 - 2010/4  
Principal Supervisor Jill Newediuk, Bachelor's Honours (Completed) , University of Manitoba  
Thesis/Project Title: Effects of Richardson's ground squirrels (*Urocyon richardsonii*) on the quality of cattle forage on Manitoba prairie rangeland.  
Present Position: M.Sc. Student (on leave), University of Manitoba
- 2009/5 - 2009/8  
Principal Supervisor Lauren Bessey, Bachelor's (Completed) , University of Manitoba  
Thesis/Project Title: Field Assistant  
Present Position: Veterinary Student, Western College of Veterinary Medicine
- 2009/4 - 2009/5  
Co-Supervisor Stefano Triolo, Research Associate (Completed) , Università degli Studi di Palermo  
Thesis/Project Title: Field assistance with lesser kestrel/jackdaw research  
Present Position: Pharmaceutical Sales, Shedir Pharma, Sicily

- 2009/1 - 2009/8  
Principal Supervisor Ffion Cassidy, Research Associate (Completed) , University of Manitoba  
Thesis/Project Title: Spectral Analysis of Richardson's Ground Squirrel Alarm Vocalizations  
Present Position: M.Sc. Student, University of Alberta
- 2008/5 - 2009/4  
Co-Supervisor David Yurkowski, Bachelor's Honours (Completed) , University of Manitoba  
Thesis/Project Title: Does size matter? Baculur and testicular size, growth and variation in the ringed seal)  
Present Position: M.Sc. Student, GLIER
- 2008/5 - 2009/4  
Co-Supervisor Sebastian Ibarra, Bachelor's Honours (Completed) , University of Manitoba  
Thesis/Project Title: Vibratory cues of Varroa mites: communication or coincidental byproduct of defecation?  
Present Position: Master's of Pest Management Student, Simon Fraser University
- 2008/5 - 2008/8  
Principal Supervisor Christine Legal, Bachelor's (Completed) , University of Manitoba  
Thesis/Project Title: NSERC USRA - Trial & Error Learning in Trap Rolling Ground Squirrels  
Present Position: Director of Music Ministry, St. Paul's College
- 2008/5 - 2009/4  
Co-Supervisor Laura Gardiner, Bachelor's Honours (Completed) , University of Manitoba  
Thesis/Project Title: Social environment of Richardson's ground squirrels affect their antipredator vigilance and stress response  
Present Position: Resource Management Officer II, Parks Canada, Grasslands National Park
- 2008/5 - 2009/4  
Co-Supervisor Calen Ryan, Bachelor's Honours (Completed) , University of Manitoba  
Thesis/Project Title: Does maternal stress influence the sex ratio of Richardson's ground squirrel litters?  
Present Position: Ph.D. Student, Northwestern University
- 2008/5 - 2009/4  
Principal Supervisor Amy Thompson, Bachelor's Honours (Completed) , University of Manitoba  
Thesis/Project Title: Richardson's ground squirrels track predators by integrating alarm calls from multiple signalers  
Present Position: Reporting Coordinator, Navus Environmental Inc.
- 2006/9 - 2008/5  
Principal Supervisor David Swan, Master's Thesis (Completed) , University of Manitoba  
Thesis/Project Title: Larval Recognition in two host species (Temnothorax longispinosus Roger and Temnothorax ambiguus Emery) of the slave making ant Protomognathus americanus Emery (Hymenoptera: Formicidae)  
Present Position: Ph.D. Candidate, Western University

## Editorial Activities

- 2013/4 - 2016/4 Associate Editor, Current Zoology, Journal
- 2011/7 - 2012/10 Special Issue Editor, Current Zoology - Special Issue on Vertebrate Social Communication, Journal

## International Collaboration Activities

- 2009-02-13 Collaborator/Italy  
Collaborative research on nesting associations between lesser kestrels and jackdaws, exploring interspecific communication and potential fitness payoffs of mixed-species nesting associations. Originally with support from the Italian Government CoRI program (awarded Feb. 2009), I have conducted field work in Italy 3 times since the summer of 2009, and continue to collaborate with Drs. Daniela Campobello and Maurizio Sarà from the University of Palermo in Sicily.

2012-09-04 - Collaborator, United States  
 2016-09-05 Collaborative research with neurophysiologist Dr. Heather Caldwell (Kent State University) exploring the role of Arginine Vasopressin in modulating Richardson's ground squirrel alarm calling, alarm call perception, and social behaviour through co-supervision of PhD student Ms. Angela Freeman. Laboratory components of this research are being performed in Dr. Caldwell's lab at Kent State University, while field work is conducted at my Assiniboine Park Zoo Richardson's ground squirrel site.

## Committee Memberships

2011/3 - 2020/3 Committee Member, Assiniboine Park Zoo Animal Welfare Committee, Assiniboine Park Zoo  
 Invited founding member, responsible for authoring terms of reference for zoo-based committee dealing with animal welfare concerns arising in the context of zoo operations, and continue to serve as a member of that committee evaluating concerns of staff/public/researchers regarding animal welfare.

2008/1 - 2020/1 Committee Member, Sundry Departmental Committees (hiring, promotion, tenure, special seminars, defence, recruitment, social functions), The University of Manitoba  
 Annually serve as member or Chair of  $\geq 1$  faculty/support staff hiring committee, Chair of organizing committee for 2009 Darwin Week events, and service in many capacities on various other committees (Promotion, Tenure, X-mas party, retirement, dedication, graduate seminar award, Evening of Excellence, Information Days, Graduate thesis or candidacy exam Chair) within the university.

2014/6 - 2015/5 Chair, University of Manitoba Faculty Association (UMFA) Grievance Chair, University of Manitoba Faculty Association  
 Appointed Grievance Chair and Member of the Executive of the University of Manitoba Faculty Association.

2006/1 - 2015/1 Committee Member, Institutional Review Board for the Protection of Human Subjects, Kutztown University  
 Review research protocols involving the use of human subjects to ensure compliance with ethics guidelines.

2011/7 - 2014/7 Committee Member, NSERC Discovery Grant EG 1503 Evolution & Ecology, Natural Sciences and Engineering Research Council of Canada (NSERC)  
 Served as member of EG 1503, selecting and identifying potential referees, reviewing NSERC Discovery Grant applications, participating in evaluation of those during annual competition week, and drafting Messages to Applicant where necessary.

2009/7 - 2012/1 Committee Member, Biological Sciences Building Design Group, The University of Manitoba  
 As department Associate Head, represented department at biweekly construction meetings, and with Head coordinated planning and occupancy of all administration/teaching/research spaces in Knowledge Infrastructure Program (KIP) -funded (13.5 million) renovation of former Pharmacy Building as it was given over to the Department of Biological Sciences, joining the Buller Building and Duff Roblin Building in housing our department.

2009/3 - 2011/12 Committee Member, Emergency Organizing Committee - Duff Roblin Fire Response Group, The University of Manitoba  
 As Associate Head, Department of Biological Sciences, appointed member of University-wide committee dealing with the immediate and longer-term aftermath of the 28 March 2009 Duff Roblin Fire.



- 2011/3 - 2011/8 Committee Member, Animal Behavior Society Student Research Grants Awards Committee, Animal Behavior Society  
Invited member of Student Research Grants Committee reviewing and ranking applications for Student Research Grants, the George Barlow Award, the E.O. Wilson Conservation Award and the Developing Nations Award
- 2010/1 - 2011/4 Committee Member, Wilson Ornithological Society Grant Selection Committee, Wilson Ornithological Society  
Two-year appointment to Awards Committee: Evaluated grant applications for the Louis Agassiz Fuertes, George A. Hall, Harold F. Mayfield & Paul A. Stewart Awards.
- 2009/9 - 2010/10 Committee Member, University of Manitoba Faculty Association (UMFA) Collective Agreement Committee, The University of Manitoba  
Served as Faculty Association member on committee advising bargaining team throughout collective bargaining toward a new Collective Agreement between the University Administration and the Faculty Association.
- 2009/9 - 2010/10 Co-chair, University of Manitoba Faculty Association (UMFA) Job Action Committee, The University of Manitoba  
Co-chaired the Faculty Association job action committee, coordinating logistics including establishment of off-campus headquarters, all materials and services necessary for potential job action (a.k.a. strike).
- 2008/9 - 2010/8 Committee Member, NSERC Subcommittee of Faculty of Graduate Studies Scholarships Committee, The University of Manitoba  
Reviewed and ranked applications from graduate students for NSERC PGSM and PGSD scholarships.
- 2007/7 - 2010/6 Committee Member, Faculty of Science Nucleus Tenure Committee, The University of Manitoba  
Evaluated applications for tenure within the Faculty of Science, and with other members, arrived at recommendation to Dean regarding tenure decisions.
- 2009/5 - 2010/4 Committee Member, Assiniboine Park Zoo Re-design Group, Assiniboine Park Zoo  
Invited user representative from the University of Manitoba on the Assiniboine Park Conservancy's Zoo re-design initiatives, and as member of the group that conceived the International Polar Bear Conservation Centre at the Assiniboine Park Zoo.
- 2009/3 - 2009/4 Chair, Biological Sciences Undergraduate Curriculum Committee, The University of Manitoba  
Chair of department's Undergraduate Curriculum Committee responsible for oversight and revisions to the department's undergraduate program, though fire response duties necessitated division of labour, and thus the appointment of a second Associate Head Undergraduate to assume this role.
- 2009/2 - 2009/4 Committee Member, Reappointment Advisory Committee for Dean of Science, The University of Manitoba  
Appointed by Vice-President (Administration) to Committee charged with examining suitability of then current Dean of Science to an additional 5-year appointment as Dean.

## Other Memberships

- 1989-05-01 - 2019-12-31 Member, International Society for Behavioral Ecology  
Professional society promoting research and education in behavioural ecology.
- 1988-09-01 - 2019-12-31 Member, Canadian Society of Zoologists  
Professional Society of Zoologists in Canada promoting education, research and an understanding of animals in their environment.
- 1987-09-01 - 2019-12-31 Member, Sigma Xi  
Scientific Honor Society

1985-09-02 - Member, Animal Behavior Society  
 2019-12-31 Society promoting education and research in the field of Animal Behaviour.

## Presentations

1. (2015). The best of a bad situation: reliable alarm communication among ground squirrels. Center for the Integrative Study of Animal Behavior 22nd Annual Animal Behavior Conference, Bloomington, United States  
 Main Audience: Researcher  
 Invited?: Yes, Keynote?: Yes
2. (2014). Decoding the Chatter: Richardson's Ground Squirrel Alarm Communication. Nature Manitoba Fall Seminars, Winnipeg, Canada  
 Main Audience: General Public  
 Invited?: Yes, Keynote?: Yes
3. (2014). Making the best of a bad situation: reliable information in ground squirrel alarm calls. Department of Biology Seminar, University of Windsor, Windsor, Canada  
 Main Audience: Researcher  
 Invited?: Yes, Keynote?: No
4. (2013). Animal communication. Presentation to Grade 12 Advanced Placement Biology Students at Fort Richmond Collegiate, Winnipeg, Canada  
 Main Audience: General Public  
 Invited?: Yes, Keynote?: No
5. (2013). The best of a bad situation: Reliable information in ground squirrel alarm calls. Biology Department, Lakehead University, Thunder Bay, Canada  
 Main Audience: Researcher  
 Invited?: Yes, Keynote?: No
6. (2013). The best of a bad situation: Reliable information in ground squirrel alarm calls. Invited Plenary Talk at the 24th International Bioacoustics Congress, Pirenopolis, Brazil  
 Main Audience: Researcher  
 Invited?: Yes, Keynote?: Yes
7. Hare invited presenter, but co-authored by \* Freeman, A.. (2013). Peacock train displays: An infrasonic tale. Invited Symposium Presentation at the 24th International Bioacoustics Congress, Pirenopolis, Brazil  
 Main Audience: Researcher  
 Invited?: Yes, Keynote?: No
8. (2013). Studies in behavioural ecology at the University of Manitoba. Presentation to Grade 12 Advanced Placement Biology Students at Fort Richmond Collegiate, Winnipeg, Canada  
 Main Audience: General Public  
 Invited?: Yes, Keynote?: No
9. (2011). Research in behavioural ecology at the University of Manitoba. Presentation to Grade 12 Advanced Placement Biology Students at Fort Richmond Collegiate, Winnipeg, Canada  
 Main Audience: General Public  
 Invited?: Yes, Keynote?: No
10. (2011). Working the BUGS out of – and hopefully into – Sociality. Biology Undergraduate Students Association (BUGS) Research Seminar, Winnipeg, Canada  
 Main Audience: General Public  
 Invited?: Yes, Keynote?: No
11. (2011). Alarm Communication: A Window Into the Mind of the Richardson's Ground Squirrel. Institute of Zoology, Chinese Academy of Sciences, Beijing, China  
 Main Audience: Researcher  
 Invited?: Yes, Keynote?: No

12. (2011). Alarm communication: A window Into the mind of the Richardson's ground squirrel. First Asia-Pacific Conference on Integrative Behavioral Science, Xian, China  
Main Audience: Researcher  
Invited?: Yes, Keynote?: Yes
13. (2010). Animal Communication Research. Presentation for Grade 12 Advanced Placement Biology Students at Fort Richmond Collegiate, Winnipeg, Canada  
Main Audience: General Public  
Invited?: Yes, Keynote?: No
14. (2010). Alarm communication - a window into the mind of Richardson's ground squirrels. Department of Biological Sciences, University of Manitoba, Winnipeg, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
15. Co-presented with Anderson, J.. (2010). Duff Roblin Fire: Lessons Learned. WHMIS Coordinators Meeting, University of Winnipeg, Winnipeg, Canada  
Main Audience: Knowledge User  
Invited?: Yes, Keynote?: No
16. (2010). Ground squirrel alarm communication. 44th Annual Prairie Universities Biological Symposium/ Harold E. Welch Plenary Lecture, Brandon, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: Yes
17. Co-presented with Anderson, J.. (2010). Duff Roblin Fire: Lessons Learned. WHMIS Coordinators Meeting, University of Manitoba, Winnipeg, Canada  
Main Audience: Knowledge User  
Invited?: Yes, Keynote?: No
18. (2010). Alarm communication - a window into the mind of Richardson's ground squirrels. Department of Biology, University of Winnipeg, Winnipeg, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
19. (2009). Research in the biological sciences at the University of Manitoba. Presentation to Grade 12 Advanced Placement Biology Students at Fort Richmond Collegiate, Winnipeg, Canada  
Main Audience: General Public  
Invited?: Yes, Keynote?: No
20. Co-presented with Anderson, J.. (2009). Duff Roblin Building Fire - Responses and Roles in Recovery. Disaster Recovery Information Exchange (DRIE) Central Region Conference, Winnipeg, Canada  
Main Audience: Knowledge User  
Invited?: Yes, Keynote?: Yes
21. (2009). Alarm communication - a window into the mind of Richardson's ground squirrels. Dipartimento di Biologia Animale, University of Palermo, Palermo, Italy  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
22. (2009). How can understanding behaviour inform conservation?. Dipartimento di Biologia Animale, University of Palermo, Palermo, Italy  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
23. (2009). Alarm communication - A window into the mind of Richardson's ground squirrels. Department of Biological Sciences, University of Lethbridge, Lethbridge, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
24. (2009). Alarm communication - A window Into the mind of Richardson's ground squirrels. Department of Entomology, University of Manitoba, Winnipeg, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No

25. (2008). Animal Cognitive Abilities. Carmen Active Living Centre, Carmen, Canada  
Main Audience: General Public  
Invited?: Yes, Keynote?: No
26. (2008). Ground squirrel alarm communication: for whom the squirrel squeals!. 4th Annual Graduate Student Symposium, College of Biological Sciences, University of Guelph, Guelph, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: Yes

## Broadcast Interviews

- 2014-06-23 - Why squirrels chew wires and consequences of that chewing, Up to Speed, CBC Radio  
2014-06-23 One Manitoba
- 2014-06-13 - Ecological role of ground squirrels and humane methods of ground squirrel control,  
2014-06-13 CBC Television Evening News, CBC Television Winnipeg
- 2014-06-10 - Ecological role of ground squirrels and humane methods of ground squirrel control,  
2014-06-10 Radio Noon, CBC Radio One Manitoba
- 2014-03-27 - Contagious communication in black-tailed prairie dogs (results from our Proc B paper),  
2014-03-27 Outrageous Acts of Science, Discovery Television USA
- 2014-03-25 - Contagious communication in black-tailed prairie dogs (results from our Proc B paper),  
2014-03-25 You Have Been Warned, Discovery Television UK
- 2014-01-18 - Contagious communication in black-tailed prairie dogs (results from our Proc B paper),  
2014-01-18 Quirks and Quarks, CBC Radio One National
- 2014-01-15 - Contagious communication in black-tailed prairie dogs (results from our Proc B paper),  
2014-01-15 The Story From Here, CBC Radio One National
- 2014-01-10 - Contagious communication in black-tailed prairie dogs (results from our Proc B paper),  
2014-01-10 Fox Television News, Fox Television USA
- 2014-01-09 - Contagious communication in black-tailed prairie dogs (results from our Proc B paper),  
2014-01-09 CTV Television Morning News, CTV Television Winnipeg
- 2014-01-08 - Contagious communication in black-tailed prairie dogs (results from our Proc B paper),  
2014-01-08 Afternoon Drive, CJOB Radio Winnipeg
- 2014-01-08 - Contagious communication in black-tailed prairie dogs (results from our Proc B paper),  
2014-01-08 Information Radio, CBC Radio One Manitoba
- 2014-01-08 - Contagious communication in black-tailed prairie dogs (results from our Proc B paper),  
2014-01-08 CTV Television Winnipeg Evening News, CTV Winnipeg
- 2014-01-08 - Contagious communication in black-tailed prairie dogs (results from our Proc B paper),  
2014-01-08 CBC Television Winnipeg Evening News, CBC Television Winnipeg
- 2014-01-08 - Contagious communication in black-tailed prairie dogs (results from our Proc B paper),  
2014-01-08 Global Television Evening News Winnipeg, Global Television Winnipeg
- 2013-12-05 - Tippy the fainting squirrel (YouTube viral video and reasons why squirrel falls over),  
2013-12-05 CBC Television Evening News, CBC
- 2012-11-06 - Deer mice as household pests, Information Radio, CBC Radio One Manitoba  
2012-11-06
- 2012-11-06 - Deer mice as household pests, CBC Television News Winnipeg, CBC  
2012-11-06
- 2012-01-25 - My lab's research on ground squirrel communication and cognitive abilities, The Scott  
2012-01-25 Thompson Show, CHML AM900 Radio Hamilton ON
- 2012-01-21 - Animal cognitive abilities - my lab's findings for Richardson's ground squirrels, The  
2012-01-21 Nature of Things (Episode- Mysteries of the Animal Mind), CBC Television

- 2011-01-07 - Simultaneous mass die-offs of birds, fish and crabs, APTN Nightly Television News,  
2011-01-07 Aboriginal Peoples Television Network (APTN)
- 2010-10-27 - Human Adultery (based on results of our Evolutionary Psychology Paper), KTLA  
2010-10-27 Television News, KTLA Television, Los Angeles, CA
- 2010-07-07 - City of Winnipeg proposal to poison Richardson's ground squirrels in St. James  
2010-07-07 industrial district, Information Radio, CBC Radio One Manitoba
- 2009-12-15 - How animals cope with cold weather, Up to Speed, CBC Radio One Manitoba  
2009-12-15
- 2008-12-18 - Reasons why tree squirrels chew on LED Christmas bulbs, Up to Speed, CBC Radio  
2008-12-31 One Manitoba

## Text Interviews

- 2014-03-26 Contagious communication by black-tailed prairie dogs (results from our Proc. B paper),  
Canadian Geographic Magazine (April 2014 issue, and see web site coverage: <http://www.canadiangeographic.ca/blog/posting.asp?ID=1081>)
- 2014-01-24 Contagious communication by black-tailed prairie dogs and the value of ground  
squirrel research, The Western Producer (and see web version at: <http://www.producer.com/2014/01/prairie-dog-communication-attracting-new-interpretations/>)
- 2014-01-11 Contagious communication by black-tailed prairie dogs (results from our Proc. B.  
paper), featured on ≥50 web sites from 6-11 Jan. including: sciencemagazine.org,  
discovery.com, bbc.co.uk, nationalgeographic.com, scientificamerican.com,  
livescience.com, esciencenews.com, scienceorf.at, Sigma Xi Smartbrief, Huffington  
Post, NY Times, etc.
- 2014-01-09 Contagious communication by black-tailed prairie dogs (results from our Proc. B paper),  
Multiple newspapers worldwide including the NY Times (USA), The Independent (UK),  
The Daily Mail (UK), Hagenbeck (Germany), Winnipeg Free Press (Canada)
- 2012-11-06 Mice as household pests, CBC web site (<http://www.cbc.ca/news/canada/manitoba/story/2012/11/06/mb-mice-infestation-million-dollar-home-winnipeg.html>)
- 2012-07-27 Reasons for burgeoning city rabbit population, Winnipeg Free Press
- 2012-07-02 Aging and senescence in seabirds (work of Ph.D. student K.H. Elliott), Multiple web  
sites: Phys.org (<http://phys.org/news/2012-07-seabirds-hard.html>) Science News ([http://www.upi.com/Science\\_News/2012/07/03/Seabirds-studied-for-clues-to-human-aging/UPI-44731341350213/](http://www.upi.com/Science_News/2012/07/03/Seabirds-studied-for-clues-to-human-aging/UPI-44731341350213/)) Sciencecodex, Sciencedaily, Discover & others
- 2012-06-18 Infrasound in peacock train displays (results from Animal Behaviour paper), Multiple  
web sites: Science News ([http://www.sciencenews.org/view/generic/id/341606/title/Peacocks\\_ruffle\\_feathers%2C\\_make\\_a\\_rumble](http://www.sciencenews.org/view/generic/id/341606/title/Peacocks_ruffle_feathers%2C_make_a_rumble)) Sigma Xi SmartBrief, Science Bulletin,  
Science Illustrated, Winnipeg Free Press, AAAS Science Update & many others
- 2012-01-26 Animal cognitive abilities, Canadian Newsblog web site (see: <http://canadiannewsblog.blogspot.com/2012/01/mysteries-of-animal-mind.html>)
- 2011-12-22 Mutual benefits of avian mixed-species nesting associations (results from our  
Behav. Ecol. paper), Science Nordic web site (<http://www.forskning.no/artikler/2011/desember/308322>)
- 2011-12-20 Mutual benefits of avian mixed-species nesting associations (results from our Behav.  
Ecol. paper), BBC Nature web site (<http://www.bbc.co.uk/nature/16249006>)
- 2011-06-11 Evolutionary basis of adultery (results from our Evolutionary Psychology paper on  
mating preferences of pair-bonded individuals), Winnipeg Free Press Newspaper

2010-10-27	Adultery Website Reveals Human Nature (results from our Evolutionary Psychology paper on human mate preferences of pair-bonded individuals), LiveScience web site ( <a href="http://www.livescience.com/culture/adultery-website-infidelity-what-women-men-want-101027.html">http://www.livescience.com/culture/adultery-website-infidelity-what-women-men-want-101027.html</a> )
2010-06-04	Comment on Voigt-Heucke et al. discovery of dual function (echolocation/social identification) calls in bats, New Scientist
2010-01-01	Ground Squirrel Ultrasonic Alarm Calls (results from our Nature and CJZ papers), Nasty, Brutish and Short – The Quirks and Quarks Guide To Animal Sex and Other Weird Behaviour
2009-11-25	Science as a Process and how this pertains to conflict between evolutionists and creationists, The Manitoban (UofM Student Newspaper)
2009-09-29	Competition between Eastern gray squirrels and North American red squirrels, Winnipeg Free Press
2009-06-18	Comment on Siemers et al. discovery of shrew echolocation in their Biology Letters paper, Discovery News Online ( <a href="http://dsc.discovery.com/news/2009/06/18/shrews-echolocation.html">http://dsc.discovery.com/news/2009/06/18/shrews-echolocation.html</a> )
2009-05-08	Comment on Con Slobodchikoff's discovery of communication of information regarding colour in Gunnison's prairie dog alarm calls, Article in Science 324: 699
2009-01-31	Significance of Charles Darwin's work to the biological sciences, Winnipeg Free Press
2008-11-12	The Value of Ground Squirrel Research, Article entitled "You are now entering gopher country" in University of Manitoba campus newspaper "The Manitoban"
2008-07-02	Ultrasonic vocalizations of Richardson's ground squirrels (our results from Nature and CJZ), Winnipeg Sun Newspaper
2008-06-15	Prey detection by water shrews (our results from PNAS), Journal of Experimental Biology - Outside JEB (see DOI 10.1242/jeb.010983)
2008-03-31	Prey detection by water shrews (our results from PNAS), Natural History Magazine - Article by Co-author Ken Catania (see: <a href="http://www.naturalhistorymag.com/features/02941/no-taming-the-shrew">http://www.naturalhistorymag.com/features/02941/no-taming-the-shrew</a> )
2008-02-29	Recording of Steller's Sea Eagle Vocalizations, Article "Sea Eagle Calls for Science" in Canadian Association of Zoos and Aquaria newsletter
2008-02-23	Coevolution of slave-making ants and their hosts, scienceline.org
2008-02-07	Prey detection by water shrews (our results from PNAS), Reported on some 400 different science-based web sites as documented by co-author Ken Catania @ Vanderbilt University (see: <a href="http://www.vanderbilt.edu/exploration/stories/watershrew.html">http://www.vanderbilt.edu/exploration/stories/watershrew.html</a> )
2008-02-01	Recording of Steller's Sea Eagle Vocalizations, Winnipeg Free Press Winnipeg Sun

## Publications

### Journal Articles

1. \* Freeman, A.R. and Hare, J.F. (2014). Infrasound in mating displays: a peacock's tale (ANBEH-D-14-00461R2; Minor Revision Requested 1 Dec. 2014). *Animal Behaviour*.  
Revision Requested  
Refereed?: Yes, Open Access?: No
2. \* Elliott, K.H., Chivers, L.S., \* Bessey, L., Gaston, A.J., Hatch, S., Kato, A., Osborne, O., Ropert-Coudert, Y., Speakman, J.R., and Hare, J.F. (2014). Windscaapes shape seabird instantaneous energy costs but adult behavior buffers impact on offspring. *Movement Ecology*. 2: 17.  
Published  
Refereed?: Yes, Open Access?: Yes



3. \* Elliott, K.H., O'Reilly, K.M., Hatch, S.A., Gaston, A.J., Hare, J.F. and Anderson, W.G. (2014). The prudent parent meets old age: a high stress response in very old seabirds supports the terminal restraint hypothesis.. *Hormones and Behavior*. 66: 828-837.  
Published  
Refereed?: Yes, Open Access?: No
4. Campobello, D., Hare, J.F., and Sarà, M. (2014). Interspecific interactions in social communities: expanded multilevel social selection analysis reveals fitness consequences of heterospecific social phenotypes (MS 14-0465.R1; Revision Requested 25 Sept 2014; Re-submitted 27 Nov. 2014). *Evolution*.  
Revision Requested  
Refereed?: Yes, Open Access?: No
5. \* Ryan, C.P., Anderson, W.G., Berkvens, C., and Hare, J.F. (2014). Maternal gestational cortisol and testosterone are associated with trade offs in offspring sex and number in a free-living rodent (*Urocitellus richardsonii*) (doi:10.1371/journal.pone.0111052). *PLoSOne*. 9(10): e111052.  
Published  
Refereed?: Yes, Open Access?: Yes
6. \* Elliott, K.H., Hare, J.F., Le Vaillant, M., Gaston, A.J., Ropert-Coudert, Y., and Anderson, W.G. (2014). Ageing gracefully: physiology but not behaviour declines with age in a diving seabird. *Functional Ecology*. DOI: 10.1111/1365-24  
Published  
Refereed?: Yes, Open Access?: No
7. \* Clary, D., \* Skyner, L.J., \* Ryan, C.P., \* Gardiner, L.E., Anderson, W.G., and Hare, J.F. (2014). Shyness-Boldness, but not Exploration, Predicts Glucocorticoid Stress Response in Richardson's Ground Squirrels (*Urocitellus richardsonii*). *Ethology*. 120(11): 1101-1109.  
Published  
Refereed?: Yes, Open Access?: No
8. \* Wood, T.J. and Hare, J.F. (2014). Blue jays (*Cyanocitta cristata*) do not spontaneously eavesdrop on red squirrel (*Tamiasciurus hudsonicus*) squeals to locate food (Submitted 30 April 2014; decision pending). *PMuser*.  
Submitted  
Refereed?: Yes, Open Access?: Yes
9. Hare, J.F., \* Ryan, C.P., Enright, C., \* Gardiner, L.E., \* Skyner, L.J., Berkvens, C.N, and Anderson, W.G. (2014). Validation of a radioimmunoassay-based fecal corticosteroid assay for Richardson's ground squirrels (*Urocitellus richardsonii*). *Current Zoology*. 60(5): 591-601.  
Published  
Refereed?: Yes, Open Access?: Yes
10. Hare, J.F., Campbell, K.L. and \* Senkiw, R.W. (2014). Catch the wave: Prairie dogs assess neighbours' awareness using contagious displays. *Proceedings of the Royal Society B*. 281(1777): 2013215.  
Published  
Refereed?: Yes, Open Access?: No
11. \* Elliott, K.H., Le Vaillant, M., Kato, A., Gaston, A.J., Ropert-Coudert, Y., Hare, J.F., Speakman, J.R. and Croll, D. (2014). Age-related variation in energy expenditure in a long-lived bird within the envelope of an energy ceiling. *Journal of Animal Ecology*. 83(1): 136-146.  
Published  
Refereed?: Yes, Open Access?: No
12. \* Newediuk, J.J., Waters, I. and Hare, J.F. (2013). Aspen Parkland Pasture Plant Community Improved by Richardson's Ground Squirrel (*Urocitellus richardsonii*) Activity. *Canadian Field-Naturalist*.  
Revision Requested  
Refereed?: Yes, Open Access?: No

13. \* Elliott, K.H., Welcker, J., Gaston, A.J., Hatch, S.A., Palace, V., Hare, J.F., Speakman, J.R. and Anderson, W.G. (2013). Thyroid hormones correlate with resting metabolic rate, not daily energy expenditure, in two charadriiform seabirds. *Biology Open*. 2(6): 580-586.  
Published  
Refereed?: Yes, Open Access?: Yes
14. \* Stoesz, B.M., Hare, J.F., and Snow, W.M. (2013). Neurophysiological mechanisms underlying affiliative social behaviour: Insights from comparative research. *Neuroscience and Biobehavioral Reviews*. 37(2): 123-132.  
Published  
Refereed?: Yes, Open Access?: No
15. Hare, J.F. (2012). Vertebrate social communication: ecological and evolutionary insights from social signals. *Current Zoology*. 58(5): 677-679.  
Published  
Refereed?: Yes, Open Access?: Yes
16. Hare, J.F. and \* Warkentin, K.J. (2012). The song remains the same: juvenile Richardson's ground squirrels do not respond differentially to mother's or colony member's alarm calls. *Current Zoology*. 58(5): 773-780.  
Published  
Refereed?: Yes, Open Access?: Yes
17. Zubair, S., Peake, S.J., Hare, J.F. and Anderson, W.G. (2012). The effect of temperature and substrate on the development of the cortisol stress response in the lake sturgeon, *Acipenser fulvescens*, Rafinesque (1817). *Environmental Biology of Fishes*. 93(4): 577-587.  
Published  
Refereed?: Yes, Open Access?: No
18. Campobello, D., Sarà, M. and Hare, J.F. (2012). Under my wing: lesser kestrels and jackdaws derive reciprocal benefits in mixed-species colonies. *Behavioral Ecology*. 23(2): 425-433.  
Published  
Refereed?: No, Open Access?: No
19. \* Ryan, C.P., Anderson, W.G., \* Gardiner, L.E., and Hare, J.F. (2012). Stress-induced sex ratios in ground squirrels: support for a mechanistic hypothesis. *Behavioral Ecology*. 23(1): 160-167.  
Published  
Refereed?: Yes, Open Access?: No
20. \* Swan, D.C. and Hare, J.F. (2012). Larval recognition by *Temnothorax longispinosus* and *T. ambiguus* hosts of the slave making ant *Protomognathus americanus* (Hymenoptera: Formicidae) revisited: colony level referent ensures conspecific preference. *Insectes Sociaux*. 59(4): 511-517.  
Published  
Refereed?: Yes, Open Access?: No
21. \* Freeman, A.R. and Hare, J.F. (2011). Infrasound in the flutter-jump display of Capercaillie (*Tetrao urogallus*): signal or artefact?. *Journal of Ornithology*. 152(3): 815-816.  
Published  
Refereed?: Yes, Open Access?: No
22. \* Kelly, T.C. and Hare, J.F. (2010). Pair-bonded humans conform to sexual stereotypes in web-based advertisements for extra-marital partners. *Evolutionary Psychology*. 8(4): 561-572.  
Published  
Refereed?: Yes, Open Access?: No
23. \* Thompson, A.B. and Hare, J.F. (2010). Neighbourhood watch: multiple alarm callers communicate directional predator movement in Richardson's ground squirrels, *Spermophilus richardsonii*. *Animal Behaviour*. 80(2): 269-275.  
Published  
Refereed?: Yes



24. \* Jameson, J.W. and Hare, J.F. (2009). Group specific signatures in the echolocation calls of female little brown bats (*Myotis lucifugus*) are not an artefact of clutter at the roost entrance. *Acta Chiropterologica*. 11(1): 163-172.  
Published  
Refereed?: Yes, Open Access?: No
25. \* Swan, D.C. and Hare, J.F. (2008). Signaler and receiver ages do not affect responses to Richardson's ground squirrel (*Spermophilus richardsonii*) alarm calls. *Journal of Mammalogy*. 89(4): 889-894.  
Published  
Refereed?: Yes, Open Access?: No
26. \* Swan, D.C. and Hare, J.F. (2008). The first cut is the deepest: primary syllables of Richardson's ground squirrel (*Spermophilus richardsonii*) repeated calls alert receivers. *Animal Behaviour*. 76(1): 47-54.  
Published  
Refereed?: Yes
27. \* Sloan, J.L. and Hare, J.F. (2008). The more the scarier: adult Richardson's ground squirrels (*Spermophilus richardsonii*) assess response urgency via the number of alarm signalers. *Ethology*. 114(5): 436-443.  
Published  
Refereed?: Yes, Open Access?: No
28. Catania, K.C., Hare, J.F. and Campbell, K.L. (2008). Water shrews detect movement, shape, and smell to find prey underwater. *Proceedings of the National Academy of Sciences USA*. 105(2): 571-576.  
Published  
Refereed?: Yes, Open Access?: No

## Manuals

1. Hare, J.F. (2013). The Norton Animal Behavior DVD. 2nd(1): 85.  
Published, W.W. Norton & Company Inc.
2. Hare, J.F. (2009). The Norton Animal Behavior DVD. 1st(1): 82.  
Published, W.W. Norton & Company Inc.
3. Hare, J.F. (2008). PI-Directed Wildlife Training (my training outline published on University of Manitoba Animal Care web site as template for other researchers; <http://umanitoba.ca/research/orec/media/PI-DirectedTrainingMarch-12.pdf>). : 7.  
Published

## Conference Publications

1. \* St. George, J., Pero, E. and Hare, J.F. (2014). Traveling with kids: why do Franklin's ground squirrels move nests?. University of Manitoba Undergraduate Research Poster Competition, Winnipeg, Canada, 2014-10-30  
Poster  
Published  
Refereed?: No, Invited?: No
2. \* Bairos-Novak, K. and Hare, J.F. (2014). Like mother, like daughter: Inheritance of Richardson's ground squirrel (*Urocyon richardsonii*) stress responses. University of Manitoba Undergraduate Research Poster Competition, Winnipeg, Canada, 2014-10-30  
Poster  
Published  
Refereed?: No, Invited?: No

3. Hare, J.F., \* Connolly, T. and \* Bairos-Novak, K. (2014). Richardson's ground squirrels integrate information from multiple alarm callers to locate predators. 51st Annual Meeting of the Animal Behavior Society, Princeton, United States, 2014-08-09  
Abstract  
Published  
Refereed?: Yes, Invited?: No
4. \* Elliott, K.H., Anderson, W.G. and Hare, J.F. (2014). Patterns of aging in two long-lived seabirds: What do they tell us about processes?. Genomes to Biomes: First Joint Meeting of the CSEE, CSZ & SCL, Montreal, Canada, 2014-05-29  
Abstract  
Published  
Refereed?: No, Invited?: No
5. \* Pero, E. and Hare, J.F. (2014). Nest relocations by Franklin's ground squirrels (*Poliocitellus franklinii*). Prairie Universities Biological Symposium, Regina, Canada, 2014-02-22  
Abstract  
Published  
Refereed?: No, Invited?: No
6. Campobello, D., Hare, J.F. and Sarà, M. (2013). Nest attendance of conspecifics and heterospecifics as social phenotypes affecting breeding lesser kestrels *Falco naumanni*. Convegno Italiano di Ornitologia (Italian Ornithology Congress), Trento, Italy, 2013-09-11  
Abstract  
Published  
Refereed?: Yes, Invited?: No
7. \* Elliott, K.H., Anderson, W.G., Hare, J.F., Gaston, A.J. and Hatch, S.A. (2013). The prudent parent meets old age: constraint and restraint in senescing seabirds. Society of Canadian Ornithologists, Winnipeg, Canada, 2013-08-13  
Abstract  
Published  
Refereed?: No, Invited?: No
8. Campobello, D., Hare, J.F. and Sarà, M. (2013). Neighbour dearest: colonial lesser kestrels (*Falco naumanni*) benefit from nest attendance of neighbouring jackdaws (*Corvus monedula*). European Ornithological Union, Norwich, United Kingdom, 2013-08-23  
Poster  
Published  
Refereed?: Yes, Invited?: No
9. \* Newediuk, J.J. and Hare, J.F. (2013). Richardson's ground squirrel (*Urocitellus richardsonii*) mound soil conditions influence plant growth and germination. Prairie Universities Biological Symposium, Winnipeg, Canada, 2013-02-21  
Abstract  
Published  
Refereed?: No, Invited?: No
10. \* Elliott, K.H., Anderson, W.G., Hare, J.F. and Gaston A.J. (2012). Senescence in Arctic birds. ArcticNet Scientific Meeting, Vancouver, Canada, 2012-12-11  
Abstract  
Published  
Refereed?: No, Invited?: No
11. Campobello, D., Hare, J.F. and Sarà, M. (2012). Intra- and inter-specific social selection of vigilance phenotypes in breeding colonies of lesser kestrels and jackdaws - Friends With Benefits?. 14th International Behavioral Ecology Congress, Lund, Sweden, 2012-08-12  
Poster  
Published  
Refereed?: Yes, Invited?: No

12. \* Elliott, K.H., Gaston, A.J., Hare, J.F. and Ropert-Coudert, Y. (2012). Diving into old age: senescence in swimming seabirds. Society for Experimental Biology, Salzburg, Austria, 2013-07-02  
Abstract  
Published  
Refereed?: Yes, Invited?: Yes
13. \* Freeman, A.R. and Hare, J.F. (2012). Acoustic properties and signals of Peacock tail displays: How low can they go?. 49th Annual Meeting of the Animal Behavior Society, Albuquerque, United States, 2012-06-09  
Abstract  
Published  
Refereed?: Yes, Invited?: No
14. Campobello, D., Sarà, M. and Hare, J.F. (2011). Vigilance and antipredator responses of lesser kestrels (*Falco naumanni*) and jackdaws (*Corvus monedula*) nesting in single- versus mixed-species colonies. Convegno Italiano di Ornitologia (Italian Ornithology Congress), Cervia, Italy, 2011-09-22  
Abstract  
Published  
Refereed?: Yes, Invited?: No
15. \* Freeman, A.R. and Hare, J.F. (2011). Shiver me feathers: Infrasound and Indian Peafowl. Prairie Universities Biological Symposium, Saskatoon, Canada, 2011-02-24  
Abstract  
Published  
Refereed?: No, Invited?: No
16. \* Newediuk, J., Waters, I. and Hare, J.F. (2010). Effects of Richardson's ground squirrels (*Spermophilus richardsonii*) on the quality of cattle forage on prairie rangeland in Manitoba. 5th Annual Undergraduate Student Research Poster Competition, Winnipeg, Canada, 2010-11-05  
Poster  
Published  
Refereed?: No, Invited?: No
17. \* Newediuk, J., Waters, I. and Hare, J.F. (2010). Effects of Richardson's ground squirrels (*Spermophilus richardsonii*) on the quality of cattle forage on prairie rangeland in Manitoba. Manitoba Association of Plant Biologists Annual Scientific Meeting, Winnipeg, Canada, 2010-11-27  
Poster  
Published  
Refereed?: No, Invited?: No
18. Campobello, D., Hare, J.F. and Sarà, M. (2010). The choice of neighbour: cooperation or conflict between nesting lesser kestrels (*Falco naumanni*) and jackdaws (*Corvus monedula*)?. European Conference on Behavioural Biology, Ferrara, , 2010-07-16  
Abstract  
Published  
Refereed?: Yes, Invited?: No
19. \* Ryan, C., Anderson, W.G. and Hare, J.F. (2010). Struggling mothers, strong sons: Optimization and adaptive sex allocation in *Spermophilus richardsonii*. 49th Annual Meeting of the Canadian Society of Zoologists, Vancouver, Canada, 2010-05-17  
Abstract  
Published  
Refereed?: No, Invited?: No
20. \* Ibarra, S., Currie, R. and Hare, J.F. (2010). *Varroa destructor* defecatory behaviour: a preliminary study on the role of the auditory signal. Prairie Universities Biological Symposium, Brandon, Canada, 2010-02-18  
Abstract  
Published  
Refereed?: No, Invited?: No

21. \* Gardiner, L.E., Anderson, W.G. and Hare, J.F. (2010). How does social environment affect stress and vigilance behaviour in Richardson's ground squirrels (*Spermophilus richardsonii*)?. Prairie Universities Biological Symposium, Brandon, Canada, 2010-02-18  
Poster  
Published  
Refereed?: No, Invited?: No
22. \* Thompson, A.B. and Hare, J.F. (2009). Do Richardson's ground squirrels (*Spermophilus richardsonii*) use multiple callers to track predator movement?. UBC Rising Stars of Research Undergraduate Poster Competition, Vancouver, Canada, 2009-08-22  
Poster  
Published  
Refereed?: Yes, Invited?: No
23. \* Thompson, A.B. and Hare, J.F. (2009). Do Richardson's ground squirrels (*Spermophilus richardsonii*) use multiple callers to track predator movement?. Prairie Universities Biological Symposium, Lethbridge, Canada, 2009-02-19  
Poster  
Published  
Refereed?: No, Invited?: No
24. Hare, J.F. and \* Senkiw, R.W. (2008). Jump yipping prairie dogs: contagious communication tests neighbors' vigilance. 12th International Behavioral Ecology Congress, Ithaca, United States, 2008-08-09  
Abstract  
Published  
Refereed?: Yes, Invited?: No

## CURRICULUM VITAE

### PERSONAL DATA:

**NAME:** Erwin HUEBNER

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Work: Department of Biological Sciences  
University of Manitoba  
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Phone 204: 474-6304,  
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### EDUCATIONAL TRAINING:

#### **Post-doctoral Training McGill University 1970 - 1972**

Post-doctoral Fellow, September 1970 to December 1972 at McGill Univ., Institute of Parasitology, Lab of Dr. K.G. Davey, Director (Currently Retired Emeritus VP Research York University)

PDF Research: Reproductive Endocrinology: Endocrine control of oogenesis in the insect Rhodnius, the Vinchuca or kissing bug. Antigonadotropins in Rhodnius prolixus. Ultrastructure of Oogenesis and the female reproductive tract of the viviparous insect Glossina austeni, the Tsetse fly.

Teaching: Six lectures in Parasitology 601 - Topics in Parasitology and a number of presentations in the Institute seminar series.

#### **Postgraduate Training 1965 - 1970**

##### **PhD University of Massachusetts, Amherst, Mass., USA**

Advisor: Dr. Everett Anderson, Dept. of Zoology, U Mass (currently The James Stillman Professor of Comparative Anatomy, Dept. of Cell Biology, Harvard Medical School)

Thesis Research: Major interest in cell biology and development, oogenesis and germ tissue compartmentalization.

Thesis Title: Cytology of the female reproductive system of Rhodnius prolixus: A normal and an experimental analysis.

Other research: Marine developmental biology of invertebrates, with in depth study of oogenesis and early development of the polychaetous annelid Diopatra cuprea.

Comparative invertebrate oogenesis research primarily was done at the Marine Biological Laboratory, Woods Hole, Massachusetts 1966-1970.

### **Undergraduate Training 1961 – 1965**

#### **BSc (Hon) - University of Alberta, Edmonton**

Research project: Laboratory and field study of the life cycle of the acanthocephalan Polymorphus.

Summer research: As an undergraduate research assistant for Dr. J.C.Holmes (Currently retired). Field and lab parasitology research at the University of Alberta Biological Station, Gorge Creek, Sheep River Turner Valley, Alberta. May - Sept 1964, May - Aug. 1965

(1) Seasonal and altitudinal variation in the parasite fauna of amphibians, (2) Life cycle work on the cestodes of spruce grouse, blue grouse and ruffed grouse.

#### **Training courses and workshops taken since on staff in Manitoba:**

- 1997 U of Manitoba, University Teaching Services Workshops: (1) Design and Production of Computer Based Courses; (2) Educational Uses of the WWW.
- 1993 Educational workshop " Use of Computers and Video microscopy in teaching cell biology. (Satellite event of Am.Soc.Cell.Biol. Conf. New Orleans). Hands on workshop limited to about 25 participants.
- 1992 Educational Workshop "Fluorescence and Immunological Techniques in Cell Biology" (Satellite event of Am. Soc.Cell Biol. Conf. Denver, Colorado). approx. 50 participants.
- In situ Hybridization Workshop ASCB 1989 Jan29 San Fran
- 1988 Hybridocytochemistry course on in-situ hybridization methods at the Boerhave Institute of the Univ. of Leiden. This course had 17 participants (from a number of European countries). The course director was Professor Dr.M. van der Ploeg. Was an intensive hands-on course (all day sessions).
- 1980 Analytical and Quantitative Light Microscopy course at Marine Biological Laboratory, Woods Hole, Massachusetts, Drs. S. Inoue (in charge) with the world's leaders in microscopy involved for example E.Salmon, G.Ellis, L.Taylor and many company experts such as Ernst Keller (Zeiss). An intensive 10 day course with 3-4 hours of lectures and 8 or more hours of lab each day. An exhausting but stimulating experience course that is world renowned.

#### **Employment Record:**

##### **Faculty Positions**

- Acting Associate Dean Research: Faculty of Science, U of Manitoba (July-December 2012)
- Professor 1982 – present (Zoology till 2008, presently Department of Biological Sciences), U of Manitoba (Half-time as of Jan. 2014)
- Acting Head, Dept. of Biological Sciences (July 2008 - Dec. 2008)

- Head, Dept. of Zoology (March 1, 1998 – July 2008)
- Associate Professor Dept. of Zoology, U of Manitoba (1976 - 1982)
- Assistant Professor Dept. of Zoology, U of Manitoba (1973 – 1976)
  - Tenure granted 1976
  - Visiting Professor, Dept. of Exptl. Zoology, Univ. of Utrecht, Netherlands (1987 – 1988).

### **Honors and Distinctions:**

Received the Career Achievement Award in 2008 from the Canadian Council of Biology Chairs Presented at their annual meeting held in Toronto in 2008 by their president Dr. Louise Nelson Assoc. VP Research, UBC Okanogan.

Significant Career and Administrative Appointments are listed in the Administration/Service sections of my CV

### **Various Other Positions During Public School and University Periods:**

- Post Doctoral Fellow - Institute of Parasitology, McGill Univ., (1970 – Dec 1972)
- Research Assistant for Dr. E. Anderson, U Mass. Summer research at Marine Biological Laboratory, Woods Hole Massachusetts (1966 – 1970).
- Teaching Assistantship (Competitive) Dept. of Zoology, U of Massachusetts, Amherst, Mass., USA. (1965 – 1969)
- Undergrad Research Assistant for Dr. J.C.Holmes, Dept. of Zoology, U of Alberta at the Alberta Biological Station, Turner Valley, Alberta. (Summers 1964 and 1965)
- Western Cabinet - Futurama Windows (Supervisor Mac Buzak) , 1962 Window screener
- Chemistry Lab Summer Assistant– Chemical and Physical Analyses, Inland Cement, Edmonton, Alberta (1963)
- Engraver - (part time during the year and full time summers) for Marvel Engraving 1957-1963 (trained by master engraver Frank Gurney), Albrite Jewellers (1961- 63) and Birks Jewellers (1957 – 1963).

### **RESEARCH:**

#### **Description of Research Interests - Present and Past:**

My research falls within the broad area of cellular developmental biology and is focussed on germ cell determination, development and gametogenesis. The research encompasses study of the origin, and fate of female germ cells and how growth and differentiation of the egg cell (oocyte) is accomplished. Segregation of germ cells from somatic cells and differentiation of the oocyte is crucial to the life cycle of most metazoan organisms. Once the oocyte is activated (usually by fertilization) a complex choreography of a myriad of intricate cascades of developmental processes ensues at the molecular and cellular levels. These culminate in the development of the structure

and pattern of the individual organisms. The developmental axes and much of the developmental plan is established during the process of oogenesis, when the oocytes differentiate in the ovary. The research outlined below has involved me as well as a number of talented graduate students, PDFs and visiting Scholars.

Particularly useful models to investigate the events of oogenesis are certain insects and polychaetes in which the germ tissue that gives rise to the oocyte is a clonal polarized syncytium. The germ tissue is organized in a compartmental syncytium where a major portion (the nurse cell compartments) are specialized for enhanced synthesis of components like maternal mRNA's, ribosomes, regulatory proteins and organelles (like mitochondria). These NC products are then transported via intercellular bridges to the other specialized compartments (the oocytes) which receive these components and grow eventually becoming mature oocytes. Thus these systems provide an excellent opportunity to investigate the mechanisms that facilitate and regulate cytoplasmic transport and how developmental polarity is established.

Significant cell biological factors that are involved include the cytoskeletal elements, the polarized electrophysiological ionic fluxes and segregation of germ cell determinants, among others. The primary research tools/approaches have involved biochemistry, molecular biology, various types of microscopy and electrophysiology.

The establishment of Germ Cells distinct from somatic cells and localization of germ cell marker genes during embryogenesis has been a major research emphasis in recent years and is ongoing.

I have also initiated a new area of research the past few years and ongoing on the cellular structure of the model organism *Daphnia magna*. This organism is widely used as a model in aquatic toxicology and surprisingly details of its cellular structure at light microscope and electron microscope levels is poorly understood. My lab has done extensive work describing in detail the cytoarchitecture of all the tissues in this species and have presented the findings at 3 international conferences. In collaboration with researchers at the Univ. of Winnipeg I have also been involved in a variety of research studies on the response of the tissues to environmental perturbations and toxicological agents. This work is ongoing.

### **Model systems I have used:**

I primarily use two model invertebrate systems that are ideal for lab culture and experimental analysis, they are the hemipteran insect *Rhodnius prolixus* and the polychaete *Ophryotrocha labronica*. Additionally we also now use *Daphnia magna*.

Throughout my career I have also done research on a variety of other systems including the following: Early development and cortical polarity in the molluscs *Nassarius* and *Bithynia*; Oogenesis in a viviparous Onychophoran; Oogenesis and viviparity in the Testse Fly *Glossina austeni*; Gap junctions and Nurse cell/oocyte interaction with follicle cells during *Cecropia* oogenesis; Ultrastructure of the complete



digestive system in relation to gut adaptation for air breathing in the catfish Hoplosternum; Hemocytes and the evolution of the immune system in lobsters; sex determination and HY antigen in selected invertebrates and fish; colchicine resistance in the parasite Entamoeba histolytica; Hepatocyte ultrastructure during inflammation in rats; The effects of biological solutions on vascular grafts fiber structure using the Vascular prostheses Vasugraft; Mammalian cell responses to the anti-cancer drug dexrazoxane (CHO cells and fetal cardiac myocytes); algal fungal association in the development of lichens; The cellular architecture of both male and female Daphnia and the effects of environmental perturbation including pollutants, abiotic factors and UV; The ultrastructure of the morphogenesis of the larval skin in sturgeon to name a few.

Some of these were as collaborations as reflected in my list of publications and conference presentations.

### **Research Funding:**

I have continually held NSERC research operating (now Discovery) grants from 1973 to 2014, as well as a number of NSERC equipment grants, and an NSERC Strategic grant. I have also held a number of U of M research grants and various miscellaneous grants during this period. **A detailed list is provided in my CV appendix.**

Noteworthy previous successful NSERC equipment grants over the years include grants - Zeiss fluorescence microscope; Zeiss Inverted microscope; Zeiss Axio Imager fluorescence microscope with 3D imaging system using the apotome structured light microscopy; Hitachi H7000 STEM electron microscope; Vibrating probe scanning gradient electrode system; imaging cameras - low light SIT and also Intensified CCD video cameras, Brown and Flaming programmable pipette puffer and a group NSERC grant in the Faculty of Engineering that funded Phillips Environmental SEM.

I initiated and wrote (with the help of colleagues in Brazil, Argentina, USA and Canada), the White Paper to Sequence the genome of Rhodnius prolixus submission (Nov 2004) to the NIH, National Human Research Institute for consideration in their review of proposals for species that they would fund for total genome sequencing. I recruited all the participants, focussed our discussions and coordinated our efforts that culminated in the White paper that I submitted to NIH. The input of Reduviid researchers in Canada, the USA and a number of Latin American countries was invaluable in this process. The NIH review panel selected our proposal as one of the 12 successful ones that would receive funding to do the total genome in 2005. The White Paper was entitled "The case for sequencing the genome of the blood-feeding hemipteran insect Rhodnius prolixus". I have subsequently chaired the Genome Steering committee that has overseen the Genome project. The genome sequencing and its assembly was done by the large scale genome sequencing facility at Washington Univ. St. Louis Medical School and it was totally funded (8-10 million at that time) by NIH. Vector Base (also NIH funded) at Notre Dame University has been the location of the assembled genome and done the automated curation of the

assembled genome. Major annotation efforts, involving many scientists world-wide, have been underway within the research community in Brazil, Argentina, Europe, Canada and the USA and the resultant keystone publication is now (Oct. 2015) in press in PNAS.

### **Areas of Expertise in Research Methodologies:**

#### Microscopy

- Various types of EM (TEM, SEM, ESEM, Freeze-Fracture and limited STEM)
- Various types of light microscopy (basic, phase contrast, dark field) polarizing, Nomarski Interference contrast, Hoffman Modulation contrast, fluorescence, Apotome, deconvolution).
- Video Microscopy and low light imaging (Details on my many years of involvement in imaging and image processing is included in the appended material.
- Image Processing
- Fluorescence Ratioing

#### Microinjection Methodologies, Microdissection

Tissue preparative methods for LM, EM, Immunocytochem -and Histochemistry.

#### Electrophysiological Methods

- intracellular recording
- vibrating probe techniques (voltage and ion selective)

Conventional protein and nucleic acid electrophoresis methods

In situ hybridization - non-radioactive approaches

Photomicrography and various graphic arts techniques

### **RESEARCH CONTRIBUTIONS – Publications, Abstracts, Conferences, Seminars:**

#### **Papers in Preparation:**

Huebner, E. and Huebner, J.D. Cellular architecture of *Daphnia magna*. For J. Morph.

Singh, A., Childs, D., Whyard, S. and Huebner, E. Characterization and localization of the Germ Cell Marker gene, *Vasa* in gonads of the insect *Rhodnius prolixus*.

Huebner, E. and Graham, Roxane Female germ cell origin and development during embryogenesis of the insect *Rhodnius prolixus*.

#### **Research papers submitted to refereed journals:**

Mirjana Roksandic, Kaitlynn Alarie, Erwin Huebner, and Ivan Roksandic. 2015. Not of African descent: Dental modification among indigenous Caribbean people from Canimar Abajo, Cuba. *American Journal of Physical Anthropology* Submitted Sept 3, 2015

#### **Research papers in refereed journals & book chapters:**

- Mesquita, R. D. et al. (46 international authors including E. Huebner) 2015. "The Genome of *Rhodnius prolixus*, an insect vector of Chagas disease, reveals unique adaptations to hematophagy and parasite infection. PNAS Accepted Oct 2015.
- Shute, Lauren, Huebner, Erwin and Anderson, W.Gary 2015. Microscopic Identification of Novel Cell Types in the Integument of Larval Lake Sturgeon, *Acipenser fulvescens*. In Press J.Morph (JMorph15-0128-R1- Accepted Aug 23,2015) –(19 pgs text, 9 pages figures I provided data and Figs 1-4,6-7 a,c,d of Fig 9). On line DOI 10.1002/jmor.20480
- Huebner, E, 2014 Microarchitecture of Plants: Inspiration for Design and Art. Pages 123-127 in: The 2014 Prairie Garden ISBN 978-0-9736849-8-8 , Editor: Richard Denesiuk, Publisher.The Prairie Garden Cttee.
- Athukorala, S., E. Huebner and M. Piercy-Normore 2014, "Identification and Comparison of resynthesis for the lichen *Cladonia rangiferina*" by Can J. of Microbiology 60: 1-12.
- Huebner, J.D. Loadman, N.L., Wiegand, M.D. Huebner, E., Palitsky D.J., and Husarewycz, H. 2013 UVB Radiation Affects Growth, Reproduction and Tissue Structure of *Daphnia magna* Across Several Temperatures. Photochemistry and Photobiology, 89: 103–110
- Goltz, D.M., B. Piniuta, E. Huebner, M. Attas, E. Cloutis and J. Broomhead 2013 Spectroscopic approaches for studying faint text on a wooden tally from Invincible (1758). International Journal of Conservation Science Vol 4 (1):3-12.
- Brubacher, J.L and E. Huebner 2011 Evolution and development of polarized germ cell cyst: New insights from a polychaete worm, *Ophryotrocha labronica*. Developmental Biology 357:96-107
- Brubacher, J.L. and Erwin Huebner 2009 Development of Polarized Female Germline Cysts in the Polychaete, *Ophryotrocha labronica*. J of Morphology 170: 413-429
- Bjornsson, C.S. and E. Huebner 2004 Extracellular Proton dynamics during oogenesis in *Rhodnius prolixus*. J. Exptl. Biology 207: 2835 – 2844  
Also noteworthy is that the cover photograph of this issue (July) featured our paper and it was one of the covers featured in the publishers highlights of the year publication.
- Bjornsson, C.S. and E.Huebner 2002 Chamber capable of tissue rotation for electrophysiology, microinjection and microdissection. Biotechniques 33(1): 38-41.
- Huebner, E. 2000 Microscopic Characterization of Cells. Chapter for Encyclopedia of Cell Technology. R.E Speir (ed). Wiley Publ. pgs. 551-577.
- Hasinoff, Brian B., Michael E. Abram, Gaik-Lean Chee, Erwin Huebner, Edward Byard, Norman Barnabe, Victor J. Ferrans, Zu-Xi Yu, and Jack Yalowich 2000 The catalytic DNA topoisomerase II inhibitor Dexrazoxane (ICRF-187) induces endopolyploidy in chinese hamster ovary cells. J. Pharmacol. Exp. Ther. 295, 474- 483.
- Huebner, E 1999 Female Reproductive System, Insects. Pgs.215-229. Encyclopedia of Reproduction. Vol.2.J.D. Neill and E. Knobil (eds) Academic Press
- Huebner, E. and W. Diehl-Jones. 1998 Developmental Biology of Insect Ovaries: Germ

- Cells and Nurse Cell Oocyte polarity. In: Microscopic Anatomy of Invertebrates, editor, F.W. Harrison; vol. 11C Insecta, eds., F.W. Harrison and M. Locke, pgs.957-993, Wiley-Liss Publ.
- Harrison, R. and E. Huebner 1997 Unipolar microtubular array is directly involved in nurse cell - oocyte transport. *Cell Motility and the Cytoskeleton* 36: 355-362.
- Berry, J.M., E. Huebner and M. Butler. 1997 Cell productivity is overestimated by the crystal violet technique. In *Animal Cell Technology* pgs. 461-466 (eds) M.J.T. Carrondo et al. Kluweers Publisher.
- Berry, J.M., E. Huebner and M. Butler. 1996 The crystal violet nuclei staining technique leads to anomalous results in monitoring mammalian cell cultures. *Cytotechnology* 21: 73-80.
- Huebner, E. and D. Lococo. 1994. Oogenesis in a placental viviparous Onychophoran. *Tissue and Cell*. 26, 867-889.
- Huebner, E., R. Harrison and K. Yeow. 1994. A new feeding technique for experimental and routine culturing of the insect Rhodnius prolixus. *Can. J. of Zoology*. 72: 2244-2247.
- Heming, B.S. and E. Huebner. 1994. Development of the germ cells and reproductive primordia in male and female embryos of Rhodnius prolixus stahl (Hemiptera: Reduviidae). *Can. J. of Zoology*. 72: 1100-1119.
- Zhang, Z., M.W. King, R. Guidoin, M. Therrien, C. Doillon, W.L. Diehl-Jones and E. Huebner. 1994. In vitro exposure of a novel polyesterurethane graft to enzymes: a study of the biostability of the Vascugraft arterial prosthesis. *Biomaterials*. 15: 1129-1144.
- Huebner, E. and W. Diehl-Jones. 1993. Nurse cell-oocyte interaction in the telotrophic ovary. *Int. J. Insect Morphol. & Embryol.* 22: 369-387.
- McPherson, S.M.G. and E. Huebner. 1993. Dynamics of the oocyte cortical cytoskeleton during oogenesis in Rhodnius prolixus. *tissue and Cell* 25: 399-421.
- Diehl-Jones, W. and E. Huebner. 1993. Ionic basis of bioelectric currents during oogenesis in an insect. *Developmental Biology* 158: 301-316.
- Diehl-Jones, W. and E. Huebner. 1992. Spatial and temporal transcellular current patterns during oogenesis. *Developmental Biology* 153: 302-311.
- Diehl-Jones, W. and E. Huebner. 1989. Pattern and composition of ionic currents around ovarioles of the hemipteran. Rhodnius prolixus (Stahl.). *Biological Bulletin*. 176(s): 86-90.
- Valdimarsson, G. and E. Huebner. 1989. Diethylene glycol disterate as an embedding medium for immunofluorescence microscopy. *Biochemistry and Cell Biology*. 67: 242-245.
- Valdimarsson, G. Huebner. 1989. The development of microtubular arrays in the germ tissue of an insect telotrophic ovary. *Tissue and Cell*. 21: 123-138.
- Kelly, G.M. and E. Huebner. 1989. The embryonic development of the hemipteran insect Rhodnius prolixus. *J. Morph.* 199, 175-196.
- Kelly G.M. and E. Huebner. 1987. Juvenoid effects on Rhodnius prolixus embryogenesis. *Insect. Biochem.* 17, 1079-1083.
- Huebner, E. and S. Caveney. 1987. Invertebrate cell junctions. In A. Greenberg (ed.) *Invertebrate Models: Cell Receptors and Cell Communications*. Karger

- Publishers, Basel. (pgs 190-219).
- Goldenberg, P.Z., A.H. Greenberg, J.M. Gerrard and E. Huebner. 1986. Activation of lobster hemocytes: Cytoarchitectural aspects. *J. Invert. Pathol.* 47: 143-154.
- Gutzeit, H.D. and E. Huebner 1986. Comparison of microfilament patterns in nurse cells of different insects with polytropic and telotrophic ovarioles. *J. of Morph. and Exptl. Morph.* 93: 291-301.
- Bohrmann, J., E. Huebner, K. Sander and H. Gutzeit. 1986. Intracellular electrical potential measurements in *Drosophila* follicles. *J. Cell. Sci.* 81: 207-221.
- Huebner, E. and W. Sigurdson. 1986. Extracellular currents during insect oogenesis: special emphasis on telotrophic ovarioles. pp. 155-163. In R. Nuccitelli (ed.) "Ionic Currents in Development", *Progress in Clinical and Biological Research* Vol. 210. Alan R. Liss Publishers.
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### Conference Posters and Abstracts:

- Wuerz, M.T., E.Huebner, Huebner,J.D. 2015 Examination of the Histology of Male Daphnia Magna. Session 140, poster 555, ID:27167 ASLO International Meeting Granada, Spain Feb 21-27, 2015
- Loadman, N. et al 2014 Effects of Different Light Regimes on Survival and Reproduction of Males of Daphnia magna exposed to juvenile hormone. ASLO International Meeting Portland Oregon May 18-23
- Loadman, N. et al. 2013 Effects of UVR on Daphnia magna: Pasteuria ramosa host-parasite system ASLO International Meeting New Orleans Feb ASLO 2013 Aquatic Sciences meeting, New Orleans Louisiana, USA, Feb 17-22
- Huebner, E. and J.D. Huebner 2012 An integrated cellular analysis of Daphnia magna using an array of light microscopy, transmission and scanning electron microscopy techniques. Session GS06Poster 43.ASLO International Meeting Biwa, Japan July 2012

- Athukoroala, S., E. Huebner and M. Piercy-Normore 2012 Mycosymbiont gene expression in 3 early resynthesis stages of *Cladonia rangii*.
- Graham, R. And E. Huebner 2011 Origin and fate of primordial germ cells in the insect, *Rhodnius prolixus*. American Society for Cell Biology, Denver, December 2011
- Huebner et al 2010 Detailed examination of the histology of *Daphnia magna* Session #T01B ASLO International Meeting June, Sante Fe, New Mexico
- Weigand et al 2010 Maternal influences on *Daphnia magna*, Offspring size persist after exposure to ultraviolet-B radiation at two temperatures. ASLSO Session #S04 June, Sante Fe New Mexico
- Loadman et al 2010 Effects of Chronic ultraviolet-B radiation at 3 temperatures on survival and reproduction of *Daphnia magna*. Session #S04 Sante Fe June
- Brubacher, J.L. and Huebner, E. 2009. Differentiation of nurse cells and oocytes in the polychaete worm, *Ophryotrocha labronica*: on the evolutionary conservation of oogenic cysts in animals. Poster #1381. Am. Soc. Cell Biol. Meeting Dec San Francisco
- Brubacher, J.L. and Huebner, E. 2009. Differentiation of nurse cells and oocytes in the polychaete worm, *Ophryotrocha labronica*: on the evolutionary conservation of oogenic cysts in animals. Canadian Microscopical Society Annual Meeting. This poster received the award for the best graduate student poster presentation
- Brubacher, J. and E. Huebner 2004 Development of Polarized Two-Cell Syncytia during Oogenesis in Polychaete Worms of the Genus *Ophryotrocha*. Abstract SDB Meeting Developmental Biology, Calgary June
- Graham, R. And E. Huebner 2004 Origin and fate of primordial germ cells in the insect, *Rhodnius prolixus*. Abst #1850, B519. Am. Soc Cell Biol. Meeting Dec 4 – 8, Washington D.C. Abst in Mol. Biol of Cell
- Brubacher, J. and E. Huebner 2003 Female Germ Cell Development in the Polychaete *Ophryotrocha labronica*. Abst. 600, pg 109a, Molec.Biol. of Cell Vol 14. Am. Soc. Cell Biol. Meeting San Francisco, Dec. 13 – 17
- Graham, R. And E. Huebner 2003 Primordial germ cell development in the insect, *Rhodnius prolixus*. Dev. Biology 259: 477. Abst #146. Soc. Dev Bio. Meeting, Boston
- Huebner, E. and C. Bjornsson, 2002 Insect follicle cell specialization during chorionation: F-actin and ionic aspects. 42<sup>nd</sup> Amer. Soc. Cell Biol. Conf. San Francisco Dec 14-18, 2002, #1400, B602
- Huebner, E. , R.D. Graham and B.S. Heming 2002 Primordial germ cell development in the insect *Rhodnius prolixus*. Abst. Page 14, Cold Spring Harbor - "Germ Cells 2002".
- Huebner, E. and C. Bjornsson, C 2002. Proton Currents during Insect Oogenesis. 40<sup>th</sup> Annual Meeting of the Amer. Soc. Cell Biol., Mol.Biol Cell vol 11(suppl) pg. 54a, abstract # 279. Dec. 9-13 San Francisco , USA
- Hasinoff, B.B., E. Huebner, E.H. Byard, G-Q. Wang, and K. Schnabel 2000. An epifluorescent microscopic method for measurement of duxorubicin-induced mitochondrial damage to rat cardiac myocytes using the membrane potential dye JC-1 and the prevention of myocyte damage by dexrazoxane (ICRF-187). Oxygen 2000, 7<sup>th</sup> Annual Meeting of the Oxygen Society 29 (S1) S118 (2000).
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- Bjornson, C. and E. Huebner 1999 Calcium transporter distribution in an insect ovariole. Molec Biol of the Cell (Nov. suppl) pg 36, #B286 (abst#329). ASCB, Washington D.C.
- Byard, E. and E. Huebner 1999, Mitochondria and gamma tubulin during spermiogenesis in an insect, Mol. Biol. Of the Cell (Nov. Suppl) pg. 121 #B236 (abst. 16090. ASCB Washington D.C.
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- Abram, M.E., G.-L. Chee, E.S. Rector, E. Huebner, E. Byard, V. Ferrano, J.C. Yalowich, B.B. Hasinoff, 1999. Inhibition of Topoisomerase II by Dexrazoxane (ICRF-187) in polyploidization through continued cell cycling in the AB concomitant cell division. CFBS Meeting.
- Hasinoff, B.B., G.L. Chee, M.A. Abram, P.E. Schroeder, E. Huebner, E.H. Byard,, P. Thampatty, W.P. Allen and J.C. Yalowich, 1998. The catalytic DNA topoisomerase II (topo II) inhibitor dexrazoxane (ICRF - 187) prevents cytokinesis while allowing an uncontrolled increase in cell size. Ninth Conference on DNA Topoisomerase in Therapy 47 (1998)
- Bjornsson, Chris and Erwin Huebner, 1997 Calcium current dynamics during germ cell differentiation and oogenesis in an insect telotrophic ovariole. Molecular Biology of the Cell Vol.8, supplement, pg. 439a, abst.#2553.
- Saltel, E. and E. Huebner 1997 Intracellular calcium in the germ tissue of an insect telotrophic ovariole. 13th International Congress of Developmental Biology, Aug, Salt Lake City, Utah, USA.
- Huebner, E., C. Bjornsson and A. Miller 1996 Intracellular calcium modulation in an insect ovariole. Molecular Biology of the Cell Vol.7, supplement, pg. 305a, abst.#1774.
- Harrison, R. and E. Huebner. 1994. Immunocytochemistry and polarity of the microtubule arrays in the telotrophic ovary of the insect Rhodnius prolixus. Molecular Biology Cell vol.5, suppl. pg.282a, abst.1636.
- Yeow, K. and E. Huebner. 1994. Ring canal origin for the extensive F-Actin mesh in the insect telotrophic ovary. Molecular Biology of the Cell vol.5, suppl., pg.157a, abst.912.
- Huebner, E., K. Yeow and D. Lococo. 1993. A Unique nurse cell-oocyte model: Germ cells of the polychaete Ophryotrocha labronica. Molecular Biology of the Cell, Vol 4 Suppl., Abst #134.
- Huebner, E. and D. Lococo. 1993. Oogenesis in a viviparous onychophoran. Molecular Biology of the Cell, Vol 4 Suppl., Abst #135.
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- hemipteran insect, Rhodnius prolixus. Molecular Biology of the Cell, Vol. 4 Suppl., Abst #2194.
- Huebner, E. and W. Diehl-Jones. 1992. Nurse cell-oocyte interaction in the telotrophic ovary. Abst. pg 69, IIS-2 Proceedings XIX Int. Congress of Entomology, Beijing.
- Huebner, E. 1990. Cortical F-actin cytoskeleton during early embryogenesis of Bithynia tentaculata (Mollusc) J. Cell Biology vol.111,#5,pt2,pg.302a, abst.1680.
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- Kelly, G.M., S.M. Graham and E. Huebner. 1988. Cytoskeletal changes accompanying blastoderm formation in the insect Rhodnius prolixus. Prairie Universities Biological Seminars, Winnipeg, Manitoba.
- Graham, S.M. and E. Huebner. 1988. Dynamics of the cortical cytoskeleton during oogenesis in Rhodnius prolixus (Hemiptera): Ultrastructure and Immunocytochemistry. Prairie Universities Biological Seminars.
- Graham, S.M. and E. Huebner. 1988. Localization of actin and tubulin during oogenesis in the telotrophic ovary of Rhodnius prolixus (Insecta, Hemiptera). Abst. P. 12.1.8. pg. 396. 4th. Int. Congress of Cell Biology, Montreal.
- Huebner, E. and R. Dohmen. 1988. The polarized topographical organization of the cortical cytoskeleton in early mollusc embryos. abst. P.2.20.8. pg. 170. 4th. Int. Congress Cell Biology. Aug. 1988 Montreal.
- Diehl-Jones and E. Huebner. 1988. Pattern and composition of ionic currents around ovarioles of the hemipteran Rhodnius prolixus (Stahl.). Ionic Currents in Development MBL Woods Hole Massachusetts Sept. 3-6. 1988.
- Dohmen, M.R. and E. Huebner. 1988. Predetermination of the orientation of the first cleavage plane in eggs of Crepidula fornicata (Mollusca) Abst. P. 12.7.16. pg. 416. 4th. Int. Congress of Cell Biology Montreal (my name was on the poster but had been left out of the printed abstracts).
- Huebner, E. and Dohmen, M.R. 1988. The polarized topographical organization of the cortical cytoskeleton in early mollusc embryos. 4th. Int. Congress of Cell Biology Montreal
- Kelly, G.M. and E. Huebner. 1988. Localization of a high MW actin in embryos of Rhodnius prolixus (Insecta, Hemiptera) Abst. P.12.7.8. pg. 415. 4th. Int. Congress of Cell Biology, Montreal.
- Kelly, G.M. and E. Huebner. 1987. Blastoderm formation in the hemipteran insect Rhodnius prolixus. J. of Cell Biol. 105 (4) pt. 2 Abst. 482 pg. 86a.
- Kelly G.M. and E. Huebner. 1986. High-resolution, 2 dimensional gel electrophoresis analysis of Rhodnius prolixus embryogenesis. Abstract. Ent. Soc. of Canada, Ent. Soc. Manitoba 1986 Joint Annual Meeting, Oct. 1986.
- Huebner, E. and H. Gutzeit. 1986. An F-Actin Mesh around the microtubular-rich core of the insect telotrophic ovary. J. Cell Biol. Vol. 103 (5) pt. 2, Abst, 1465 pg. 393a.
- Huebner, E. 1986. Bioelectric factors: An approach to the study of JH action. Abstract. Fourth International Symposium on Juvenile Hormones. JH IV. Niagra Falls
- Kelly, G.M. and E. Huebner. 1986. JH analogue perturbation on Rhodnius prolixus

- embryogenesis: EM and biochemical analysis. Abstract. Fourth International Symposium on Juvenile Hormones. JH IV.
- Kelly, G.M. and E Huebner. 1985. Rhodnius prolixus embryogenesis: Cellular events of normal development compared with those after juvenile hormone analogue perturbation. Cell Diff. 16, 120s abst. 290.
- Huebner E. and W. Sigurdson. 1985. Ion current patterns in insect ovaries. Cell Diff. 16, 181s abst. 448.
- Woodruff, R., E. Huebner and Wm. Telfer. 1984. The origin of electrical currents in insect ovarioles. In Advances in invertebrate Reproduction Vol. 3. W. Engels (ed). Elsevier/North-Holland Publishers. pg. 652.
- Kelly, G. and E. Huebner. 1984. Cellular aspects of early-to-mid- embryogenesis in the insect Rhodnius prolixus. J. Cell Biol. 99, pp. 270a, abst. 993.
- Sigurdson, W. and E. Huebner. 1984. Extracellular currents during oogenesis in an insect. J. Cell Biol. 99, pp. 55. abst. 206.
- Huebner, E. and W. Sigurdson. 1984. Comparative aspects of extracellular currents in insect ovaries. J. Cell Biol. 99, pp. 56 abst. 208.
- Watson, A. and E. Huebner. 1984. Immunocytochemical localization of the follicle cell microtubule cytoskeleton of the insect Rhodnius prolixus. J. Cell Biol. 99, 194a, abst. 721.
- Huebner, E., R.I. Woodruff and W.H. Telfer. 1980. Electrophysiological and structural aspects of nurse cell-oocyte interaction in the telotrophic ovarioles of Rhodnius prolixus. Am. Zool. 20: 867 Abst. #815.
- Lococo, D. and E. Huebner. 1980. The morphogenesis of the Rhodnius accessory gland. Am. Zool. 20: 945 Abst. #1231
- Lococo, D. and E. Huebner. 1979. The morphogenesis of the Rhodnius accessory gland. Can Soc. Of Zoologist Conference Feb 7, 1979
- Lutz, D. and E. Huebner. 1978. Structural and physiological aspects of post-embryonic development in Rhodnius prolixus. J. Cell Biol. 79: 183a.
- Injeyan, H. and E. Huebner. 1977. A colchicine-induced heritable change in cell shape and motility in Entamoeba histolytica. J. Cell Biol., 70: 413a.
- Huebner, E. 1977. Cell interaction in the Rhodnius prolixus follicle. American Zoologist 17: 944. Also at Can. Soc. Of Zoologists Conf
- Huebner, E. 1976. Experimental modulation of the follicular epithelium of Rhodnius oocytes by juvenile hormone and other agents. At 1st International Congress of Cell Biology.. J. Cell Biol., 70: 251a.
- Anderson, E. and E. Huebner. 1967. Cytodifferentiation of the oocyte and its associated nurse cells of the polychaete Diopatra cuprea. Anat. Rec. 157: 205.

### **Conference Communications - Invited Speaker:**

### **Platform Conference Presentations and Invited Symposium Presentations:**

### **Symposium Presentations:**

- Huebner, E. 2009 Invited Symposium speaker at Can. Microscopical Society Annual Conference "Microscopy Artistic Inspiration and Biodesign".

- Huebner, E. 2007 Invited Symposium speaker, The *Rhodnius* Genome Project: The promises and challenges it affords in our understanding of reduviid biology and their role in Chagas' transmission. International Congress of Comparative Physiology and Biochemistry, Salvador, Brazil Aug. 2007
- Huebner, E. 2007 Opening address and conference chair of the Triatomine Genomics and Biology II Workshop in Salvador, Brazil in May
- Brubacher, J.L. and Huebner, E. 2007. Germ cells differentiation in the polychaete worm, *Ophryotrocha labronica*. Canadian Society of Zoology Meetings,
- Huebner, E. 2006 The key note address on *Rhodnius* germ cell development the *Rhodnius* Genome project at the Insect Biotechnology Conference held in St. Catherines, Ontario June 14 -16.
- Brubacher, J. and E. Huebner 2006 *Ophryotrocha* oogenesis and nurse cell oocyte interaction. International Evolution and Development Conference May 2006 at U of California Berkely
- Brubacher, J.L., and Huebner, E. 2006. Differentiation of nurse cells and oocytes in female germline cysts of the polychaete worm, *Ophryotrocha labronica*. Germ Cells Meeting, Cold Spring Harbor, NY, Oct 11-15, 2006.
- Huebner, E. 2005 Opening address Conference Chairman and member of Scientific organizing committee of an International Workshop on Triatomine Genomics and Biology held in Rio de Janeiro Nov. 3-5, 2005. Also presented a talk on germ cell development in *Rhodnius* embryos and oogenesis.
- Huebner, E, 2005 Presented Invited symposium talk "Imaging Germ Cells in Invertebrate Embryos and Female Gonads" in Symposium – "Cell, Molecular and Atomic Imaging" , Oct 7, St. Boniface Research Center, Winnipeg.
- Huebner, E., 2004, I presented a symposium talk at the International Germ Cell Meeting held Oct 13 – 17 at Cold Spring Harbor At the Laboratories, New York. The Talk was entitled "Two-cell Germ Line Syncytia in Annelids of the Genus Ophryotrocha: Nurse Cell – Oocyte Polarity. Authors: J. Brubacher and E. Huebner.
- Brubacher, J. and E. Huebner, 2004, Development of Polarized Two-Cell Syncytia During Oogenesis in Polychaete Worms of the Genus Ophryotrocha. Society for Developmental Biology (USA) Conference in Calgary
- Huebner, E, R.G. Graham and B.S. Heming, 2002, Primordial Germ Cell Development in the Insect Rhodnius prolixus. Germ Cells 2002 Conference Cold Spring Harbor, New York, Oct 9-13
- Huebner, E. 2000, Cell-Cell Interaction in Ovary Differentiation. Invited symposia

- presentation at 2000 Joint Annual Meeting of Entomological Societies of America, Canada, and Quebec, Montreal Dec 3-7.
- Huebner, E. 1997, Germ Cells and Oogenesis in *Rhodnius*. Special meeting Festschrift in honour of Dr. K.G. Davey April 27-30, Niagra-on-the-Lake, Ontario
- Huebner, E. 1992 Nurse cell-Oocyte Interaction in the Telotrophic Ovary. Invited at The XIX International Congress of Entomology in Beijing.
- Huebner, E. 1991 Invited to present a symposium talk "Cytoskeletal aspects of Oogenesis and Early Development, on the cytoskeleton". Canadian Microscopical Society Meeting in Calgary in June 25 1991.
- Huebner, E. 1988, Invited speaker to First European Minisymposium on the Vibrating Probe 1988. Pattern and composition of ionic currents around ovarioles of the hemipteran *Rhodnius prolixus* (Stahl) Dept. of Zoology, U. of Leuven, Leuven, Belgium.
- Diehl-Jones, W. and E. Huebner. 1988, "Pattern and composition of ionic currents around ovarioles of the hemipteran *Rhodnius prolixus* (Stahl)", International Conference on Ionic Currents in Development. Marine Biological Laboratory, Woods Hole, Massachusetts Sept. 3-6 1988.
- Huebner, E. 1986 Invited symposium speaker. Joint Canadian & Manitoba Entomological Societies Conference. "Entomology 86". In Symposium "Current Topics in Insect Physiology" Oct. 1986.
- Huebner, E. Invited by Dr. Lukas Margarites as a symposium speaker at the International Congress of Dipterology in Budapest in 1986 (Declined)
- Huebner, E. 1986 Invited speaker 4th. International Symposium on Juvenile Hormone: Physiology and Biochemistry. Sept. Niagara on the Lake, Ontario.
- Huebner, E., 1985, Invited speaker to first vibrating probe meeting: Ionic Currents in Development. UCLA Aug. 2-4, 1985
- Huebner, E., 1983 Invited symposium speaker for August 1983. International Symposium Invertebrate Reproduction. Tübingen West Germany.
- Huebner, E., 1982 Invited symposium speaker Aug. 3-6, 1982. SCUFIC International Conference on Insect Ultrastructure in Sapporo, Japan. Dr. Hirumo Akai organizer and hosted by the President of Tokyo University., Title: Development and ultrastructure of the telotrophic ovary.
- Huebner, E., 1979. Modifications in Cell Junctions in oogenesis. Thin sectioning and freeze-etch techniques in Can Soc. Cell Biol Workshop on Cellular Membranes

Feb. 16-17, Winnipeg

Huebner, E. 1975 The role of follicle cells in oogenesis in *Rhodnius prolixus*. Manitoba Society of Entomology Conference.

Huebner, E. and E. Anderson. 1974. Comparative Oogenesis of Spiralian – Structural Aspects. Symposium presentation. Am. Soc. Zoology Meetings, Dec. Tucson, Arizona.

Huebner, E. 1974. Oogenesis in the tsetse fly *Glossina austeni*: with special reference to vitellogenesis. Int. Conf. on Regulation of Insect Reproduction. Czech. Acad. of Sciences. Liblice, Czechoslovakia. Was also invited for follow up conference in 1982 but declined.

Huebner, E. 1972 Yolk Production by Follicle Cells in *Glossina austeni*. Can. Soc of Zoologist Conference

Huebner, E. and K.G. Davey 1971 Two talks – one on Antigonadotropin and a second on tropharium EM in *Rhodnius*. At *Rhodnius* 71 Conference at Queens University

### **Miscellaneous Conferences:**

1997 Attended by invitation a special conference of the German DAAD, Academic Exchange and Grant Service in Ottawa Sept.14-17. For promotion of research and cultural exchange between Canada and Germany and promote graduate student exchange.

### **Invited Seminars Presented:**

- 2015 Science: Inspiration for Art. Biology Department, U. of Winnipeg Oct 2,
- 2013 Development of Female Germ Cell Syncytia – Diverse Invertebrate Models Entomology Dept. U Manitoba, November 21
- 2010 Microscopy: Revealing the Inner Beauty of Life. Entomology Dept. U Manitoba, November 23
- 2009 “ Microscopy: The Science and the Art” Dept. Biol. Sciences. Nov 27
- 2007 The origin, development and differentiation of female germ cells. Chemistry Dept, U Manitoba January
- 2007 *Rhodnius prolixus*: A milestone species last century and this century. Entomology Dept. U Manitoba, November
- 2001 Univ of Alberta (presented Feb,16)
- 1998 Oogenesis and the development of polarity. Dept.Biology, Univ. of Winnipeg. Feb.1998
- 1995 Invited Seminar Speaker for Department of Zoology, University of Western Ontario, November.
- 1995 Zoology Department seminar given with Karen Yeow: “Discovery and

- Excitement in Research and Learning – The MBL Experience”
1994. Lecture to National Vibrating Probe Facility and visiting scientists, Marine Biol. Lab, Woods Hole. Nurse Cell - Oocyte interaction: Polarity During Oogenesis
1993. Cell Biology of Insect Oogenesis: Polarity aspects. Department of Entomology
- 1991 Merck Sharpe Dome Lecturer (two invited lectures) at Berea College, Berea, Kentucky: Cell Interactions during oogenesis for Dept. of Biology and Cell Biology class of Dr.Dell and a general lecture for the Faculty of Science on Oct 17th on "Contemporary Light and Electron Microscopical Approaches to Biology".
1990. Developmental Polarity During Oogenesis and early development: Cytoskeletal and Bioelectrical Aspects. Department of Zoology, University of Alberta, March 1990
1989. Zoology Department, University of Manitoba. Early development and the cortical cytoskeleton: Molluscan model systems.
1988. Dept.of Zoology, University of Leuven, Belgium; Cellular Interaction and the cytoskeleton during oogenesis in an insect ovary: Ultrastructural and Immunological aspects..
- 1988 Dept of Experimental Zoology, Experimental Embryology, U. of Utrecht, Netherlands Cellular Interaction and the cytoskeleton during oogenesis in an insect ovary: Ultrastructural and Immunological aspects..
1987. Invited seminar speaker Department of Biology, Queens University, Kingston, Ontario.
- 1987 Dept.of Experimental Zoology and Embryology, U of Utrecht, Holland
1986. (a) Sigma Xi Lecture at U. North Dakota Grand Forks. The insect ovary a model for cell interaction: The cytoskeleton.  
(b) Biological Seminar U. North Dakota, Grand Forks. Insect Oogenesis: Physiological Control Aspects.
1984. (a) Department of Entomology, University of Manitoba. Feb. "Bioelectric aspects of insect ovaries".  
(b) Manitoba Veterinary Assoc. Feb. "Light and Electron Microscopy, windows to another world".
1984. Electrical currents during oogenesis in Rhodnius. Insitut fur Biologie, Albert-Ludwigs Univ. Freiburg, West Germany
1983. Institute fur Biologie, Albert-Ludwigs Univ. Freiburg, West Germany. August. "Cell Interaction in the Telotrophic ovary".
1981. Department of Zoology, University of Manitoba. January. "The making of an egg".
1981. Zoology, University of Toronto. February. "Intra and extracellular transport routes in the telotrophic ovary".
1980. Marine Biological Laboratory Seminars: Boston University, Marine Program. February 27. "Cellular interaction during insect oogenesis".
1980. Biology, Westchester State College, Westchester, Penn. Jan. "Oogenesis in the telotrophic ovary"
1980. Pharmacy, U of Manitoba. Nov. 4. "Intra and extracellular transport within

- an invertebrate ovary".
1979. Department of anatomy, University of Manitoba. February. "A model cell interacting system".
1979. Department of Zoology: Cell Development Group, University of Western Ontario, London, Ontario. November. "Cell interaction in the insect ovariole".
1979. Zoology, University of Manitoba. Jan. "A unique interacting system: The insect ovariole".
1978. Whiteshell Nuclear Research Establishment, Cellular Division, Pinawa, Manitoba. "Insect Oogenesis - Cellular Differentiation".
1977. Zoology, U of Alberta, Edmonton. October 28. "Differentiation and function of the insect ovarian follicle".
1976. Entomology, U of Manitoba, "Insect Reproduction".
- 1974 Reproduction in the Tsetse fly *Glossina morsitans*. Dept. of Zoology Seminar
- 1974 Zoology Seminar " The Marine Coast and its Inhabitants:

### **Research Related Activities – Collaborative Projects, Assisting research of other labs, etc.**

#### **Most Recently:**

Collaborative research with Dr. Michelle Piercy-Normore on lichen tissue morphology :preparation for plastic embedding, sectioned and images collected. (Jan 2009 and Ongoing).

Collaborative research with Dr. Gary Anderson of the development and morphology of larval sturgeon (2012 – present).

Assisting the research of Dr. Jim Hare and his colleagues with SEM examination of peacock feathers (2015)

Ongoing collaboration with the Daphnia Environmental Toxicology research group in Biology, U of Winnipeg 2015

Collaboration with Dr. M. Roksandic, Anthropology, U of Winnipeg. 2015

On going collaboration with Dr. Steve Whyard, Biological Sciences U of M

#### **Contributions from my lab to research here and elsewhere:**

Bertger,A., J. Brubacher and A. Paululat 2009 Muscle formation during embryogenesis of the polychaete *Ophryotrocha diadema*: New insights into annelid muscle formation. *Frontiers in Zoology* 5:1 My lab provided the worms, did the fixations and preparation for the immunostaining (my PhD student John Brubacher)

Supplied an *Ophryotrocha labronica* cDNA library we prepared to Dr. M . Schmere, a PDF in the lab of Dr M. Shankland's lab U of Texas Austin; Also supplied same to Dr.



J.Henry, U of Illinois.

Contributed Figs 3, a,b,c,, in the research paper by G.Hanke, K.W. Stewart and George Lammers 1996. Squamatognathous steopockensis Gen. et sp.nov. An Arthrodire inferognathal from the middle Devonian Elm Point formation of Manitob. J of Vertebrate Paleontology 16 (4) pages 617-622

Had research visitor Dr. Cassandra Extavour from the Department of Organismal and Evolutionary Biology, Harvard Univ. here to learn techniques for dissecting insect embryos, visited for 1 week 2007. Also advised her on EM sectioning techniques in May 2010.

1982 Microscopical analysis of the original zinc and copper plates of the artist, L. Fitzgerald for Helen Coy (U of M , School of Art) and took photomicrographs for her book "Fitzgerald as Printmaker", University of Manitoba Press. The analysis was to determine if Fitzgerald used dry point, engraving, etching techniques or a combination of these to produce his art works. Micrographs were published in Helen's book.

2010 Provided cover images of Rhodnius for Cell Press May Special issue of Trends in Parasitology ; Tug of War between Vector and Parasite 2010 Vol. 26 # 10 for Lynn Sherrer Editor for Cell Press Cambridge Massachusetts.

2004 Provide photograph of the insect Rhodnius prolixus to NIH for the Human Genome Research Institute for their public relations of the Rhodnius genome sequencing project that I initiated.

### **Previously:**

Past collaborative research since at U of M (reflected in my publication list) have included Drs. H. Gutzeit (Freiburg now Head of Zoology U of Dresden), R. Woodruff (Westchester State Univ, Penn.) and W. Telfer (U of Pennsylvania), J. Jamieson (Chem U of M), M. Butler (Microbiology U of M) A. Greenberg (Former Director Cancer Center U of M), J. Gerard (U of Med School), B. Hasinoff 1998-1999 (Pharmacy), D.Goltz ( Chem U of Winnipeg, E. Byard (Biol U of Winnipeg), J. Marcus, Biol. Sci.,.

### **Research Study Leaves and other shorter term research at other institutions and research visitors here:**

Leave July1 2007 – June 30 2008- Admin Leave. Primarily research in my lab at U of Manitoba.

2007 Had research visitor to my lab at U of M, Dr. Cassandra Extavour from the Department of Organismal and Evolutionary Biology, Harvard Univ. here to learn techniques for dissecting insect embryos, visited for 1 week 2007. Also advised her on EM sectioning techniques in May 2010.

1994 Jan 1-July 31 Research Study Leave at U of Manitoba, included a research training trip to the laboratory of Dr. Dick Woodruff, Dept of Biology, Westchester State Univ., Pennsylvania to learn intracellular pH electrode recording techniques; and research trips to the Marine Biological Laboratory to do trial experiments on calcium ions in insect ovarioles.

Dr. Woodruff subsequently came to my lab at U of M to conduct research on vibrating probe measurements on cecropia ovarioles here twice for about 2-3 weeks each trip.  
1985

1987-1988 Department of Experimental Zoology - Experimental Embryology Work Group - University of Utrecht, Netherlands with research trips to the Department of Zoology, Albert-Ludwigs University, Freiburg, West Germany. Research on polar lobes, localization and early development in the gastropod molluscs, Nassarius, and Bithynia. Role of the cytoskeleton. Insect oogenesis cytoskeletal aspects and cell surface lectin binding in Rhodnius and Drosophila.

1988 Invited (June 5 – July 6) to the Laboratoire Argo (A marine biology station) in Banyuls-Sur-Mer, France by Dr. H. Marthy and Prof. Dr. J. van der Biggelaar.

1983 Three month research funded by the German Government DAAD doing insect germ cell research at Albert Ludwig University, Zoology Department with Dr. H. Gutzeit and Prof. Dr. Klaus Sander. Subsequently in 1984, Johannes Bohrman (PhD Student in Dr. Gutzeit's lab) came to my lab here at U of M for a 6 month period doing research on intracellular bioelectric recording of Drosophila ovarioles. Another PhD student Ulf Reidiger also visited the lab for a 1 week period.

Dr. Bruce Hemming (Dept. of Entomology U of A) 1990-1991 spent a 1 year sabbatical in my lab.

Dr. Ed Byard (Head Biology U of Winnipeg) 1998 spent a 6 month sabbatical in my lab.

1983 Invited to visit to the Laboratory of Dr. Arnold de Loof Katholieke University of Leuven, Belgium.

1982 Invited research visit to the Sericultural Experiment Station at Tsukuba Science City Japan by Dr. H. Akai. Spent a week there. Followed by a visit to Toshiga Gichi Medical School in Toshiga.

An invited research visit to the National Calcium Imaging Laboratory (Lionel Jaffee and Andrew Miller) Marine Biological laboratory Woods Hole Massachusetts. Spent close to a month there investigating calcium dynamics in Rhodnius ovaries.

1979-1980 Primarily at the Marine Biological Laboratory, Woods Hole, Massachusetts (Library Reader Desk #20B and research access to the NIH lab of Dr. Dan Alkon so I could work on Rhodnius and the polychaete Diopatra). Approximately 2

months were spent doing research at the Department of Biology, University of Pennsylvania. (Research collaboration with Drs. W. Telfer and R. Woodruff). Electrophysiology of oogenesis.

Hosted International Visitor from France Dr. Bernard Mauchamp, Expert on insect molting. 1986

Hosted Dr. Gerry Kidder, Gap Junction Expert UWO

Hosted Dr. Subramanian, Visitor from Madras University India

Hosted Dr Craig Mandato, visitor from Anatomy-Cell Biology McGill University

hosted research scientist from US Agriculture North Dakota Dr. Ed Reinecke  
2000

## **TEACHING:**

### **Department of Biological Sciences, University of Manitoba**

**BIOL 3560** – Comparative Animal Histology – (Jan 1973 – June 2013) – lab intensive. Since I have been on a half-time appointment (2014) someone else is teaching this course.

**BIOL 4560** – Microtechnique (Originally 22:440) 1974 until the present). An intensive 4th year honors level course, full compliment of lectures and intensive weekly labs plus individual student projects. (Sept – Dec ).

**BIOL 7230** (3CH) – Grad Course: Biology Special Topics: Advanced Microtechniques (involved the practical full scale teaching of light microscopy techniques). Taught most years

**BIOL 7600** (6CH) Taught various times depending on demand. The course is on tissue preparation for light and electron microscopy.

### **Previous Courses Taught:**

Proposed, developed and taught the Zoology 2<sup>nd</sup> year course in Developmental Biology (22:215) for a number of years - Developmental Biology formerly 22:215 (3 CH) Lectures and tutorials. Developed and taught the 3<sup>rd</sup> year intensive lab based Advanced Cellular and Developmental Biology course (formerly 22:307) with Gunnar Valdimarsson.

Coordinated the Zoology 2150 Developmental Biology Course 2007-2008 Taught by Dr. E. McLachlan

- Graduate courses in the Zoology Department - Taught numerous times for various students: Topics in Zoology and the Topics in Developmental Biology courses. Coordinated Grad courses formerly 22:734 and 735 (Dev. Biology)

Taught in Invertebrate Zoology (formerly 22:341) for a number of years and directed the course for 2 years and other years was a contributing lecturer (6-8 lectures) on insects, and 2 labs (1973-1979). (when Dr. F. Ward was in charge). In 1980 I taught the course while Dr. Ward was on sabbatical.

Taught the 3<sup>th</sup> year topics in Zoology course (formerly 22:375) with Dr. C. Lindsey for approximately 4 years. Covered analysis of scientific literature, structure of publications, various research areas, communication; poster and conference presentation guidelines and also lectures on becoming a graduate student.

Contributed some regular scheduled lectures in the Zoology Topics Course 22.375 for a number of years when others taught the course - gave lectures on communication; posters and also a research lecture.

Topics in Zoology formerly 22:450 (6CH) Co-taught the course with Dr. Cass Lindsey 1977 and 78; involved extensive lecturing and an array of writing assignments and exercises for class size of approx 40-45.

Taught Intro Biology special summer course for Public School teachers for 1 summer. - 71:130 General Science Course for elementary school teachers - contributing lecturer (1982) for section (3 weeks) on cells and tissues.

Zoology Honors Thesis formerly 22:411 (6CH) (1992-1993) New course, Dr. S. Sealy and I developed the proposal for this course and were in charge of the course the first year of its inception. In 1993-94 Dr. L. Graham and I ran the course.

Developed (with G. Valdimarsson) a 3CH course on Reproductive Physiology (course proposal approved) for the Nursing Mid-Wifery Program. Course put on hold as Midwifery program was not initiated.

Guest Lectures in the Department of Entomology, Physiology course, 1977 for Dr. T. Galloway.

### **Teaching in the Faculty of Architecture Dept. of Interior Design: Co-taught in BioDesign :**

Co-taught with Professor Tijen Roshko (Sensory Technology 5 IDES7240) course since 2008 have taught in the grad course three times for grad students (only offered some years) and once for undergrads (EVIE 3016).

Other architecture teaching: (Jan 28, 2015) I gave an afternoon workshop in Dr. Ted McLachlan's grad course in Landscape Architecture.

## **Graduate Student Supervision, Advisory Committees, Thesis Examiner:**

### **Postdoctoral fellows:**

- Lococco, D. 1992-1995. PDF research on oogenesis in the insect Rhodnius, the polychaete Ophryotrocha and a viviparous onychophoran, Plicatoperipatus.
- Injeyan, H.S. 1976-1978 PDF research on insect follicle cells, endocrine control, follicle cell junctions: research on cell motility, cytoskeleton, and colchicine resistance in Entamoeba histolytica.

### **Graduate Students under my supervision:**

- Wuerz, Maggie 2014 – present. Co-supervision of her as a U of W MSc. Student. She on average spends 2 days a week doing research in my lab. I mentor her in the areas of tissue preparation and microscopy.
- Brubacher, John 2010 PhD Germ cell determination in the polychaete annelid, Ophryotrocha labronica.
- Yeow, Karen Mei-Lan 1996. MSc, Development and Dynamics of the F-actin in the germ tissue of the telotrophic ovariole of Rhodnius prolixus.
- Bjornsson, Chris. 1996 PhD, Ion currents, ion-selective vibrating probe analysis in oogenesis.
- Harrison, Rene 1995. MSc, Structural and Dynamic Aspects of Trophic Cord Microtubules in Rhodnius prolixus.
- Li, Qun 1993. MSc, Oogenesis in Rhodnius prolixus: A search for Drosophila maternal gene homologies.
- Diehl-Jones, William L.W. 1991. PhD, Bioelectric currents during oogenesis in Rhodnius prolixus.
- Kelly, Gregory M. 1989. PhD, Embryogenesis of the insect, Rhodnius prolixus: cellular, biochemical and molecular aspects.
- Graham-McPherson, Sandra M. 1989. MSc, Dynamics of the oocyte cortical cytoskeleton during oogenesis.
- Diehl-Jones, William L.W. 1986. Experimental analysis of the cytoskeleton and cell motility in insect hemocytes.
- Valdimarsson, Gunnar 1987. MSc, Microtubules during ovary development. April 2
- Watson, Andrew 1984. MSc, The Dynamics of the Rhodnius prolixus follicle cell cytoskeleton: Ultrastructure and Immunocytochemistry.
- Sigurdson, Wade 1984. MSc, Bioelectric aspects of the Rhodnius prolixus ovariole: extracellular current mapping during oogenesis.
- Lutz, Doug 1979. MSc, Structural and physiological aspects of the 5th instar ovarian development in Rhodnius prolixus (Insecta: Hemiptera). July 27
- Lococco, Don 1979. MSc, The ultrastructure and Morphogenesis of the female accessory gland in the insect Rhodnius prolixus July 25
- Vokey, Randy 1975 MSc, Withdrew April 1976 due to personal family crisis.

### **Acting advisor:**

- Kriger, Frank 1975 Acting Advisor for the last year of his MSc including the Thesis writing and defence - Alcohol dehydrogenase in the nematode *Panagrellis*. (Advisor Dr. M. Samoiloff away on sabbatical)
- Hobson, Keith 1986 Acting advisor for 3.5 months

#### **Other:**

-Oversaw Dept. of Fisheries and Oceans NSERC Research Intern Dr. Michelle Gray working with Dr. Karen Kidd at the Freshwater Institute

#### ***4th Year Honors Thesis Students and Summer Research Students:***

##### **Honors Thesis I Supervised:**

- Graham, Roxanne 2000. Mitochondrial distribution and activity during oogenesis.
- Bartley, Cory. 1999. Comparative histology of fossilized dermal armour of four families of placoderm fishes. Co-supervised with K.W. Stewart. Defence April 10
- Saltel, Eric. 1997. Intracellular free calcium in the germ tissue of the telotrophic ovarioles of *Rhodnius prolixus*.
- Yeow, Karen. 1993. Vitellogenesis in the polychaete *Ophryotrocha labronica*. Hon.B.Sc.
- Curtis, Janene. 1993. Mitochondrial distribution and transport within the nurse cell-oocyte complex in the insect *Rhodnius prolixus*. Hon. B.Sc.

##### **Summer undergraduate students and Undergrad Students doing programs in my lab**

Roxanne Graham (2000), Jeff Powell (1999), Sussana Wiens (1998), Dave Hochman (1996), Eric Saltel (1996), James Whitney (1997), Joe Swartz (1974), Ghan Chee (1975), Karen Yeow (1991-92), Putnam Fraser (1986), Rehana Yacob-Durocher (1987,88), Lesia Kozyra (1988), Azim Mustapha Summer Research high school student NSERC program from Montreal, 1985), Tony Shaw (1990), Pat Nelson (1994,95), Chris Bjornsson (research assistant part time 1995-96), Kathryn Drepko Research assistant summer and part time 2009, Daniel Palisky ( U of W) trainee with me in microtechnique, Mable Chan Co-op Genetics Student 2010, Jenna Yuen Co-op Genetics Student 2010 Undergrad Mentor in BIOL 3100 for Maria Mikos and Mariam Iskander 2010, Assisted Matt Yunik Honors Thesis student (Jane Waterman) with imaging fleas for his thesis.

##### **External PhD Thesis Examiner:**

2008 PhD Raul Ursic Biology, Simon Fraser U. Advisor Dr. C. Loewenberger CRC

2000 PhD Rene Harrison Anatomy and Cell Biology, Fac. Of Medicine, U of Toronto  
Advisor Dr. Eva Turley

1994 PhD Jianshe Zhang, Biology, Dalhousie Advisor Dr. T. MacRae

1992 PhD Robert A. Harris, Zoology, UBC Advisors Drs. Randall and Phillips

1985 PhD Graham Couch, Biology, U. of Saskatchewan Advisor Dr. C. Gilott

### **Teaching at other Institutions:**

Department of Biology, McGill University:

- June 1973. Was invited to co-instruct (with Dr. N. Wolfson, McGill University) a one month intensive lab and field course in Marine Embryology: Experimental analysis of development of marine organisms for the consortium of Eastern Canadian Universities at the Huntsman Marine Laboratory, St. Andrews by the Sea, New Brunswick. I contributed the major part in the on-site organization of the course and organized and ran most of the labs. A few guest lectures were contributed by Dr. Joan Marsden (McGill) and Dr. Ruth Turner (Museum of Comparative Zoology, Harvard).

McGill University, Institute of Parasitology:

- Macdonald College of McGill, 1971-1972, Topics in Parasitology Course; I contributed 6 lectures on the structure and diversity of the integument of helminths. As well, research presentations were given in the Parasitology and insect physiology seminars were given in our weekly seminar and discussion group series.

University of Massachusetts, Zoology Department:

- Teaching Assistant from 1965 - 1969 in the following courses: Histology; Introductory Zoology; Developmental Zoology; and Invertebrate Zoology. Teaching assistants at U Mass were totally responsible for the lab, including set-up, lab talks and outlines, setting the exams and assigning the lab grade.

### **ADMINISTRATION and SERVICE:**

#### **National and International Committees:**

Initiated and coordinated the International Rhodnius Genome Sequencing Project as noted in the Research Funding Section of my CV. I participated in many conference calls of the Steering Committee over the years involved. Discussion focused on assessing progress and work as it progressed, planning the various conferences we held in Brazil on Triatomine Genomics.

Served as Conference Chairman and member of the scientific organizing committee of the Conferences and International Workshops on Triatomine Genomics and Biology held in Rio de Janeiro, Brazil in 2005 and Salvador, Brazil in 2007.

Served on Special NSERC Cell Biology GSC restructuring Committee (May 2007) by Invitation.

2004 External Reviewer for Research at the Univ. of Sienna, Italy

2003 served on the University of Western Ontario Faculty of Science External Review Panel (3 members - myself and Dr. Allen George, Head Computer Science U. of Waterloo, Dr. Suzanne Fortier, VP Academic Queens Univ.). We were appointed by the Vice President Administration of the University of Western Ontario in 2003. We spent a number of days reviewing the entire faculty of Science and selected associated faculties and the Dean of Science. An extensive review report was prepared.

2003 External reviewer for Michael Smith Foundation Career Research Awards (UBC)

Served as a member of the Executive of the Canadian Council of Biology Chairs (1999-2002) – Served as Councillor,(1999), Vice President (2000) and President, (2001), Secretary (2002). Was heavily involved of the CCUBC lobby efforts for research funding in Ottawa the years I served on the executive and I organized and ran the Lobby efforts the year I served as President. While president, I initiated the Distinguished Public Educator Award and presented the award to the first recipient Jay Ingram I continued attending and contributing to CCUBC throughout my tenure as Department Head.

Gave workshop on Undergrad Curricula and Departmental Reorganization in 1999 with Drs. Susan Jensen (U of A) and Ron Aiken (Mt. Allison) and a workshop on graduate student training with Drs. Laura Frost (U of A) and Carl Douglas (UBC) in 2004.

1995-1997 Served on the selection committee for the International Distinguished Entomologist Award in Insect Morphology and Development presented at the Int. Congress of Entomology

### **Service as External Reviewer for Promotions and other awards:**

- 2013 External reviewer of the Tenure and Promotion applications of Professor Tijen Roshko Faculty of Architecture.
- 2011 served as external reviewer for Full Professor promotion application of an applicant in the Biology Department Faculty of Science, of Sultan Qaboos University Qatar.
- 2010 Simon Fraser University Biol. Sciences Promotion to Full Professor
- 2007 CRC review for Simon Fraser University
- 2005 Simon Fraser Univ. Tenure and Promotion
- 2004 UWO Tenure and Promotion Reviewer
- 2003 CRC Chair reviewer for McGill
- 1999 Faculty Human Ecology U of M Promotion to Full Professor Committee
- 1999 Univ. of Ottawa, External Reviewer for Promotion to Professor.
- 1998 Univ. of Calgary, Reviewer for Killam Award
- 1994 Univ. of Friburg, Germany, Reviewer for Doctoral Habilitation.
- 1989 Univ. of Exeter, England, External Reviewer for Promotion to Reader.
- 1986 Laurention Univ. External review for NSEC URF Dr. Ali Khan



### **University of Manitoba and Manitoba Societies Committees:**

2014 Internal/External reviewer of the Graduate Program of the Department of Entomology with Dr.Packer (Guelph) and Dr.Marshall (U of T).

2010 Internal/External reviewer on a panel with D. Scrubsole (Head Geography UWO) and M. Douglas (U of Alberta) of the Graduate Program of the Department of Environment and Geography for the U of M Faculty of Graduate Studies

2003-2004 President's Advisory Committee to select the new Dean of Science 2000- present. I oversee the Biological Sciences Core Microscopy facilities and the technician Andre Dufresne, initially with Dr. Mike Sumner and subsequently with Dr. Mark Belmonte after Mike retired.

Currently Serve on the Department Cell/Developmental Biology Theme Curriculum Committee

1978-1980 Appointed to Board of Graduate Studies

1978-1980 Appointed to the U of M Vice President's Research Board

1998-2001 Delta Marsh Univ. Field Station Committee

1999 U of M committee involving Native Studies, CIER, Science regarding application for an Aboriginal Scholar Position cross appointed between Zoology and Native Studies

1999 Served on a campus wide Task Force on Aboriginal Issue and developing strategies (chair D. Unruh, Presidents Office).

1978 Manitoba Entomology Society Awards Committee

1983 – 1986 Manitoba Chapter of Sigma Xi served as Program Chair (1983-1984); President (1984-1985) and Past President 1985 – 1986).

### **Faculty of Science Committees and related admin:**

2015 Ad hoc committee for Dean, Chaired by Assoc. Dean M. Piercy-Normore on Concentrations in Science undergrad programs across Canada

2012 Acting Associate Dean Research Science, regular meetings with Agriculture Assoc Dean Dr. Scanlan and grant editor Chantal Bassett and other central administration research related meetings.

Executive Committee Faculty of Graduate Studies 2012  
University Associate Deans of Research Committee 2012

Search committee for Headship of the Dept. of Microbiology 2012  
 Promotion committee for Kevin Campbell (Biol. Sci.) 2010-2011  
 Promotion Committee for K. Scott, G. Davoren, M. Piercy-Normore, and D. Schroeder (2010)  
 Tenure committee for M. Docker, D. Schroeder, A. Worley 2010  
 Tenure committee for S. Whyard and G. Anderson (2009)  
 Promotion committee for S. Whyard (2009)  
 Served on Committee dealing with the Duff Roblin Fire and Clean-up (2009)  
 Support staff performance evaluation team 2000 drafted the annual report form.  
 Promotion for Dr. Martin King to Full Prof Textiles Jan 1999  
 Science Executive Council 1998 - 2008  
 Gave workshop on NSERC grants for Barbara Crutchley (ORA) for U of M Faculty of Agriculture 1998  
 Sci. graduate industry achievement award committee 1998  
 Promotion Committee for Dr. B.L. Sherriff (Geology) to Full Prof, Nov. 1998  
 Science Research Committee 1993-2005  
 Science Promotion Committee 1980, 1989, 1994, 1995-1998, 1998-2001  
 Biology Restructuring Committee 1993-1994  
 Botany EM technician hiring committee 1993  
 Biology EM and Microscopy committee 1981-present  
 Oversee Dept. of Biological Sciences Core Microscopy facilities.(to the present)  
 Genetics-Cell Biology review committee (Zool., Botany, Micro, Chem.) 1976

**Attended the following various Administrative Workshops for administrators:**

Seminar for New Administrators (1998 and 2012)  
 Immigration Workshop in Feb 2007  
 Respectful Workplace Legislation Policy (2004)  
 Taming the Bully (2003-2004)  
 Mentoring Untenured Faculty (2003)  
 CHERD all day workshop Professional Development for Department Heads (2003)  
 Professional Development for Heads  
 Using the SEEQ Evaluation System to Improve Teaching (2002)  
 Workshop for Chairs of Search and Tenure Committees (2002, 2012)  
 Having Media Savvy Workshop by Danniella Kieffler (CBC) (2001 Feb.)  
 Annual performance evaluations (March 2000)  
 Nuts and Bolts of Administration (1999)  
 Employment Equity Workshop (1999)  
 Administration Restructuring (1999)  
 Academic Administrators as Facilitators of Research Development (1998)  
 Understanding the University Budget Budgetary Planning (1998)  
 Performance Management Workshop Julia Knight (1998)  
 University Procedures for Academic Recruitment (1998-1999)

**Department of Zoology and subsequently Dept. of Biological Sciences**

## Committees:

### **Administrative and Service Activity While Head of Zoology 1998-2008**

- participated in HR discussions and issues re the Admin Assistant position in Botany
- Continued recruitment efforts (SIP reports, memos to Dean, Retirement projections, etc)
- discussions with new Head of Biology Brandon U (David Greenwood) re curricula.
- discussions with Physics re Physics course for Biologists
- Chaired Zoology selection committees (Asst. Prof & Instructor positions) -
- Mentorship of new faculty
- prepared Department reports and requests regarding a variety of matters (Endowment, Indirect research costs, renovations, space related, responses on program proposals from other units as needed
- Facilitated proposal development and eventual approval of a change in the graduate minimum course requirements. Involved pressing a number of issues with the Fac. Of Grad Studies - eg. Presentation at the Graduate planning and priorities committee
- dealt with University Archivist (Brian Hubner) re donated documents re Barrett-Hamilton Zoological publications
- Dealt with grad student matters (Fall informational meeting with New Grad Students, deal with grad requests for travel funds, issues with advisors, set all advisor and examining committees,
- Monitored all Dr. Dick's Grad students re progress, etc. as mandated by Senior Administration in view of Dr. Dick's reprimand for having breached the "Respectful Workplace Legislation" in his dealings with students.
- Interactions with Continuing Education in regard to Inter-universities of the North and Other units we provide service courses for
- Interaction with other Science departments (via Exec council, meet with candidates for CRC, Statistics Headship, positions.
- Met with Israel National Fund director re research (Dr. Avi Gafni and Mr. Kleinnam)
- many meetings with IT services and architects regarding cabling and voice data room for Duff Roblin Building
- participated with Claire Juan-Oudendahl (Admin Assistant) in internal audit meeting re Zoology practices May 30, 2006
- Safety office Chemical inventory sessions March 24, 2006
- Evening of Excellence; NSERC luncheon; Science Graduation Dinner;
- served on admissions selection committees for the Department of Physiotherapy and also the School of Medical Rehabilitation June 24, 2006
- Initiated the arrangements for the Barrett Hamilton Memorial Lecture Series have continued until today (2015). Many discussions with Mr. Michael Nesbitt the donor and arrangements for the first speaker fall of 2007. The inaugural Barrett Hamilton Lecture was held in early October with the world renowned key-note speaker Dr. John Croxall, noted Ornithologist from the U.K.
- Mike Sumner (now Mark Belmonte) and I oversee the Biology Electron Microscope and EM preparative facility.

- Zoology - carried various faculty searches.
- survived a nasty flood that impacted the 3rd floor significantly as well as the 2nd and 4th floors.
- We hosted the Canadian Biology Olympiad as per discussions with Bob Brown
- Initiated the Joint Biological Seminar Series with Botany.
- While Zoology Dept. Head and Acting Head Dept. of Biological Sciences I set departmental committees. These all had their own committee chairs and were advisory to the Head. I chaired all the hiring committees and Departmental Council Meetings

### **Activities related to the merger of Botany, Intro Biology and Zoology into a Biological Sciences Department**

Organized and Chaired many Merger Discussions: There were numerous meetings, information memos, working groups etc. throughout 2008 involving Botany, Zoology and Intro Biology faculty and staff regarding the benefits of merging our units and harmonizing our activities. While it is not necessary to catalogue all those here but can be provided as needed. Our activities initially focused on the rationale for a merger, and the decision to take this bold step. Secondly much discussion began the process of looking at the nuts and bolts of facilitating a true harmonization and reorganizing the department into broad research clusters (analysis of curricula, cataloguing of courses, initial subject areas sub-groups, web site -PR, administrative concerns etc.). It was rewarding that the vote to merge was unanimous with only a couple of abstentions. In some ways it still seems unbelievable that we did take this historic step with an optimism of a new exciting future. This was not undertaken as an administrative "cosmetic" change but an opportunity to do things in a new way. The reorganization and moving of labs to establish shared equipment facilities and bring labs with similar interests and equipment needs into closer proximity was viewed as vital to achieve a true unification. This required the good will and enthusiasm of the bulk of the faculty. Tom Booth and I take some personal pleasure and satisfaction in having played a large role in bringing this about. We feel we have helped create a situation that, with support, will help biology flourish here at the U of M into the future and will attract considerable student interest. Ongoing discussions with Dr. Tom Booth and Dr. Mike Sumner were held regarding development of flexible Undergraduate thematic areas for student options that have served the department well to this day (2015). I worked with Dr. Tom Booth and Bev Horn to develop initial draft web page for Dept. of Biological Sciences

I was appointed to serve as Acting Head for the Department of Biological Sciences which came into existence July 1<sup>st</sup> (originally I was to begin my admin leave July 1st but this was delayed to begin Jan 1/08). I proposed the new department be called the Department of Biological Sciences and with no objections that became our new name. Tom Booth and Lane Graham were appointed to assist me as Associate Heads and Mike Sumner agreed to continue as director of the Introductory Biology Programs. As

noted above the many discussions to begin the process of true harmonization continued. Plans were made to move Margaret Docker and Erwin Huebner to the 5th floor of Buller and Sylvie Renault to Duff Roblin as part of the plan to establish research clusters. These few months were a busy time. I hosted a "Meet the Department Function" in September at which all member of the Department (Academic Staff and Grad Students, Adjunct, Support Staff, Senior Scholars) were introduced. We developed a successful proposal for a Canada Research Chair in Phylogenomics and a search committee was selected.

We (Tom Booth, Mike Sumner and I) successfully made a case for the Department of Biological Sciences obtain the Pharmacy Building (after they relocated to the Medical Campus) to meet the space ( for Teaching and Research ) needs of the Department. Tom Booth, Mike Sumner and I presented the case to Richard Lobdell and Alan Simms at a key central administration meeting in the spring and were informed at a subsequent meeting that Pharmacy would be designated as Biology. We were delighted at the news.

After Dr. Judy Anderson became the Head Oct 1st. I continued the remainder of my term as one of the Associate Heads to assist Judy in the early stages of her headship. A myriad of discussions have been held on space and other issues. I relocated my office to Buller and initiated plans to move my lab.

### **Committees Prior to becoming Head:**

Strategic Planning Committee 1999  
 Heads Advisory Committee 1992-1998  
 Represented Dr. Gee (Head) at Can Council Univ. Biol. Chairs Meeting, Ottawa 1993  
 Promotions Committee 1979-1986  
 Zoology Heads Selection Committee 1978,1985-1986,1991  
 Committee to advise head on promotions and merit 1979,1981  
 Adjunct Professor Committee 1983,1885 (revise regulations), 1986, Chair 1989 (Establish application forms, standard letters etc)  
 Scholarships and Awards Committee (including Rauch, Leon Provancher, Lubinsky, NSERC, and U of M awards) 1973-1983,1985-1987,1992-1997, Chair 1997-1998  
 Zoology Curriculum Committee 1989, 1997.  
 Dev.Biol./Cell Biol./Histology Curriculum Cte Chair 1989-2006  
 Committee to recommend on the 4 year specialist degree 1978  
 Committee to review graduate courses 1994  
 Committee on Graduate Students (COGS) Chair 1986 (Draft regulations of the committee and streamline applications and forms, checklist etc), 1997-present  
 Committee to Exam MSc and PhD regulations 1974  
 Committee to examine the PhD qualifying Exam 1975,1976,1983  
 Graduate Carrels 1974-1979  
 Committee to define new faculty staff position 1997  
 Search committee for Molecular Biology position 1989,1990  
 Cell biology sessional lecturer review committee 1974,1975

Open house and Info Days in 1982 and 1985 organized these events  
 Departmental Poster 1983 and Information Brochure 1974  
 Seminar Policy Committee 1983 (seminar policy rethinking)  
 Organize departmental seminars 1978,1980, served on committee 1999  
 Visiting lecturer committee 1974  
 Microcomputer Committee 1986  
 Space Committee 1973,1983-1985,1989  
 Microscope Committee 1981,1983-1987  
 Timetable 1980-86

### **Miscellaneous Committees:**

Federal Govt. Dept. Fisheries and Oceans, Fresh Water Institute, Hiring  
 selection committee for a Fish Physiologist Position. 1999  
 U of M Long Distance Education and Inter-Universities of the North 1998  
 UMFA Grievance Committee 1986-1987  
 UMFA Board of Reps 1984

### **Duff Roblin Fire Related Service:**

I was involved in various aspects of dealing with the Duff Roblin fire aftermath. The period impacted was from the end of March 2009 to the present. As former Head of Zoology and having served as the initial acting Head of our newly formed Biological Sciences Dept., I had much familiarity with the facilities, labs, equipment etc. in the Duff Roblin Building. Due to the seriousness of the situation and toxic environment only a few individuals were to be selected for access to assist the companies (Clean Harbors, WFS, and LWG) handling the recovery process. I was one of four designated individuals (Lane Graham, Gary Anderson, Kevin Scott and myself) who, fitted with safety gear, were allowed into the building on an ongoing basis to access toxic areas and assist in dealing with the immediate and subsequent aftermath of the fire. For the initial period, much time and effort were spent transferring valuable materials from -80 freezers, cleaning out and disposing of decomposing biological materials from regular freezers, assisting in the identification and location of research and teaching equipment on the 2nd, 3rd and 4th floors. I was the sole person designated to assist WFS to deal with the heavily impacted 6th floor that had supplies/equipment stored belonging to several faculty (Abrahams, Dick, Campbell, Hann, Pruitt and myself, caging for AHF).

I also served on the University's Equipment Recovery Team Committee. A variety of trips were made to the warehouse to deal with equipment issues; variety of aspects re teaching equipment, microscopes, graphics room etc.

**Service Related to Research - Research Grant Selection Committees, Grant Reviewing, Journal Paper reviewing, Research Collaborations, Professional Societies Service , Reviewing, Research activities, etc.**

### **National Committees:**

2007 NSERC consultation committee for GSC 32 Cell Biology restructuring. May 4 Ottawa, Dr. Welsh, U of C was Chair.

2001 Chaired two Expert Review Panels for CFI. Reviewed 7 major CFI grants in Infectious diseases and blood research at a meeting in Vancouver. Drafted the final report.

2000 Chaired an Expert Review Panel for CFI to review 3 large CFI grants in biotechnology, biomedical and stem cell research at a meeting in Ottawa. Drafted the final report.

1992-1995. Consultant to NSERC Cell Biology GSC for the preparation of the Reallocation Report that presented the state of the discipline, strengths and future directions. The report was prepared and co-authored with Nils Petersen, Chemistry, U.W.O. and Paul Young, Biology, Queens. This was considerable work since NSERC was using these reports to reallocated funds between GSCs so a lot was riding on them. Coordination with the other life sciences involved discussions between the consultants of all the life sciences GSCs and a special meeting held at Concordia Univ. Montreal.

1990 – 1991 **Chaired** the NSERC Cell Biology Grant Selection Committee. This was an especially onerous task as NSERC had just reorganized the GSCs so this was a New GSC due to a split of the original Cell Biology and Genetics GSC into 2. Over 2/3rds of the committee members had to be newly recruited, a difficult task made all the GSC preparations for grant reviewing, the assignments of grants to individual CSC members, selected external reviewer for each grant, prepared NSEWRC review reports and budget summaries, dealt with grant decision appeals and arranged site visits.

1988-1991 NSERC Cell Biology and Genetics Committee Member.

1982 Nominating Committee for Can. Soc. Of Zoologists with Drs. W. Legett and L. O'Neil.

### **Research Grant Reviewing:**

Natural Sciences and Engineering Research Council, Canada  
 Research Grants, 1988 - present (2015)  
 Killam Fellowship reviewer 1998  
 Stacie Awards, 1995  
 Special Projects Grant, 1995

Review Research Program of Univ. of Sienna, Italy, 2004

Crocker Foundation, Hong Kong Senior Research Fellow Applications 2003

International Science Foundation (Washington) 1993

Univ. Western Ontario - Academic Development Fund, 1985, 1995

Univ. of Toronto Connaught Transformative Research Grant, 1996

National Science Foundation U.S., 1980,1985,1991, 1996

U.S. - Israel Binational Science Foundation, 1978,1982,1989,1990,1991,1996,1997

March of Dimes - Birth Defects USA, 1984, 1987

Man. Health Sciences Center Neurosciences Research Award, 1992

NATO Scientific Affairs Div. (Belgium) Grant, 1986 Review Nato Grant (S. Berry USA  
A. De Loof Belgium 1986

Review and provide evaluation as the external Canadian expert for MRC Centennial  
PDF fellowship application of Dr. Leask, Stanford Univ. 1985

Reviewer of NSERC URF application of Dr.Ali Khan Laurentian University 1996

### **Professional Society Memberships:**

Society of Developmental Biology

American Society of Cell Biology

In previous years was a member of Canadian Microscopical Society; Royal  
Microscopical Society, England; Historical Microscope Society Canada; Soc.  
Exp. Biology, Sigma Xi, CFBS, Entomol. Soc. Of Manitoba), Am. Soc.  
Zoologists, Can. Soc of Zoologists.

### **Service for Professional Societies and Organizations:**

- Canadian Society for Cell Biology and Biochemistry, 1987, Local organizer for  
annual Canadian CFBS conference: Arranged Symposium ("Cell Biology of  
Oogenesis and Early Development") - selected speakers (R. Woodruff, W.  
Jeffery, L. Browder, F. Longo) , raised the funds, made all the speaker travel and  
accomodation arrangements; made all the plans and arranged the banquet for  
the society including transportation and funding to subsidize grad students.
- Neurosciences Society (Winnipeg Chapter) Councilor 1992-1997

### **Service on Editorial Boards:**

1999 to 2008: North American Section Editor for Arthropod Structure and  
Function, Elsevier Science.

1983-1999 Associate Editor of the Int. J. Insect Morphology and Embryology.

Invited by Dr Hoar (UBC) 1979 to join the editorial board of CJZ

1979-1982 and 1996-present an Associate editor of the Canadian Journal of  
Zoology.

### **Over the years have reviewed for Journals, Books, Bulletins etc. for a number of International and National Journals:**



Developmental Biology  
 Developmental Biology International  
 Roux's Archives of Developmental Biology  
 Invertebrate Reproduction and Development  
 Differentiation  
 Acta Zoologica  
 Cell Motility and Cytoskeleton  
 Cell Biology International  
 Cell and Tissue Research  
 Physiological Zoology  
 Canadian Journal of Zoology  
 Journal of Morphology  
 Int J. of Insect Morphology and Embryology  
 J. of Insect Physiology  
 Insect Biochem. and Molec. Biol.  
 J. of Medical Entomology  
 The Canadian Entomologist  
 Archives Insect Biochem. Physiol.  
 Bull. Entomol. Research  
 The Canadian Entomologist  
 Tissue and Cell  
 Tissue and Cell Research  
 Reviewed textbook chapters for Developmental Biology Textbook by Dr. Klaus  
 Kaltoff for McGraw Hill Publishers 1998  
 Review research paper for Dr. Ramaswamy, Mississippi State Univ. 1985.  
 1973 Reviewed Chapter on Oogenesis by Dr. F. Longo U of Iowa for  
 Developmental Biology Textbook

## **RESEARCH CONTRIBUTIONS PROVIDING ADVICE, MICROGRAPHS AND PUBLIC SERVICE RELATED ACTIVITIES :**

- Assisted Dr. Hagit Peretz PDF in lab of Dr. Frances Lin (Physics) with her NSERC PFD Fellowship application and research in bioelectric phenomena related to oriented cell movements, the cytoskeleton and intracellular pressure gradients. Sept-Oct 2015
- Aug 2015 sent cultures of the polychaetes *Ophryotrocha labronica* and *notoglandulata* to Dr. Manu Prakash, Stanford University
- Provided nematode images for U of M Today June 3, 2015 "Soil, surely it isn't dirt"
- featured in U of M Today April 28, 2015 "Plant like you have never seen them"
- 2015 SEM images of Flea Beetle mites for Dr. Steve Whyard's lab'
- advised Debra Clemons regarding advice for testing for Chagas disease. 2014
- gave tour and demonstration of our microscopy facilities for Richard Denesiuk Editor of The Prairie Garden Publication. 2014
- Provided SEM images of Mezzotint and copper plate etching surface 2014 to Dr. Ted Howorth (Martha Street Print Studio, retired U of M Professor of Print Making).
- gave tour of the microscopy facilities to the Biophysics class of Dr. Francis Lin Physics Department. 2014
- participated in the lab dedication ceremony for my friend Dr. Gunnar Valdimarsson

2014

- 2014 provided Dr. Shelley Sweeney Director of U of M Archive with photos for their Annual Report 2014
- Provided microscope images of insect material in fragments of Amber for the Canadian Fossil Discovery Center in Morden, Manitoba, 2014
- exhibitor in a book exhibition on Botanicals at the U of M Library Archive with books on botanical subject matter.2014
- 2014 Assisted various students from various labs with their research primarily in microscopy and or tissue preparation, and biodesigns follows:Sara Rasporo-Blouw MSc student Foods and Nutrition; Shyamchan Mayanglam PhD Human Nutritional Science; Shuo Huang MSc Biol Science; Quian Jiang MSc Landscape Architecture; Lauren Shute MSc Biol. Science; Melanie Scallion Entomology Student; Elaine Anjos PhD Biol Sci,
- 2013 SEM images for UMTODAY Nov 22, 2013
- 2011 -Contributed 3 images used on the previous Faculty of Science Web site;  
<http://umanitoba.ca/faculties/science/research/910.html>  
<http://umanitoba.ca/faculties/science/staff/1208.html>
- Research imaging of Dutch Elm germinating spores for Dr. Jim Reid (Emeritus – Microbiology) 2011
- 2011 Co-judge of Photomicrography competition held by Zeiss Canada
- 2010 Contributed DIC microscopy footage and time lapse sequences on cyanobacteria blue green algae for a David Suzuki CBC documentary Save My Lake aired in March on the Nature of Things, for Rebecca Hunt Production Manager Stornoway Productions Toronto
- 2010 Supported Dr.Richard K. Wilson, Director, The Genome Center, Washington University School of Medicine NIH NHGRI center renewal application for continued funding at The Genome Center at Washington University School of Medicine
- Assisting student (Daniel Palitsky) from Biology U of Winnipeg in preparation of Daphnia for microscopy and Imaging to examine the effects of UVB on tissue morphology.2009
- 2009 assisted Landscape Architecture student Ariadna Choptiany in imaging of musical instrument wires.
- Assisted Mohammed from Entomology with pulling of glass micropipettes for research at the National Lab.2009
- 2009 Provided SEM image for background of Biol Dept Seminar notice 2009
- 2007 Supplied cDNA library of Ophryotrocha labronica to U of Texas, Austin (Dr. Matthew Schmeer)
- Assisted in the establishment of Department of Biological Sciences “Microscopy Core Facility - Various meetings and discussions (Bob Ramsey, J.Anderson, J.Hare etc.) regarding the establishment of a “microscopy suite” in the area of Buller 517 to house a variety of instruments.
- provided images to Greg Sobbie Dean’s Office Fac. Of Science for recruitment CD 2005
- 2005 Featured in Winnipeg Free Press (March 8<sup>th</sup>) and CBC Radio with respect to the NIH Rhodnius genome project and Chagas disease.
- 2004-2005 My research featured in the U of M Annual Research report pages 18-19
- 2005 assisted grad students :Natashha Ryz of Dr. Carla Taylor (Foods and Nutrition) with fluorescence microscopy, also 1999-2000 Carla on metalothiones and kidney

histology

- 2005 grad student of Dr. Dennis Krause Animal Science on Pig gut histometry
- 2005 Adam Burgener from D. M Butler Lab (Microbiology) on Vero cell size and growth.
- Assisted Dr. Haskel Greenfield (Anthropology) with assessing SEM techniques in examining teeth.
- Assisted Graduate student (Kanaka Wijayarafne) of Dr. Paul Field (Agriculture. Canada) in dissecting and imaging reproductive tracts of Tribolium treated with precocenes
- Assisted Dr. Arian Burke (formerly on faculty in Anthropology) with fluorescence microscopy of teeth 2000
- Provided specimens of Rhodnius and Triatoma to Dr. Ron Gooding, U of Alberta, Biology. 1996 and also in 2000
- Provided support for the NIH renewal of the funding of the National Vibrating Probe facility at the MBL in Woods Hole Massachusetts in 1995. Based on 2 research trips
- Assisted Dr. Gary Anderson's student Sadaf in imaging and measuring sturgeon embryos and juveniles for her MSc research
- 2004 Hosted Winnipeg TV "A Channel" feature on Aquatic research in the Zoology Department
- 2003 I was directly involved in assisting the CBC with their Nov Disclosure program (Producer Morris Karp) on Forensics and Hair Evidence. CBC spent an entire day filming microscopy in my labs
- 2001 Assisted in TV clip for CBC National News for item involving Dr, Riewe and use of furs in Aboriginal clothing providing microscope views of hair of northern species.
- 2001 provided Images of Rhodnius accessory gland to Dr. Cedric Gillot Biology U of Sask for his Entomology Textbook
- 2000 Provide microscope images of hair for Great North Productions (Edmonton) for TV series film - Shivers@
- 2000 Provided fluorescence figures for review article by Dr. W. Telfer (U.Penn) on vitellogenesis and for his Symposium presentations.
- Assisted Dr. Nancy Chow (Geology) with DIC imaging of Gypsum 1998
- 1997 Designed and developed Advertising Brochure for the Biology Electron Microscopy Facilities
- Assisted student of Dr. Anne Worley (Josh Perlman) with fluorescence imaging of pollen for viability analysis. had made there previously using their facilities.
- 1999-2000 D.Court lab on yeast mitochondrial and DNA staining (microbiology)
- Invited participant to a Focus discussion group at the Int. Congress of Dev. Biol., Salt Lake City, Utah, by McGraw Hill regarding "Analysis on Developmental Biology" K.Kalthoff. Aug.1997
- 1996-1997 Organized U of M Fac. of Science Dev. Biol. Seminar Discussion Group (Organized by Keith Lewis) included researchers interested in developmental and cell biology from Zoology, Botany, Microbiology and Chemistry.
- 1997 Design and development of advertising brochure for Biology EM facility, Univ. Manitoba.
- Provided technical advice and help to Dr. Collin Demiuk, Agriculture Canada re Grain beetles. 1996
- 1996 video clip aired live on the CBC National News for interview of Dr. R.Riewe on

cariboo hair

- 1996 Fostering Success and Persistence in Science - A lab presentation of my research and approach to science to about 30 women undergrad students from the U of Winnipeg for the V.P. Academic Dr. Katherin Schultz.
- 1992 Assisted grad student Wei Yaen of Dr. Laurie Connor (Animal Science) with EM methods and EM interpretation of data.
- Assistance with EM methods and micrograph interpretation for Wei Yaen (grad student of Dr. Laurie Connor, Animal Science) 1992
- 1991 Cell Biology Workshop (all day event) for Biology Teachers' Organization of Manitoba. "Contemporary Microscopical Approaches to the Study of Cells and Tissues" and a laboratory demonstration on Image Processing, DIC & Fluorescence Microscopy.
- Provided hands-on training experience for Shad Valley Program for gifted High School Students (1991, 1993).
- Research Visit of Lord Selkirk Regional Comprehensive Biology 300 Class (Teacher, Kathrine Fallis) to my Lab, 30 students 4 groups 1991.
- DNA ploidy quantitative image processing of plant cells for Edwin DeGroot (Grad student of Dr. Van Caeselle, Botany) 1991
- Class of Science Teacher, Garry Streuber 1992.
- Microscopical Analysis and photomicrography of cross sections of High Tension Cables for Manitoba Hydro, Engineer Karl Hesse. 1990.
- 1992 Fluorescence micrographs provided by David Capco (U. of Arizona) for book chapter on DGD methods.
- 1988 Freeze fracture EM provided for Textbook Cover Grade 9 Science Textbook "Insights 9", editor Les Jolliffe, Copp Clark Pitman Ltd., Longman Publishers
- 1987 EM figures provided by M.A. Hayat (Kean College, New Jersey) for EM Book
- 1985 Photomicrographs for Dr. Yngve Grahn, Sveriges Geologiska Undersokning, Uppsala, Sweden.
- Zoology, U of M Development and Endowment Fund Volunteer 86, 87,89.
- 1982 EM figure provided by Lukas Margaritis (U of Athens) for book chapter on the insect chorion.
- Zoology United Way Canvasser 1980, 1989-1991
- 1978 Advised Manitoba Renewable Resources Division on Walley and Sauger gonad histology
- 1978 Presentation at Bruns Junior High School Collegiate re biology careers
- Judging at Manitoba Schools Sciences Symposium 1978,79,81,83,85-87
- Judge at Science fair Fort Richmond Elementary School 1975.
- Zoology United Way Canvasser 1980, 1989, 1987, 1990, 1991, 1992.
- Participated in Fac. Of Science Luncheon meeting and research discussion with Nobel Laurette Dr. George Palade, Rockefeller Univ. April 19, 1979
- Assisted PDF Jon Svendeson (Gary Anderson) with imaging of juvenile lake sturgeon.
- Advised visiting Russian Scientist of Margaret Docker on EM techniques for lampreys
- 1978 EM figures provided by Lawrence S. Fillon (Texas A and M Univ.) for monograph on Ultrastructure, Macromolecules and Evolution and also a book on Animal Variety.
- 1976 Photograph (#27) (photomicrograph - "Serenity") exhibited in a juried show at the Winnipeg Art Gallery also published in Winnipeg Art Gallery Catalogue: The Manitoba 1976 Juried Photography Exhibition: Juror J. Borcoman Curator National Gallery of Canada.

- Assisted with registration for XIX Congress of Limnology (1974) and Am. Ornithology Conference (1974) both hosted by U. Manitoba.
- 1974 Provided photomicrograph of snail radula for design of Zoology Poster.
- 1974 Provided photomicrographs requested by Dr. Trager (Parasitologist, Rockefeller Univ.) for a review article.
- 1972 Electron micrographs of mitotic Ascites tumor cells published in a book "Cells, their structure and function" by Dr.J.C.Moner, Wm. C. Brown Publ.

**Academic Service on Undergrad Thesis Defences, MSc and PhD Advisory Committees, Candidacy , Qualifying Examinations, PhD Selection Committees and Theses defences.**

**Undergraduate Thesis Examiner:**

Lauren Shute Biol Sci. Hon BSc. 2013  
 Josh Kuluzney BSc Hon Bio Science U of M 2012  
 Ali Breddam Hon Thesis Biology U of W 2010  
 Jolene Fisher Hon Thesis Biology Univ, of Winnipeg 2005  
 Michael Lizardo, Biology U of Winnipeg 4<sup>th</sup> Year thesis 2000  
 Chris Fedak Zoology Hon BSc U of M 1998  
 Ian Thorlakson U of M Med School BSc Med 1991  
 Martin Mummery U of M Med School BSc Med 1990  
 Assessed Invertebrate collection of Bonnie Moffat for the Zoology Provencher Award 1979

**Graduate Student Advisory Committees:**

**MSc: Have served on about 19 (List provided in the appendix)**

Current one - 2015 MSc Practicum Advisory Committee external advisor for Adele Sinclair Dept. of Interior Design, Faculty of Architecture- Biodesign based thesis. Using Biodesign to Develop Mobile Transportable Dental Clinics in Guatemala.

Others listed in appendix

**PhD: Have served on about 21 list provided in the appendix**

**MSc Graduate Student Thesis Examining Committees: have served on 39, list in the appendix**

**Other Graduate Committees**

**PhD. Qualifying Exam: Have served on 18 list in the appendix**

**Candidacy Exam: have served on 17, list in the appendix**

## PhD Selection Committees: have served on 16 list in the appendix

### Macdonald College - Institute of Parasitology

1972 Ph.D. Comprehensive Examination for B. Dumser

**Supervision of research assistants:** Darcy Childs and Aditi Singh worked part time for me (2011-2013)

### Appendix

#### Research Funding Detailed List:

2008-2014	NSERC 4 yr Research Grant (32,000/yr) Total 128,000 Germ Cell Development and Oogenesis Grant (2008- 2012) was carried over until 2014
2003-2008	NSERC 4 yr Research Grant (39,000/yr) Total 195,000 Germ Cell Development and Oogenesis
1999-2003	NSERC 4 yr Research Grant (50,820/yr) Total 232,080 Cytoplasmic Transport and Differentiation in Oogenesis: Cytoskeletal and Bioelectrical Aspects
1995-1999	NSERC 4 yr Research Grant (44,000/yr) Total 176,000 Cytoplasmic Transport and Differentiation in Oogenesis: Cytoskeletal and Bioelectrical Aspects
1995-1996	NSERC Equipment Grant (35,580) Ion Selective Probe and Microscope
1998	Participant on CFI grant (M.Chaturvedi) for Environmental SEM (138,440)
1997	Manitoba Career Start Grant (910) Canada Human Resources Career Placement Grant (1260)
1996	U of M Program Dev. Grant (9,900) Manitoba Career Start Grant (910) Canada Human Resources Career placement grant (1260)
1993-1995	-NSERC 2 yr Research Grant (45,000per annum) CytoplasmicTransport: Cytoskeletal and Bioelectrical Aspects
1991	-Manitoba Career Start Grant (840) -NSERC Equipment Grant (17,340) Low Light Fluorescence CCD Camera -NSERC Equipment Grant fo Ultratome (15,000) with M. Sumner & L. Van Caeselee
1990-1993	-NSERC 3 yr Research Grant (49,220 per annum)
1987-1990	-NSERC 3yr Research Grant (39,520 per annum) CytoplasmicTransport: Cytoskeletal and Bioelectrical Aspects

- 1989 -NSERC Equipment Grant (128,280)  
Transmission Electron Microscope  
Lead applicant with co-applicants M. Sumner & L. Van Caesele  
-U. of M. Funds for EM (80,000)  
-External Funding Shell Oil (90,000)
- 1989 -Manitoba Career Start Grant (1,861)
- 1984-1986 NSERC 2 yr Research Grant (28,900 per annum)  
Oogenesis: Functional and Developmental Aspects  
NSERC Equipment Grant (18,957)  
Vibrating Probe  
Manitoba Career Start Grant (3,406)
- 1985 U. of M. Academic Dev. Grant (6,000)
- 1982-1984 NSERC Strategic Grants(35,500, 17,490, 12,500)  
Mode of Action of Third Generation Insecticides on  
Reproduction and Development: Prediction of  
Developmental Defects  
NSERC Equipment Grant (22,000)  
Inverted Microscope and Camera  
U. of M. Research Grant (1,600)  
Ion Localization During Development  
German DAAD (Academic Exchange) Grant 4,900 D.M.
- 1981-1984 NSERC 3yr. Research Grant (15,000, 17,325, 17,325)  
Oogenesis: Functional and Developmental Aspects
- 1982 NSERC Scientific Exchange Grant for visit for Dr. Wollberg, Israel  
(6,000). This and a U of M grant declined because of  
change in Dr. Wollberg's plans.
- 1981 U. of M. Research Funds from the President, Dean of Science and  
Zoology for \$5000 To set up new Vibrating Probe
- 1980 U. of M. Research Grant (1500)
- 1979 NSERC Travel Grant (950)
- 1976-1979 NRC 3 yr.Operating Grant (8,000, 8,672, 9,192)  
Developmental and Functional Cytology  
U. of M. Research Grant (1500)
- 1973-1976 NRC 3 yr. Operating Grant (7000, 7,000, 7,985)  
Cellular interactions during oogenesis
- 1977 U of M Grant for PDF (H. Injeyan) (3700)
- 1976 U of M Grant for PDF (H. Injeyan) (3800)
- 1975 U. of M. Research Grant (1500)  
Cellular Interactions and Reproductive Biology
- 1974 U of M Research Grant (836)  
NRC Equipment Grant (8000)  
Microscope  
Amer. Soc. Zool. Travel Grant (250)
- 1973 U of M Research Grant (4500)

**Academic Service on Undergrad Thesis Defences, MSc and PhD Advisory  
Committees, Candidacy , Qualifying Examinations, PhD Selection Committees**

## and Theses defences.

### Undergraduate Thesis Examiner:

Lauren Shute Biol Sci. Hon BSc. 2013  
 Josh Kuluzney BSc Hon Bio Science U of M 2012  
 Ali Breddam Hon Thesis Biology U of W 2010  
 Jolene Fisher Hon Thesis Biology Univ, of Winnipeg 2005  
 Michael Lizardo, Biology U of Winnipeg 4<sup>th</sup> Year thesis 2000  
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 Ian Thorlakson U of M Med School BSc Med 1991  
 Martin Mummery U of M Med School BSc Med 1990  
 Assessed Invertebrate collection of Bonnie Moffat for the Zoology Provencher Award  
 1979

### Graduate Student Advisory Committees:

#### MSc:

2015 MSc Practicum Advisory Committee external advisor for Adele Sinclair  
 Dept. of Interior Design, Faculty of Architecture- Biodesign based thesis. Using  
 Biodesign to Develop Mobile Transportable Dental Clinics in Guatemala.

Kanmani Natarajan (Biol. Sci) 2013- 2014  
 Johannes Huver (Biol.Sci) 2011-2013  
 Erin Spice (Biol. Sci) 2012-2013  
 Ahmed Waheed (Biol. Sci) 2010-2011  
 Darcy Childs (Biol. Sci) 2010-2011  
 Laura Shead (Anthropology)  
 Kathryn Drepko (Biol Sci) 2009-2010)  
 Lea Peters (Foods and Nutrition) 2009-2011)  
 Arpita Chakraborty (MSc) Zoology - completed her MS in 2006  
 Aihui Yang (MSc) Zoology- completed MSc in 2006  
 Julieta Werner (Zoology) 2000  
 Steven Theriault (Microbiology) 1998-1999  
 Bruce Adams (Zoology) 96-99  
 Christa Dubesky (Zoology) 1995-1999 defence April 15  
 Megan Cooley (Zoology) 1995-1998  
 Chris Martin (Zoology) 1993-1995  
 Gloria Goulet (Zoology) Sept 10, 1993 Chaired defence  
 Andrew Fox (Entomology) 1990-1991  
 Julia Porter (Zoology) 1981

#### PhD:

2015 Chaired PhD thesis Defence of Mr. Sunday Malomo, Human Nutritional  
 Sciences



Kevin Sunley (PhD) Microbiology 2009 Examiner on PhD Thesis Defense  
 Liang Tao (Zoology)  
 Shaohong Cheng Zoology  
 Matt Young (Microbiology) 2005  
 Chandra Chambers (PhD) Zoology 2005  
 Ike Isinguzo (PhD) Zoology 2005  
 Jose Rodrigous; Microbiology Chaired PhD Thesis Defense  
 Xingwei Hou Entomology Chaired Defence June 2, 2003  
 S.E. Stelkov, (Plant Science) 1998-2001  
 Vince Palace Zoology 1991-1996  
 Donna Young (Anatomy) 1989-1992 Defence June 15, 1992  
 M.A. Turner, Zoology Sept 8, 1993 Chair PhD Defence  
 Debbie MacLatchy Zoology 1989-1991  
 Ma Lou (Entomology) 1984-1986  
 Dan Cyr Zoology 1984-1986  
 Val Converse Zoology  
 Odd Bres Zoology 1985  
 Marek Tomalek (Entomology) 1982-84 Defence May 24, 1984  
 Cassie Aitcheson 1981-84. Defence April 27, 1984  
 Barbara Zielinski 1978-82

### **MSc Graduate Student Thesis Examining Committees:**

Kanmani Natarajan Bio Sci U of M 2014  
 Erin Spice Bio Sci U of M Aug 2013  
 Johannes Huver Bio Sci U of M April 2013  
 Leah Peters Foods and Nutrition U of M 2010  
 Nada Sagga (U of W Biology) External Thesis Examiner Dec 10, 2010  
 Mindy Oulten Biology Dalhousie University 2002  
 Leanne Zrum, Bio Sci U of M 2000 Chaired defence  
 Bruce Adams, Zoology U of M 1999  
 Christa Dubesky, Zoology U of M 1999  
 Steve Therault Microbiology U of M 1999- 2001  
 Megan Cooley, Zoology U of M 1998  
 Katrin Stedronsky Zoology 1996 Chaired defence  
 Bill Yu Chung Ng 1995 Microbiology U of M  
 Chris Martin Zoology U of M 1994  
 Vince Palace Nov. 22, 1991 Chaired defence  
 Gloria Goulet Zoology 1993  
 Sandra Lee Zoology Nov 1988 Chaired defence  
 Sandra Lee Zoology 1986 Chaired defence  
 Robert Cook Zoology April 30, 1986 Chaired defence  
 Glen Chilton Zoology Feb. 26, 1985 Chaired defence  
 Kevin Cash Zoology June 11, 1985 Chaired defence  
 Mansour Mikhail Zoology June 19, 1985  
 Robert Omeljaniuk Zoology April 7, 1983  
 Darlene Agar Zoology March 30, 1983 Chaired defence

Ray Ratynski Zoology June 14, 1982 Chaired defence  
 Walter Klenner Zoology April 2, 1982  
 Julia Porter Zoology 1981  
 Tom Lesiuk (Anatomy - U of M Med School) Sept 28, 1981  
 David Hunt Zoology May 26, 1978  
 Bob Fargher Zoology Aug 4, 1977 Chaired defence  
 Susan Eddy Zoology Nov 20, 1975  
 Bill Dentry, Zoology 1975 Chaired defence  
 Mohammed Abdulrahman Zoology May 27, 1974  
 Alex Hawley Zoology July 23, 1974  
 Carol Pollock Zoology Aug 30, 1974  
 Osmar Nusetti Zoology Jan 24, 1974  
 Briditte de March Zoology May 10, 1974 Chaired defence  
 Suwakonta Balakanich Zoology Sept 21, 1973  
 Hooi-Har Chan Zoology Dec 21, 1973

### **Other Graduate Committees**

#### **Ph D. Qualifying Exam:**

Brian Peer 1994  
 Joe Carney April 13, 1992  
 Marks Dithogo April 10, 1992  
 Sompong Doolgindach April, 1992  
 R. McNicol 1991  
 B. Wangilla Jan 30, 1987  
 Tor Sveinson Jan 5, 1986 Chair  
 Barbara Zielinski 1985  
 Val Converse Nov 14, 1985; repeat March 20, 1986  
 Scott Brown March 16, 1984  
 Dan Cyr March 11, 1985  
 Doug Torrance Dec 12, 1984 Chair  
 Od Bres Nov 18, 1983  
 Brigitte de March Sept 3, 1982  
 Al Shostack July 8, 1981  
 Ron Rosen Sept 10, 1980  
 Brian Knudson Oct 12, 1976  
 Ron Pauls Sept 27, 1976 Chair

#### **Candidacy Exam:**

Chaired Written Candidacy Exam for Jonathan Hare:2011  
 David Shearer (PhD) Zoology - served as an examiner on his Candidacy Exam  
 Steve Stelkov (Plant Science) Sept 2000  
 Julieta Werner 1999  
 Brian Peer 1995

Joe Carney 1995 Chair  
Sam Stephanson Jan 1993 Chair  
Donna Young (Anatomy) 1991  
Deep Swai Chaired 1990  
Al Shostak June 19, 1985 Chair  
Ron Rosen Feb 13, 1983  
Marek Tomalek Nov 22, 1983  
Barbara Zielinski Oct 15, 1982  
Cassie Aitcheson May 12, 1981  
Alex Hawley April 25, 1975  
Osmar Nusetti 1975 Chair  
P. Suraswadi 1974

### **PhD Selection Committees:**

Barbara Glassey, 1997  
James Duncan Nov. 9, 1988  
Debby MacLatchy March 30, 1987  
Mike Pabst May 20, 1987  
B.Wangila June 13, 1986  
Li Wancheng April 23, 1985  
Od Bres 1983  
P. Chaorkpurat Sept. 9, 1982  
M. Lintlop June 2, 1981  
T.A.O. Bogaert Feb 3, 1981 Chair  
K.Asotra May 25, 1981  
G. Hochbaum Sept 12, 1977  
Chris Mackenzie Dec 14, 1977  
Brain Knudson Aug 5, 1975  
Ting-Po Kam 1974  
Alex Hawley July 19, 1973

# CIRRICULUM VITAE

October 2015

Norm C. Kenkel, Professor  
Department of Biological Sciences, University of Manitoba  
Winnipeg, Manitoba R3T 2N2  
Tel: 204-474-6889  
Fax: 204-474-7604  
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Website: <http://home.cc.umanitoba.ca/~kenkel/>

## AREAS OF EXPERTISE

Ecological and Ecosystem Modeling:

- Boreal forest ecology and forest stand dynamics.
- Grassland and wetland ecosystems of Manitoba.

Statistical Ecology:

- Multivariate analysis (ordination, cluster analysis, canonical analysis, etc.).
- Spatial statistics and fractal theory.
- Biostatistics (regression, analysis of variance, contingency tables, etc.).
- Sampling theory and experimental design.

## EDUCATION

B.Sc. (Honours)	1978	University of British Columbia.
M.Sc.	1980	University of British Columbia.
Ph.D.	1984	University of Western Ontario.

## POSITIONS HELD

1984 – 1989	Assistant Professor, Department of Botany, University of Manitoba.
1989 – 1996	Associate Professor, Department of Botany, University of Manitoba.
1996 – 2007	Professor, Department of Botany, University of Manitoba.
2003 – 2005	Assistant Head, Department of Botany, University of Manitoba.
2007 – present	Professor, Dept. of Biological Sciences, University of Manitoba.

## AWARDS AND DISTINCTIONS (1984-present only)

2003 University of Manitoba, Graduate Students Association Award for Excellence in Graduate Teaching.

**TEACHING (Department of Biological Sciences, 2007-present)**

BIOL 1300 *Economic Plants*.

BIOL 3290 *Medicinal and Hallucinogenic Plants*.

BIOL 4312 *Analysis of Biological Communities*.

BIOL 7540 *Methods for Analysing Biological Data*.

BIOL 3100 *Skills in Biological Science* (guest lecture each year).

BIOL 7220 *Critical Thinking in Biological Science* (October 2012 guest lecture).

**PEER-REVIEW JOURNAL EDITORSHIPS**

*Ecology*: Board of Editors, 2001-2007.

*Ecological Monographs*: Board of Editors, 2001-2007.

*Journal of Vegetation Science*: Associate Editor, 1997-2007.

*Community Ecology*: Co-Editor (with J. Podani), 2000-2007.

*Community Ecology*: Editorial Board, 2007-present.

*Plant Ecology*: Editorial Board, 2001-2002.

*Canadian Journal of Botany*: Associate Editor, 1990-1996.

**SERVICE**

- Graduate Student Advisory Committees: 57 (Departments of Biological Sciences, Botany, Zoology, Geography, Computer Science, Plant Science, Soil Science, Landscape Architecture; Natural Resources Institute).
- Hiring and Promotion Committees: 9.
- Science and Technology Library Representative, Botany and Biological Sciences, 1991-present.
- Member, Advisory Committee to the President, "Building for a Bright Future": Life Sciences Committee, R. Lobdell (Chair), 2003-2004.
- University of Manitoba Field Station (Delta Marsh), Advisory Committee, 1993-2004.

**RESEARCH GRANTS AND CONTRACTS (1995-present only)**

**Nature Conservancy of Canada**

1. Ford, B., N. Kenkel and P. Catling. (2013-2015). *Manitoba alvar initiative*. \$14,000.

**Faculty of Science Field Work Support Program (FWSP)**

2. Ford, B. and N. Kenkel (2014 and 2015). *A comprehensive botanical study and classification of Manitoba's alvars*. \$5,400 and \$8,010.

**NSERC Networks of Centres of Excellence: Sustainable Forest Management**

3. Comeau, P., N. Kenkel and two others (2007-2011). *Influence of relative density and composition on growth and understory in boreal mixedwoods*. \$175,833.
4. Chen, H., N. Kenkel and eight others (2007-2011). *Forest successional dynamics in the east-central Canadian boreal forests*. \$420,000.
5. Thomas, S., N. Kenkel and three others (2005-2008). *Tree mortality following partial stand harvests: a cross-Canada study*. \$490,000.
6. Kenkel, N. (2000-2003). *Recruitment dynamics of white spruce and balsam fir advance regeneration in aspen stands*. \$105,000.
7. Messier, C., N. Kenkel and six others (2000-2004). *Developing better probabilistic function and field indicators of seedling mortality of important boreal species across the Canadian boreal forest*. \$150,000.
8. Kenkel, N. (1998-2001). *Forest succession and post-logging regeneration dynamics in the Duck Mountain ecoregion, west-central Manitoba*. \$105,000.
9. Kenkel, N. (2000-2001). *Forecasting our future forests*. \$18,000.
10. Kenkel, N. (1998-2011). *Manitoba Centres of Excellence Fund: Duck Mountain forestry research*. \$91,700.

**Natural Sciences and Engineering Research Council (NSERC)**

11. Kenkel, N. and six others (2004-2007). Collaborative Research and Development Grant: *Development of improved indicators of seedling growth and mortality of important boreal trees species: a long-term study*. \$85,000.
12. Kenkel, N. (2001-2006). Individual Research Grant: *Fractal analysis of ecological patterns and processes*. \$88,000.
13. Goldsborough, G., N. Kenkel and five others (1999-2002). Major Facilities Access Grant: *University of Manitoba Field Station (Delta Marsh)*. \$75,000.
14. Kenkel, N. (1997-2001). Individual Research Grant: *Dynamic scaling processes in plant population, community and landscape ecology*. \$83,790.
15. Ford, B. and N. Kenkel (1994-95). Equipment Grant: *The University of Manitoba Herbarium*. \$25,000.
16. Robinson, G., N. Kenkel and eight others. (1994-98). Major Facilities Access Grant: *University of Manitoba Field Station (Delta Marsh)*. \$75,000.
17. Kenkel, N. (1993-1996). Individual Research Grant: *Vegetation pattern in boreal forest ecosystems*. \$57,096.

**Parks Canada**

18. Kenkel, N. (2006-2008). *Ecological and hydrological consequences of beaver activity in Riding Mountain National Park*. \$35,000.
19. Kenkel, N. (2002-2005). *Dynamics of the grassland-forest ecotone in Riding Mountain and Prince Albert National Parks*. \$55,000.
20. Kenkel, N. (2002-2005). *Patterns and processes of exotic plant species invasion in Riding Mountain National Park*. \$55,000.
21. Kenkel, N. (2002). *Prescribed burning and tree encroachment in Prince Albert National Park fescue grasslands*. \$3,200.
22. Kenkel, N. and D. Barber (2000-2002). *Measuring tundra productivity and vegetation structure using satellite imagery*. \$90,000.
23. Kenkel, N. (1998-2000). *Structure and dynamics of bur oak (Quercus macrocarpa Michx.) stands in Riding Mountain National Park*. \$28,800.
24. Kenkel, N. (1997-1999). *Modelling Douglas-fir population dynamics in Canada's four Mountain Parks*. \$28,000.
25. Kenkel, N. (1996-98). *Modelling landscape-level vegetation dynamics in Riding Mountain Park*. \$28,000.
26. Kenkel, N. (1994-97). *Spatial and temporal landscape diversity in Riding Mountain National Park*. \$90,000.
27. Kenkel, N. (1994-96). *Long-term vegetation dynamics of fescue grasslands in Riding Mountain National Park*. \$26,000.

**Ducks Unlimited**

28. Kenkel, N. (1997-1999). *Dynamics of emergent macrophyte vegetation in the Delta Marsh MERP complex*. \$22,000.
29. Kenkel, N. (1995-97). *Competitive hierarchy of native grass species in Canadian mixed-grass prairie*. \$40,000.

**Ontario Ministry of Natural Resources**

30. Kenkel, N. (1994-96). *Modelling spatio-temporal processes in the boreal forests of northwestern Ontario*. \$41,800.

**Manitoba Hydro**

31. Kenkel, N. (1995-97). *Stable shrub vegetation on hydro rights-of-way: lowbush blueberries as a sustainable crop*. \$24,900.
32. Kenkel, N. (1994-96). *Sustainable harvesting of seneca snakeroot on hydro rights-of-way*. \$28,800.

## PUBLICATIONS (1995-present only)

### Books and Book Chapters

1. Epp, B., J.C. Tardif, N. Kenkel, and L. De Grandpré, 2009. *Forest dynamics of the Duck Mountain Provincial Forest, Manitoba, and the implications for forest management*. Pages 287-314 in: Gauthier, S., M-A Vaillancourt, A. Leduc, L. De Grandpré, D. Kneeshaw, H. Morin, P. Drapeau and Y. Bergeron (editors). *Ecosystem management in boreal forest*. Université du Québec, Québec. [also published in French, 2008].
2. Hagen, C.A., N.C. Kenkel, D.J. Walker, R.K. Baydack and C.E. Braun. 2001. *Fractal-based spatial analysis of radio telemetry data*. Pages 167-187 in: Millspaugh, J.J. and J.M. Marzluff (eds.). *Radio tracking and animal populations*. Academic Press, New York.
3. Kenkel, N.C. and C. Hamel. 2000. *The boreal mixedwood forests of Manitoba*. Pages 10-13 in: Kattenburg, D. & L. Clubb (eds.). *The Manitoba mixedwoods: a forest in transition*. MFRAC, Brandon, Manitoba.
4. Kenkel, N.C. and J. Podani (editors). 1998. *Scale, pattern, fractals and diversity*. Scientia, Budapest.
5. Barker, J. and N.C. Kenkel. 1998. *Lowbush blueberry (Vaccinium myrtilloides Michx.) management in northern Manitoba*. Pages 47-64 in: Oakes, J. and R. Riewe (eds). *Issues in the North*. Vol. III. Can. Circumpolar Inst. No. 44.
6. Turcotte, C. and N.C. Kenkel. 1997. *The ethnobotany and economics of seneca snakeroot (Polygala senega L.)*. Pages 17-24 in: Oakes, J. & R. Riewe (eds.). *Issues in the North*. Vol. II. Can. Circum. Inst. No. 41.
7. Kenkel, N.C. 1996. *Markovian spatial-inhibition models for established clonal populations*. Pages 29-33 in: Oborny, B. and J. Podani. (eds.) *Clonality in plant communities*. Opulus Press, Uppsala.

### Articles in Refereed Journals

8. Otfinowski, R., N.C. Kenkel and M. Tenuta. 2015. *Reduced vigor of a clonal invader: lack of evidence for soilborne pathogens*. *Applied Soil Ecology* (in press).
9. Lastra, R.A., N.C. Kenkel and F. Daayf. 2015. *Phenolic glycosides in Populus tremuloides and their effects on clonal vigour*. *J. Chem. Ecol.* (in press).
10. Bergeron, Y., H.Y.H. Chen, N.C. Kenkel, A. Leduc and S.E. MacDonald. 2014. *Boreal mixedwood stand dynamics: ecological processes underlying multiple pathways*. *For. Chron.* 90(2): 202-213.
11. Kenkel, N.C. 2013. *Sample size requirements for fractal dimension estimation*. *Comm. Ecol.* 14: 144-152.
12. Otfinowski, R. and N. C. Kenkel. 2010. *Covariance between disturbance type and soil resources dictates the invasibility of northern fescue prairies*. *Biological Invasions* 12: 1349-1361.



## CIRRICULUM VITAE: N.C. KENKEL

13. Otfinowski, R., N.C. Kenkel and R. C. van Acker. 2008. *Reconciling seed dispersal and seed bank observations to predict smooth brome (Bromus inermis) invasions of a northern prairie*. Invasive Plant Science and Management 1: 279-286.
14. Otfinowski, R. and N.C. Kenkel. 2008. *Clonal integration facilitates the proliferation of smooth brome clones invading northern fescue prairies*. Plant Ecology 199: 235-242.
15. Otfinowski, R., N.C. Kenkel and P.M. Catling. 2007. *The biology of Canadian weeds. 134. Bromus inermis Leyss.* Can. J. Plant Sci. 87: 183-188.
16. Kenkel, N.C. 2006. *On selecting an appropriate multivariate analysis*. Can. J. Plant Sci. 86: 663-676.
17. Bullied, W.J., R. C. Van Acker, A. M. Marginet, and N. C. Kenkel. 2006. *Agronomic and environmental factors influence canola competitiveness in southern Manitoba*. Can. J. Plant Sci. 86: 591-599.
18. Moffat, S., S.M. McLachlan and N.C. Kenkel. 2004. *Impacts of land-use on riparian forest along an urban-rural gradient in southern Manitoba*. Plant Ecology 174: 119-135.
19. Caners, R.T. and N.C. Kenkel. 2003. *Forest stand structure and dynamics at Riding Mountain National Park, Manitoba, Canada*. Community Ecol. 4: 185-204.
20. Kenkel, N.C., D.A. Derksen, A.G. Thomas and P.R. Watson. 2002. *Multivariate analysis in weed science research*. Weed Sci. 50: 281-292.
21. Brook, R.K. and N.C. Kenkel. 2002. *A multivariate approach to vegetation mapping of Manitoba's Hudson Bay lowlands*. Int. J. Remote. Sens. 23: 4761-4776.
22. Shirliffe, S.J., N.C. Kenkel and M.H. Entz. 2002. *Fractal analysis of seed dispersal and spatial pattern in wild oats*. Community Ecol. 3: 101-108.
23. Uhmman, T.V., N.C. Kenkel and R.K. Baydack. 2001. *Development of a habitat suitability index model for burrowing owls in the eastern Canadian prairies*. J. Raptor Res. 35: 378-384.
24. Johnson-Green, P., N.C. Kenkel and T. Booth. 2001. *Soil salinity and arbuscular mycorrhizal colonization of Puccinellia nuttalliana*. Mycol. Res. 105: 1094-1110.
25. Walker, D.J. and N.C. Kenkel. 2001. *Landscape complexity in space and time*. Community Ecol. 2: 109-119.
26. Kenkel, N.C., D.A. Peltzer, D. Baluta and D. Pirie. 2000. *Increasing plant diversity does not influence productivity: empirical evidence and potential mechanisms*. Community Ecol. 1: 165-170.
27. Walker, D.J. and N.C. Kenkel. 2000. *The adaptive geometry of boreal conifers*. Community Ecol. 1: 13-24.
28. Ominski, P., M. Entz and N.C. Kenkel. 1999. *The influence of alfalfa (Medicago sativa L.) on weeds in subsequent cereal crops: a comparative survey*. Weed Sci. 47: 282-290.
29. Walker, D.J. and N.C. Kenkel. 1998. *Fractal analysis of spatio-temporal dynamics in boreal forest landscapes*. Abst. Bot. 22: 13-28.
30. Ricotta, C., N.C. Kenkel, E. De Zuliani and G.C. Avena. 1998. *Community richness, diversity and evenness: a fractal approach*. Abst. Bot. 22: 145-150.
31. Kenkel, N.C., M.L. Hendrie and I.E. Bella. 1997. *A forty-one year study of jack pine population dynamics*. J. Veg. Sci. 8: 241-254.

32. Kenkel, N.C., R.T. Caners, R.A. Lastra, D.J. Walker and P.R. Watson. 1997. *Vegetation dynamics in boreal forest ecosystems*. *Coenoses* 12: 97-108.
33. Ursic, K.A., N.C. Kenkel and D.W. Larson. 1997. *Revegetation dynamics of cliff faces in abandoned limestone quarries*. *J. Appl. Ecol.* 34: 289-303.
34. Bourgeois, L., N.C. Kenkel and I.N. Morrison. 1997. *Different ACCase inhibitor cross-resistant patterns among 85 lines of wild oat*. *Weed Science* 45: 750-755.
35. Kenkel, N.C. 1996. *Environmental persistence and the structure/composition of northern prairie marshes*. *Coenoses* 11: 137-142.
36. Lee, E.J., N.C. Kenkel and T. Booth. 1996. *Atmospheric deposition of macronutrients by pollen in the boreal forest*. *Écoscience* 3: 304-309.
37. Lee, E.J., N.C. Kenkel and T. Booth. 1996. *Pollen deposition in the boreal forest of west-central Canada*. *Can. J. Bot.* 74: 1265-1272.
38. Kenkel, N.C. and D.J. Walker. 1996. *Fractals in the biological sciences*. *Coenoses* 11: 77-100.
39. Johnson-Green, P., N.C. Kenkel and T. Booth. 1995. *The distribution and phenology of arbuscular mycorrhizae along an inland salinity gradient*. *Can. J. Bot.* 73: 1318-1327.

### Technical Reports

40. Sinkins, P. and N. Kenkel. 2008. *Ecological and hydrological consequences of beaver activity in Riding Mountain National Park, Manitoba*. Final Project Report, Parks Canada, Wasagaming. 51 pages.
41. Otfinowski, R. and N. Kenkel. 2007. *Patterns and processes of exotic plant invasion in Riding Mountain National Park, Manitoba, Canada*. Final Project Report, Parks Canada, Wasagaming. 68 pages.
42. Sinkins, P. and N. Kenkel. 2006. *Beaver in Riding Mountain National Park: a literature review*. Final Project Report, Parks Canada, Wasagaming. 40 pages.
43. Lastra, R. and N. Kenkel. 2005. *Trembling aspen invasion of the plains rough fescue grasslands, Riding Mountain National Park*. Final Project Report, Parks Canada, Wasagaming. 75 pages.
44. Matthias, L., N. Kenkel and seven others. 2003. *Differential growth and mortality of advance regeneration across the Canadian boreal forests*. Final Project Report, Sustainable Forest Management Network, Edmonton. 40 pages.
45. Kenkel, N., C. Foster, R. Caners, R. Lastra and D. Walker. 2003. *Spatial and temporal patterns of white spruce recruitment in two boreal mixedwood stands, Duck Mountains, Manitoba*. Final Project Report, Sustainable Forest Management Network, Edmonton. 29 pages.
46. O'Brien, D. and N. Kenkel. 2002. *Measuring terrestrial net primary productivity in arctic ecosystems using AVHRR satellite imagery*. Final Project Report, Parks Canada, Ottawa. 79 pages.
47. Kenkel, N. 2002. *Prescribed burning and tree encroachment in Prince Albert National Park fescue grasslands*. Final Project Report, Parks Canada, Winnipeg. 64 pages.

## CIRRICULUM VITAE: N.C. KENKEL

48. Walker, D. and N. Kenkel. 2002. *A vegetation map for Riding Mountain National Park using Landsat TM imagery*. Final Project Report, Parks Canada, Wasagaming. 60 pages.
49. Lastra, R. and N. Kenkel. 2001. *Vegetation dynamics of interior Douglas-fir in Banff, Jasper, Yoho and Kootenay National Parks*. Final Project Report, Parks Canada, Banff. 156 pages.
50. Murray, S. and N. Kenkel 2001. *Effect of harvesting on aspen dominated stands*. Project Report 2001-6. Sustainable Forest Management Network, Edmonton. 37 pages.
51. Kenkel, N. and C. Hamel. 2000. *Structure and dynamics of boreal forest stands in the Duck Mountains, Manitoba*. Project Report 2000-27. Sustainable Forest Management Network, Edmonton. 30 pages.
52. Wolfe, K. and N. Kenkel. 2000. *Bur oak in Riding Mountain National Park*. Final Project Report, Parks Canada, Wasagaming. 105 pages.
53. Kenkel, N., P.R. Watson and P. Uhlig. 1998. *Modelling landscape-level vegetation dynamics in the boreal forests of northwestern Ontario*. Forest Research Report No. 148. Ministry of Natural Resources, Ontario Forest Research Institute, Sault Ste. Marie. 151 pages.
54. Caners, R. and N. Kenkel. 1998. *Modelling landscape-level vegetation dynamics in Riding Mountain National Park*. Final Project Report, Parks Canada, Wasagaming. 156 pages.
55. Goulet, S. and N. Kenkel. 1997. *Habitat survey and management proposal for Manitoba populations of western spiderwort (Tradescantia occidentalis)*. Final Project Report, Endangered Species Recovery Fund (World Wildlife Fund). Manitoba Habitat Heritage, Winnipeg. 89 pages.
56. Barker, J. and N. Kenkel. 1997. *Lowbush blueberry (Vaccinium myrtilloides Michaux) management on Hydro-electric rights-of-way in northern Manitoba*. Final Project Report, Manitoba Hydro, Winnipeg. 69 pages.
57. Slogan, J. and N. Kenkel. 1996. *Long-term vegetation dynamics of plains rough fescue grasslands in Riding Mountain National Park*. Final Project Report, Parks Canada, Wasagaming. 114 pages.
58. Turcotte, C. and N. Kenkel. 1996. *Sustainable harvesting of seneca snakeroot (Polygala senega L.) on Manitoba Hydro rights-of-way*. Final Project Report, Manitoba Hydro. 73 pages.

### **CONFERENCE PRESENTATIONS AND PROCEEDINGS (2004-2014, a selective list)**

1. Catling, P.K., N. Kenkel and B. Ford. 2015. *The classification and management of alvars in the Interlake Region of Manitoba, Canada*. Canadian Botanical Association/Botanical Society of America, Botany 2015 Conference, Edmonton, AB. July 28.
2. Kenkel, N.C. 2012. *Long-term direct observations of old-growth boreal mixedwood forest stand dynamics in west-central Manitoba*. Boreal Mixedwood Symposium 2012: Ecology & Management for Multiple Values. Edmonton, AB. June 19.
3. Lastra, R. and N.C. Kenkel. 2011. *Determining the consequences of clonal biology on the likelihood of trembling aspen (Populus tremuloides) encroachment*. Ecological Society of America, Annual Meeting, Austin, TX. August 10.

## CIRRICULUM VITAE: N.C. KENKEL

- Otfinowski, R. and N.C. Kenkel. 2010. *Plant community consequences of smooth brome invasions in the northern fescue prairies*. Ecological Society of America, Annual Meeting, Pittsburgh, PA. August 12.
- Reyes-Hernandez, V., P.G. Comeau, H. Chen, N. Kenkel, C. Hawkins, K. Greenway and A. Velazquez-Martinez. 2009. *Influence of relative density and composition on growth rates in boreal mixedwoods*. North American Forest Ecology Workshop, Annual Meeting, Logan, UT. June 23.
- Otfinowski, R., N. C. Kenkel and P. Dixon. 2008. *Integrating climate and trait models to predict invasiveness of exotic plants in Canada's Eastern Prairie Region*. Canadian Invasive Plant Framework, Prairie Workshop, Winnipeg, MB. January 21.
- Otfinowski, R. and N. C. Kenkel. 2008. *Clonal integration facilitates the proliferation of smooth brome invading northern fescue prairies*. Ecological Society of America, Milwaukee, WI. August 12.
- Otfinowski, R. and N.C. Kenkel. 2005. *The proliferation-decline model of exotic plant invasion*. Ecological Society of America Annual Meeting, Montreal, PQ. August 10.
- Otfinowski, R. and N.C. Kenkel. 2004. *Invasion ecology of smooth brome in the Northern Great Plains*. Canadian Botanical Association Annual Meeting, Winnipeg, MB. June 29.

### INVITED LECTURES (2004-2014, a selective list)

- Kenkel, N.C. 2012. Symposium Presentation: *Multivariate statistics for agriculture*. Canadian Weed Science Society, 66<sup>th</sup> Annual Meeting, Winnipeg. November 14.
- Kenkel, N.C. 2009. *The log transform is special, or why we should all be loggers*. Department of Entomology, University of Manitoba. March 17.
- Kenkel, N.C, M. Lazowski and P. Sinkins. 2006. *Late-successional trajectories for Manitoba mixed woods derived from long-term permanent sample plot data*. Sustainable Forest Management Network: Sustaining Canada's Forests, Edmonton. June 21.
- Kenkel, N,C, and J. Levac. 2006. *Advancing research in boreal mixedwood succession in Manitoba: Riding Mountain and Duck Mountain*. Sustainable Forest Management Network, Mixedwood Succession Research, Thunder Bay. Nov. 6.
- Kenkel, N.C. 2006. *Forest succession in Manitoba boreal mixed woods*. Annual General Meeting, Manitoba Association of Plant Biologists. Winnipeg. Nov. 25.
- Kenkel, N.C. 2005. Special Symposium. *On choosing an appropriate multivariate analytical strategy*. Plant Canada 2005, Edmonton. June 15.

### GRADUATE THESES SUPERVISED

- Catling, P. (M.Sc.) *Vegetation of alvar ecosystems in the Interlake region of Manitoba* (in progress).
- Xu, W. (Ph.D.) *Modelling jack pine and black spruce growth and yield in Manitoba, Canada*. 2012.
- Levac, J. (M.Sc.) *Forest succession in Manitoba boreal mixed woods: modeling composition and structure*. 2012.

4. Lastra, R. (Ph.D.) *Determining the ecological mechanisms of forest encroachment within the aspen parkland of western Canada*. 2011.
5. Fisher, D. (M.Sc.) *Impact of modified retention clearcuts on perimeter stands dominated by trembling aspen*. 2009.
6. Otfinowski, R. (Ph.D.) *Patterns and processes of exotic plant invasion in Riding Mountain National Park, Manitoba, Canada*. 2008.
7. Sinkins, P. (M.Sc.) *Ecological and hydrological consequences of beaver activity in Riding Mountain National Park, Manitoba*. 2008.
8. Matthias, L. (M.Sc.) *Sapling growth and mortality in contrasting light environments for four predominant tree species across the Canadian boreal forest*. 2004.
9. Xu, W. (M.Sc.) *Developing ecoregion-based height-diameter models and reference-age invariant polymorphic height and site index curves for black spruce and jack pine in Manitoba*. 2004.
10. Foster, C. (M.Sc.) *White spruce regeneration thirty-nine years post-fire in the boreal mixedwoods of Duck Mountain, Manitoba*. 2002.
11. Walker, D. (Ph.D.) *Landscape complexity and vegetation dynamics in Riding Mountain National Park, Canada*. 2002.
12. Caners, R. (M.Sc.) *Landscape-level vegetation dynamics in Riding Mountain National Park, Manitoba, Canada*. 2002.
13. Froese, J. (M.Sc.) *Determining effective strategies for conserving biological diversity in Manitoba's Interlake*. 2002 (co-advisor: R. Baydack).
14. O'Brien, D. (M.Sc.) *Measuring terrestrial net primary productivity in arctic ecosystems with AVHRR satellite imagery*. 2002.
15. Hamel, C. (M.Sc.) *Structure and dynamics of boreal forest stands in the Duck Mountains, Manitoba*. 2002.
16. Lastra, R. (M.Sc.) *Population dynamics of Interior Douglas-fir (*Pseudotsuga menziesii* var. *glauca*) in Canada's four mountain parks*. 2001.
17. Grosshans, R. (M.Sc.) *Long-term vegetation dynamics following water level stabilization in a prairie marsh*. 2001.
18. Murray, S. (M.Sc.) *Effects of harvesting on aspen dominated stands*. 2001.
19. Wolfe, K. (M.Sc.) *Bur oak (*Quercus macrocarpa*) in Riding Mountain National Park*. 2001.
20. Baluta, D. (M.Sc.) *Competitive hierarchies amongst twelve native prairie species*. 1999.
21. Slogan, J. (M.Sc.) *Long-term vegetation dynamics of plains rough fescue (*Festuca hallii*) grassland in Riding Mountain National Park, Manitoba*. 1997.
22. Watson, P.I. (M.Sc.) *Modelling landscape level vegetation dynamics in the boreal forests of northwestern Ontario*. 1997.
23. Turcotte, C. (M.Sc.) *Towards sustainable harvesting of seneca snakeroot (*Polygala senega* L.) on Manitoba Hydro rights-of-way*. 1997.
24. Barker, J. (M.Sc.) *Lowbush blueberry (*Vaccinium myrtilloides* Michaux) management on hydro-electric rights-of-way in northern Manitoba*. 1997.
25. Walker, D. (M.Sc.) *A model for predicting boreal vegetation dynamics and management requirements on electric transmission right-of-ways, Interlake region, Manitoba*. 1994.

26. Johnson-Green, P. (Ph.D.) *The ecology of arbuscular mycorrhizal fungi in inland boreal salt pans*. 1994 (co-advisor: T. Booth).
27. Shaw, M. (M.Sc.) *Spatio-temporal dynamics of the vegetation and seed bank of beaver meadows in Riding Mountain National Park, Manitoba*. 1993.
28. Jones, G. (M.Sc.) *Competitive processes and spatial patterning of plant species in boreal saline habitats*. 1992.
29. Burchill, C. (M.Sc.) *Vegetation-environment relationships of an inland boreal salt pan*. 1991.

#### **DOCTORAL THESES: EXTERNAL EXAMINER**

- Tucker, B. *The spatial statistics of linear features: an application to ecology*. Department of Biological Sciences, University of Alberta. 2011.
- Newmaster, S. *Patterns of bryophyte diversity in the interior and coastal cedar-hemlock forests of British Columbia*. Department of Botany, University of Alberta. 2000.
- Hauser, M. *Spatial aspects of community structure in a secondary dry grassland: a two dimensional approach*. Institut für Pflanzenphysiologie, Universität Wien. 1991.
- Zoladeski, C. *A phytosociological analysis of the boreal forests of northwestern Ontario*. Department of Botany, University of Toronto. 1989.

#### **DOCTORAL THESES: ADVISORY COMMITTEE AND INTERNAL EXAMINER**

- Brook, R. K. *Elk-agriculture conflicts in the greater Riding Mountain ecosystem: building bridges between the natural and social sciences to promote sustainability*. Dept. of Environment and Geography, University of Manitoba. 2008.
- Mauro, I.J. *Riding the risk wave: farmer knowledge and experience with GM crops in the Canadian prairies*. Dept. of Environment and Geography, University of Manitoba. 2008.
- Hwang, B.J. *Retrieval of geophysical and thermodynamic state information from time series microwave radiotelemetry in the fall and spring periods over Arctic sea ice*. Dept. of Environment and Geography, University of Manitoba. 2008.
- Nelson, P.A. *Ecology of sympatric catostomid fishes in a glaciated riverine system: habitat, food and biogeography*. Dept. of Zoology, University of Manitoba. 2005.
- Bakke, O.A. *Jack pine (Pinus banksiana Lamb.) pollen effects on jack pine and black spruce (Picea mariana (P. Mill.) B.S.P.) seed germination and seedling growth*. Dept. of Botany, University of Manitoba. 1999.
- Shirtliffe, S. J. *The effect of chaff collection on the combine harvester dispersal of wild oat (Avena fatua L.)*. Dept. of Plant Science, University of Manitoba. 1999.
- Bourgeois, L. *ACCase inhibitor resistant wild oat in Manitoba : prediction, identification, and characterization*. Dept. of Plant Science, University of Manitoba. 1997.
- Stephenson, S.A. *An analysis of meristic, morphometric and biochemical variation in the johnny darter, Etheostoma nigrum, in the northern United States and Canada with biogeographic and systematic considerations*. Dept. of Zoology, University of Manitoba. 1996.
- Duncan, J.R. *Influence of prey abundance and snow cover on great gray owl breeding dispersal*. Dept. of Zoology, University of Manitoba. 1992.

*CURRICULUM VITAE*  
**Dr. Jay Dene Kormish PhD**

**Personal**

**Citizenship:** Canadian

**Date of Birth/Gender:** September 24, 1976/ Female

**Business Address:** 474W Duff Roblin Building  
University of Manitoba  
Winnipeg, Manitoba  
Phone: (204) 474-7810  
Email: jay.kormish@umanitoba.ca

**Mailing Address:** 212 Biological Sciences Building  
50 Sifton Road  
University of Manitoba  
Winnipeg, Manitoba  
R3T 2N2

**Education:**

June 07, 2005 Ph. D.  
Department of Biochemistry and Molecular Biology  
Genes and Development Research Group  
University of Calgary

June 03, 1998 B. Sc. With Distinction  
Specialization in Biological Sciences - Molecular Genetics  
University of Alberta

**Research/Professional Experience**

May 2012 to current Assistant Professor  
Department of Biological Sciences  
University of Manitoba. Winnipeg, MB, Canada  
Developmental and Cell Biologist and Molecular Geneticists

Sept. 2009 to May 2012 Postdoctoral Fellow  
Supervisor: Dr Jeb Gaudet  
Department of Biochemistry and Molecular Biology  
Alberta Children's Hospital Research Institute  
University of Calgary, Calgary, AB, Canada  
"The antagonistic functions of the receptor tyrosine kinases, CAM-1/ROR and EGL-15/FGFR, in the retrograde extension of the pharyngeal gland cells in *C. elegans*."

**Research/Professional Experience Continued**

- Feb. 2008 to Aug 2009      Research Fellow  
Supervisor: Dr. Aaron Zorn  
Department of Developmental Biology  
Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA  
"Sox17/ $\beta$ -catenin/TCF interactions during anterior/posterior  
patterning of embryonic *Xenopus laevis* endoderm".
- April 2005 to Jan. 2008      Postdoctoral Associate  
Supervisor: Dr. Kenneth Zaret  
Cell and Developmental Biology Program  
Fox Chase Cancer Center, Philadelphia, PA, USA  
"Transcription factor associations and histone modifications  
during mouse embryonic endoderm development and early liver  
specification".
- Jan. 1999 to Feb. 2005      Graduate Student – Ph.D.  
Supervisor: Dr. James McGhee  
Department of Biochemistry and Molecular Biology  
University of Calgary, Alberta  
Thesis title: "*gob-1* is a Trehalose-6-Phosphate Phosphatase  
Required for Intestine Development in the Nematode  
*Caenorhabditis elegans*."
- May 1998 to Dec. 1998      Research Assistant  
Supervisor: Dr. Judy Chernos  
Cytogenetics Laboratory, Calgary  
Alberta Children's Hospital, Calgary, AB, Canada  
"Database creation for the analysis of prenatal amniocentesis  
cytogenetics results."
- April 1996 to April 1998      Laboratory Assistant  
Supervisor: Dr. Susan Rosenberg  
Department of Biochemistry  
University of Alberta, Edmonton, AB, Canada
- May 1995 to Aug. 1995      Summer Student  
Supervisor: Dr. Jutta Preiksaitis  
Department of Medical Microbiology and Immunology University  
of Alberta  
"ELISA sensitivity study for Hepatitis C antibody detection in  
Hepatitis C infected immunosuppressed patients."



### **Current and Past Research Funding**

#### **Graduate Enhancement of Tri-Council Stipends (GETS ) Academic Enhancement Fund**

Proposal Title: “The morphogenic movements and cell signalling events during organ development.”

Funds Awarded: Stephanie Tkachuk MSc \$16,333.34. Sept 1st, 2015 to August 31st , 2017

#### **Faculty of Science Research Tools Initiative (June 2015-January 2016)**

Proposal Title: Diagenode Bioruptor Pico and a Bio-Rad CFX Connect Real-time PCR Detection System

Funds Awarded: \$48,985.13

Grant Supplement of \$3,500.00 from Department of Biological Sciences

#### **Faculty of Science Interdisciplinary/New Directions Research Collaboration Initiation Grant (January 2015-May 2016)**

Proposal Title: “Pharyngeal gland cell development and secretory function mediating host interaction in the plant parasitic root-knot nematode *Meloidogyne hapla*”

Primary Investigator with Dr. Mario Tenuta as Co-investigator

Funds Awarded: \$11,772 December 2014.

#### **NSERC Research Tools and Instruments (RTI ) - Category 1:**

Proposal Title: “Fluorescent stereomicroscope, microinjection training module and objective upgrade for *C. elegans* transgenic generation, husbandry and phenotypic screening”

Primary Applicant with Dr. Anne Karen Brassinga as a Co-applicant

Funds Awarded: \$110,689.00 April 2014

Grant Supplements of \$6,855.00 each from the Faculty of Science and the Vice-President of Research.

#### **NSERC Discovery Grant , November 1st 2012 Competition**

Proposal Title: “The morphogenic movements and cell signalling events during organ development.”

Funds Awarded: \$35,000.00 over five years (May 2013 to April 2018).

#### **Graduate Enhancement of Tri-Council Stipends (GETS) Academic Enhancement Fund**

Proposal Title: “The morphogenic movements and cell signalling events during organ development.”

Funds Awarded:

Shinhye Kim MSc \$9,333.33. May 1st, 2013 to August 31st , 2014

Royden (Sasha) Loewen MSc \$14,000. September 1st, 2013 to August 31st , 2015

#### **University Research Grants Program (URGP) New Faculty October 2012 Competition**

Proposal Title: Regulation of cell migrations during organ development by the Fibroblast Growth Factor Receptor.

Funds Awarded: \$7,500

## **Awards/Training Grants**

CIHR Training Program in Genetics, Child Development and Health Fellowship, January 2010, Renewed for January 2011 \$40,000/year

CIHR Training Program in Genetics, Child Development and Health Studentship, November, 2003, \$20,000

Biochemistry and Molecular Biology Department Graduate Award, November, 2002 \$4,000

William H. Davies Medical Research Scholarship & Faculty of Medicine Graduate Studentship, September, 2001 \$4,000

Province of Alberta Graduate Studies Scholarship 2000/2001 \$10,000

B.Sc. with Distinction, 1998, University of Alberta

Alberta Heritage Foundation for Medical Research Summer Studentship, 1995

Millar Western Entrance Scholarship (Leadership Award), 1994, University of Alberta

Faculty of Science Entrance Scholarship, 1994, University of Alberta

Women in Scholarship, Engineering, Science and Technology (WISEST) High school Summer Studentship, 1993, University of Alberta

## **Publications**

Adlimoghaddam A, O'Donnell MJ, Kormish J, Banh S, Treberg JR, Merz D and Weihrauch D. Ammonia excretion in *Caenorhabditis elegans*: Physiological and molecular characterization of the *rhr-2* knock-out mutant. Comparative Biochemistry and Physiology. *Manuscript Accepted*.

Hellinga JR, Garduño RA, Kormish JD, Tanner JR, Khan D, Buchko K, Jimenez C, Pinette MM, Brassinga AK. (2015) Identification of vacuoles containing extraintestinal differentiated forms of *Legionella pneumophila* in colonized *Caenorhabditis elegans* soil nematodes. MicrobiologyOpen 4 (4), 660-681. doi: 10.1002/mbo3.271. Epub 2015 July 1.

Lagha M, Mayeuf-Louchart A, Chang T, Montarras D, Rocancourt D, Zalc A, Kormish J, Zaret KS, Buckingham ME, Relaix F. (2013) *Itm2a* is a Pax3 target gene, expressed at sites of skeletal muscle formation *in vivo*. PLoS One.;8(5):e63143. doi: 10.1371/journal.pone.0063143. 2013 May 1.

Cha SW, McAdams M, Kormish J, Wylie C, Kofron M. (2012) Foxi2 is an animally localized maternal mRNA in *Xenopus*, and an activator of the zygotic ectoderm activator foxi1e. PLoS One 7(7):e41782. Epub 2012 July 27.

Jason A. Watts, Chaolin Zhang, Andres J. Klein-Szanto, Jay D Kormish, Jian Fu, Michael Q. Zhang and Kenneth S. Zaret. (2011) Study of FoxA Pioneer Factor at Silent Genes Reveals Rfx-

Repressed Enhancer at Cdx2 and a Potential Indicator of Esophageal Adenocarcinoma Development. *PLoS Genetics* **7(9)**:e1002277 Epub 2011 September 15.

Cheng-Ran Xu, Philip A. Cole, David J. Meyers, Jay Kormish, Sharon Dent & Kenneth S. Zaret. (2011) Chromatin "prepattern" and histone modifiers in a fate choice for liver and pancreas. *Science* **332**:963-966.

Scott A. Rankin, Jay Kormish, Matt Kofron, Anil Jegga, and Aaron M. Zorn. (2011) A gene regulatory network controlling *hhex* transcription in the anterior endoderm of the organizer. *Developmental Biology* **351**:297-310.

Jay D. Kormish, Jeb G. Gaudet and Jim D. McGhee. (2010) The *C. elegans* endoderm. *Current Opinion in Genetics and Development* **20**:346-354.

Jay D. Kormish, Débora Sinner and Aaron M. Zorn. (2010) Interactions between Sox factors and Wnt/ $\beta$ -catenin signaling in development and disease. *Developmental Dynamics* **239**:56-68.

Mounia Lagha\*, Jay D. Kormish\*, Didier Rocancourt, Jon A. Epstein, Kenneth S. Zaret, Frédéric Relaix and Margaret E. Buckingham. \*These authors contributed equally to this work. (2008) Pax3 regulation of FGF signaling affects the progression of embryonic progenitor cells into the myogenic program. *Genes and Development* **22**:1828-1837.

Kormish J.D. and Zaret, K.S. (2007) Chapter 43: Early Liver Development and Hepatic Progenitor Cells. Pages 982 to 1003. *Principles of Developmental Genetics*. Edited by Sally Moody. Elsevier Academic Press.

Wiebe P.O., Kormish J.D., Roper V.T., Fujitani Y., Alston N.I., Zaret K.S., Wright C.V., Stein R.W., Gannon M. (2007) Ptf1a binds to and activates Area III, a highly conserved region of the Pdx1 promoter that mediates early pancreas-wide Pdx1 expression. *Molecular and Cellular Biology* **27**:4093-104.

Kormish, J.D. and McGhee, J.D. (2005) The *C. elegans* lethal gut-obstructed *gob-1* gene is trehalose-6-phosphate phosphatase. *Developmental Biology* **287**:35-47.

Kormish, J. D. *gob-1* is a Trehalose-6-Phosphate Phosphatase Required for Intestine Development in the Nematode *Caenorhabditis elegans*. (January 2005) Ph.D. Thesis University of Calgary.

**Invited Presentations/Conferences**

**Invited Research Seminar** November 30th, 2015 Science Research Talks at Migizii Agamik, University of Manitoba.

“Big ideas from little worms: lessons learned in organ development and plant parasites”

**Invited Research Seminar** November 27th, 2015 Graduate student organized Cracker jack seminar series, Department of Biological Sciences, University of Manitoba.

“Root-knot Nematodes: *C. elegans* Genetics Leading the Way to Stopping the Invasion”

S. Tkachuk, S.R. Kim, M. Burg, O. Atta, M. Singh, W.H. Raharjo and J. Kormish. **(University of Manitoba Endorsed Participant -Poster Presentation, October 2015)** “Morphogenic Movements and Cell Signalling Events during Organ Development in *Caenorhabditis elegans*” CIHR’s Institute of Genetics 14th Annual New Principal Investigators Meeting, Mont Gabriel, Québec. Abstract 25.

Canadian *C. elegans* Satellite Meeting **(Member of Speaker Series – Oral Presentation)**, Complex Organ Development Made Simple by the Worm; Mont-Tremblant, Québec, March 16 – 17, 2014.

**Invited Research Seminar** May 8th 2013 – Department of Medical Genetics, Faculty of Medicine, University of Manitoba

“Complex Organ Development Made Simple by the Worm: Signalling pathways required for salivary gland morphogenesis in the pharynx of *C. elegans*”

**Invited Research Seminar** January 16th 2013 – Department of Biochemistry/Biology, Faculty of Science, University of Winnipeg

“Complex organ development made simple by the worm: Signalling pathways required for salivary gland morphogenesis in the pharynx of *C. elegans*”

**Invited Research Seminar** November 29th, 2012– Department of Oral Biology, Faculty of Dentistry, University of Manitoba

“Complex organ development made simple by the worm: Signalling pathways required for salivary gland morphogenesis in the pharynx of *C. elegans*”

**Kormish J (Assistant Professor Candidate, October 2011)** “Complex organ development made simple by the worm: signalling pathways regulating cell migrations during pharynx morphogenesis.” Cellular and Developmental Biological Research Group, Department of Biological Sciences, University of Manitoba.

**Kormish J, Raharjo W., Rohs P., Kim S., and J. Gaudet. (Awarded talk, June 2011).** “The long cellular projections of *C. elegans* pharyngeal gland cells form *via* retrograde extension under the control of CAM-1/ROR and EGL-15/FGFR signaling”. 18th International *C. elegans* Meeting. University of California Los Angeles. Parallel Session: Cell Biology II - Cell Polarity and Morphogenesis.

Kormish J. **(Invited Presentation, May 2011)**. "Complex organ development made simple by the worm: Wnt5a/ROR2 and FGF/FGFR2 signaling regulates gland cell retrograde extension in a developing organ". CIHR-Institute of Human Development, Child and Youth Health, Scientific Forum on Maternal and Child Health. University of Calgary.

Kormish J., Raharjo W., Rohs P., Kim S., and J. Gaudet. (Poster Presentation, April 2011). "Complex cell interactions during organ morphogenesis: retrograde extension of the glands in the *C. elegans* pharynx is controlled by the ROR and FGFR receptor tyrosine kinases". Fourth Annual Canadian Human Genetics Conference, Banff Alberta. Abstract 42.

Kormish J., Raharjo W., Rohs P., Kim S., Gaudet J. **(Awarded talk, April 2011)**. "Signaling pathways required for retrograde extension - formation of long cellular projections by migration of *C. elegans* pharyngeal glands". Alberta Children's Hospital Research Institute Symposium. University of Calgary and Alberta Children's Hospital. Concurrent Session: Embryonic and Fetal Health.

Kormish, J., Rohs, P. and J. Gaudet. **(Awarded talk, April 2010)**. "Signaling pathways required for retrograde extension - formation of long cellular projections by migration of *C. elegans* pharyngeal glands". 5<sup>th</sup> Canadian Developmental Biology Conference. Mont-Tremblant, Québec. Session: Morphogenesis.

Kormish, J.D., M. Lagha, M. Buckingham and K. Zaret. **(Invited presentation, March 2007)**. "Liver and muscle development: Embryonic ChIP and ChIP on chip. The Cutting Edge: Array Power. Microarray Technologies". Département de Biologie du Développement, Institut Pasteur.

Kormish, J.D., M. Lagha, M. Buckingham and K. Zaret. **(Invited presentation, August 2007)**. "Embryonic chromatin immunoprecipitation and ChIP on chip: tracking the dynamics of chromatin structure and transcription factor recruitment during liver and muscle development". Genes and Development Research Group, University of Calgary.

Wiebe, P.O., J.D. Kormish, Y. Fujitani, K.S. Zaret, C.V.E. Wright, R.W. Stein, and M. Gannon. (Poster presentation, 2007). "Ptf1a binds to Area III, a highly conserved region of the Pdx1 promoter that mediates early pancreas-wide Pdx1 expression". Pan-American Society for Developmental Biology Abstract 360:A99.

Kormish J.D. and Zaret K. (Poster presentation, 2006) "Transcriptional and chromatin control of endoderm cell type differentiation". FASEB Summer Research Conferences: Transcriptional Regulation during Cell Growth, Differentiation, and Development Abstract 24.

Kormish, J.D. and McGhee, J.D. (Poster presentation, 2004) "*gob-1* is a HAD hydrolase necessary for intestine development in *Caenorhabditis elegans*". Society for Developmental Biology 63<sup>rd</sup> Annual Meeting Abstract 348.

Kormish, J.D. and McGhee, J.D. (Poster presentation, 2003) "Characterization of *gob-1*: a gene required for intestine development in the nematode *Caenorhabditis elegans*". Society for Developmental Biology 62<sup>nd</sup> Annual Meeting Abstract 455.

Kormish, J.D and McGhee, J.D. (Poster presentation, 2003) “The cloning and characterization of *gob-1*, a gene affecting intestine development”. 14<sup>th</sup> International *C. elegans* Meeting Abstract 980.

Kormish, J.D and McGhee, J.D. (Poster presentation, 2001) “The cloning and characterization of *gob-1*, a gene affecting intestine development”. 13<sup>th</sup> International *C. elegans* Meeting Abstract 503.

### **Invited Presentations/Conferences Continued**

Kormish, J.D and McGhee, J.D. (Poster presentation, 2000) "A genetic screen for genes involved in gut development and differentiation in *Caenorhabditis elegans*". West Coast Worm Meeting Abstract 175.

Kormish, J.D and McGhee, J.D. (Poster presentation, 2000) "A genetic screen for genes involved in gut development and differentiation in *Caenorhabditis elegans*". 10<sup>th</sup> Annual Winternational Symposium *Biochemistry and Cell Biology* October 78 (5).

Kormish, J.D. and McGhee, J.D. (Poster presentation, 1999) "A genetic screen for genes involved in gut development and differentiation". 12<sup>th</sup> International *C. elegans* Meeting Abstract 493.

### **Professional and Training Committee Experience**

Biol 4100 Department of Biological Sciences Honours Thesis Course  
Committee Member May 2013 to present [Medical Leave September 2013 to December 2013].

Research Manitoba Fellowship Review Panel April 20, 2015.  
Panel member, primary reviewer for five to eight applications.

Department of Biological Sciences Strategic Planning Committee: Department Communication  
Committee Member February 2013.

Paper reviewer International Journal for Developmental Biology  
Primary Reviewer – submitted manuscript comments January 2014

Graduate committee member for Alison Patrigel; Fall Term 2012 to Fall Term 2015.  
MSc Student in the Department of Biological Sciences, supervisor - Dr. Steve Whyard.  
MSc thesis was successfully defended August 19, 2015 titled "Characterizing putative cellular mediators of West Nile virus infections in bird and mosquito tissues".

Graduate committee member for Xun Wu; Fall Term 2012 to Fall Term 2014.  
MSc Student in the Department of Immunology, co-supervised - Dr. Francis Lin/Dr. Aaron Marshall  
MSc thesis successfully defended August 7, 2014 titled "Quantitative Cell Migration Analysis of CCR7-mediated Lymphocytes Migration Using a Microfluidic Device"

Graduate committee member for Jacqueline Hellinga; Fall Term 2012 to Summer Term 2014  
MSc Student in the Department of Microbiology, supervisor - Dr. Karen Brassigna  
MSc thesis was successfully defended July 22, 2014 titled "Observation of infectious *Legionella pneumophila* in host model *Caenorhabditis elegans*".

Biol 4100 Honours Thesis External Evaluator  
Stefany Morrison (Whyard Laboratory) April 2013

### **Professional and Training Committee Experience Continued**

Committee: Alberta Children's Hospital Research Institute Symposium and Career Development Day – April 18 and 19<sup>th</sup>, 2011

Position: Head organizer and Trainee participation coordinator

Committee: Genes and Development Research Group, September 2010 January 2011

Position: Postdoctoral representative and Trainee coordinator for invited speaker seminar series

Committee: Delaware Valley Science Fair 2006.

Position: Final Round Judge for Grade 11 Biochemistry Division

Committee: The George Washington Carver Science Fair 2006

Position: Final Round Judge for Secondary Fair Life Sciences Division

Committee: Canada Wide Science Fair, May 2003

Position: Team Captain of Judging Team for Senior Life Sciences Division

Committee: Genes and Development Research Group, September, 2000 to August, 2001

Position: Ph.D. Student Representative

Committee: Ninth Annual Medical Sciences Graduate Student's Association Symposium "A Tour of the Cell", May 18<sup>th</sup>, 2001

Position: President

Committee: Genes and Development Annual Mini-Symposium, March 16<sup>th</sup>, 2001

Position: Head Organizer

Committee: Eighth Annual Medical Sciences Graduate Student's Association Symposium "From Research to Reality", May, 2000.

Position: Committee Member

### **Training Experience**

#### ***Supervision of graduate students:***

##### **Stephanie Tkachuk – Master's graduate student, Supervisor**

Enrolled in Department of Biological Sciences Graduate Program/Faculty of Science in the Faculty of Graduate Studies at the University of Manitoba

Program started: September 2015

Anticipated completion: August 2017

##### **Royden (Sasha) Loewen - Master's graduate student, Supervisor**

Enrolled in Department of Biological Sciences Graduate Program/Faculty of Science in the Faculty of Graduate Studies at the University of Manitoba

Program started: September 2013

Anticipated completion: April 2016



## **Training Experience Continued**

### **Shinhye Kim – Master’s graduate student, Supervisor**

Enrolled in Department of Biological Sciences Graduate Program/Faculty of Science in the Faculty of Graduate Studies at the University of Manitoba

Program started: September 2012

Program completion: successfully completed Masters Thesis in December 2014.

Technical Expert (Medicare)

### ***Supervision of Undergraduate Students:***

#### **Monty Singh – Research Assistant , Supervisor.**

Canada Summer Jobs Recipient, 1 September 2015 to 21 February, 2016. “Cloning and sequencing of the *C. elegans ina-1/α-integrin* locus and *Mhhlh-6* cDNA; and species typing of Agriculture and Agri-Food Canada Quebec and Ontario *Meloidogyne* strains.

#### **Mackenzie Sato – Research Assistant , Supervisor.**

Canada Summer Jobs Recipient, 1 September 2015 to 20 October 2016. “Development of *Meloidogyne hapla* infected host plant inventory, isogenic strain isolation, J2 collection and root infection protocols”.

#### **Emma Bennici Clendinnen - Faculty of Science Co-op Work Term Student, Supervisor.**

Work term 2, 1 September 2015 to 24 November 2015. Work term oral presentation December 1, 2015 “The characterization of CAM-1 antibodies in Western Blot and whole mount embryo immunohistochemistry”.

#### **Emma Bennici Clendinnen - Faculty of Science Co-op Work Term Student, Supervisor.**

Work term 1, 1 June 2015 to 21 August 2015. Final Work Term Report “Summary of mutagen screen on the gland cells in *Caenorhabditis elegans* and update on protocols used in daily lab duties in the Kormish lab.”

#### **Monty Singh – Faculty of Science Co-op Work Term Student, Supervisor.**

Work term 3, 1 June 2015 to 21 August 2015. Final Work Term Report “Generation of *ina-1*, *dpy-7* promoter, and *elt-3* promoter plasmid constructs to test their role in the development of the *Caenorhabditis elegans* pharynx”.

#### **Mackenzie Sato – Faculty of Science Co-op Work Term Student / Research Assistant , Supervisor.**

Work term 3 / Canada Summer Jobs Recipient, 1 June 2015 to 21 August 2015. Final Work Term Report “Development of controls for anthelmintic compound screen and protocols for infection assays of root knot nematode, *Meloidogyne hapla*”

#### **Stephanie Tkachuk – Research Assistant , Supervisor.**

Canada Summer Jobs Recipient, 1 June 2015 to 21 August 2015. “The genetic basis of cell migration during organ development”.

**Onorueiza (Oiza) Atta - MBI0 4530 Honours Student** (Fall term 2013/Winter term 2014), Thesis Supervisor.

Completed honours thesis April 21st, 2014 “Characterization of molecular mechanisms of gland cell migration in *Caenorhabditis elegans* pharynx using a mutagenesis screen”.

**Stephanie Tkachuk - Faculty of Science Co-op Work Term Student**, Supervisor.  
Work term 3 May 20th to August 9th, 2014. Work term oral presentation August 28th, 2014 titled “Foregut, Forward: a Genetic Screen of the *Caenorhabditis elegans* Pharynx”.

**Maxwell Burg - Vice President of Research Undergraduate Research Award (URA)**  
May to Aug 2014, Project Supervisor, presented research at the 7th Canadian Developmental Biology Conference & 5th Canada Regional SDB Conference, Mont-Tremblant, Québec, March 17 – 20, 2014. Poster session A, Abstract A-8 titled “The Role of  $\beta$ -integrin in mediating pharyngeal gland cell migration during *Caenorhabditis elegans*”.

**Maxwell Burg - Vice President of Research Undergraduate Research Award (URA)**  
May 6th 2013 to August 23rd 2013. Presented research at University of Manitoba Undergraduate Research Poster Competition Nov 2013 “Role of  $\beta$ -integrin in mediating pharyngeal gland cell migration during *Caenorhabditis elegans* development.”

**Onorueiza Atta -Summer Student**  
May 6th 2013 to August 23rd 2013  
“Molecular mechanism of the ROR tyrosine receptor kinase, cam-1, in gland cell migration during the development of the *Caenorhabditis elegans* pharynx.”

**Maxwell Burg - Biol4890 Special Topics in Biology - DEVELOPMENTAL GENETICS IN INVERTEBRATE MODEL SYSTEMS**, Fall term 2013, Supervisor.  
Undergraduate research project “Role of  $\beta$ -integrin in mediating pharyngeal gland cell migration during *Caenorhabditis elegans* development.”

**Stephanie Rozbacher - Biol4890 Special Topics in Biology - DEVELOPMENTAL GENETICS IN INVERTEBRATE MODEL SYSTEMS**, Fall term 2013, Supervisor.  
Undergraduate research project “Role of extracellular matrix component laminin in mediating pharyngeal gland cell migration during *Caenorhabditis elegans* development.”

## **Training Experience Continued**

### ***Supervision of research assistants:***

#### **Stephanie Tkachuk Oiza Atta - Research Assistant (Part-time)**

Employed September 2014 to December 2014.

#### **Oiza Atta - Research Assistant (Part-time)**

Employed August 31, 2012 to April 2014.

#### **Royden (Sasha) Loewen - Research Assistant (Part-time)**

Employed May 20th 2013 to August 30th 2013.

#### **Matthew Martens – Student Research Assistant (Part-time)**

Employed May 10th 2013 to August 9th 2013.

#### **Shinhye Kim – Biological Technician/Student Research Assistant**

Employed June 4, 2012 to August 31, 2012.

### ***Mentoring Activity:***

#### **Dilukshi Fernando Ph.D Candidate, Teaching Evaluator/Mentor.**

Certificate Course in Higher Education Teaching (CHET), University Teaching Services, University of Manitoba.

## **Teaching Experience and Development**

#### **BIOL4860 Special Topic Course in Biology - DEVELOPMENTAL GENETICS IN INVERTEBRATE MODEL SYSTEMS [1 registered students] (Fall 2015 term)**

University of Manitoba, Department of Biological Sciences  
Course co-ordinator and Instructor.

#### **BIOL7600 – Special Topic Course in Biology - CELLULAR AND GENETIC BASIS OF ORGAN DEVELOPMENT [1 registered student] (Fall 2015 term)**

University of Manitoba, Department of Biological Sciences  
Course co-ordinator and Instructor.

#### **BIOL4860 Special Topic Course in Biology – CELLULAR MIGRATION AND TISSUE REMODELLING IN DEVELOPMENT AND DISEASE [1 registered students] (Winter Term 2015).**

Course co-ordinator and Instructor.

#### **BIOL 2540 Developmental Biology [219 registered students] (Fall 2015 term)**

University of Manitoba, Department of Biological Sciences  
Course co-ordinator and Instructor.

#### **BIOL 4890 Special Topic Course in Biology - – DEVELOPMENTAL GENETICS IN INVERTEBRATE MODEL SYSTEMS [1 registered student] (Fall term 2014).**

**BIOL3500 Genetics 2 (Molecular Genetics)** [24 registered students] (Winter Term 2014).  
Instructor and Laboratory Director  
Supervised two teaching assistants Royden (Sasha) Loewen and Bonnie McCullagh.

**BIOL4860 Special Topic Course in Biology – CELLULAR MIGRATION AND TISSUE REMODELLING IN DEVELOPMENT AND DISEASE** [2 registered students] (Winter Term 2014).  
Course co-ordinator and Instructor.

**BIOL 7220 – CRITICAL THINKING IN BIOLOGICAL SCIENCES (2014–2015)**  
INSTRUCTORS: DR. M. F. DOCKER AND DR. W. G. ANDERSON,  
Guest Lecture for October 23rd, 2014.

**BIOL 2540 Developmental Biology** [219 registered students] (Fall 2014 term)  
University of Manitoba, Department of Biological Sciences  
Co-instructor Katharine Blaschuk (Sessional Instructor)  
Course co-ordinator; Instructor for February 27th to April 8th.

**BIOL4860 Special Topic Course in Biology - DEVELOPMENTAL GENETICS IN INVERTEBRATE MODEL SYSTEMS** [2 registered students] (Fall 2013 term)  
University of Manitoba, Department of Biological Sciences  
Co-instructor with Dr. Steven Whyard

**BIOL7600 – Special Topic Course in Biology - CELLULAR AND GENETIC BASIS OF ORGAN DEVELOPMENT** [1 registered student] (Fall 2013 term)  
University of Manitoba, Department of Biological Sciences  
Co-instructor with Dr. Steven Whyard

**BIOL 2540 Developmental Biology** [219 registered students] (Winter 2013 Term)  
University of Manitoba, Department of Biological Sciences  
Co-instructor Katharine Blaschuk (Sessional Instructor)  
Course co-ordinator; 11 of 23 lectures; co-ordinated lecture by Dr. Mark Belmonte on Plant Embryo Development

**BIOL 3500 – Genetics 2 (Molecular Genetics)** (Lecture 7 – September 28th, 2012)  
University of Manitoba, Department of Biological Sciences  
Guest Lecture for Dr. Jeffrey Marcus  
Lecture content: DNA methylation and epigenetics.

**BIOL7600 Special Topic Course in Biology - Cell Adhesion Molecules** [2 registered students] (Fall term 2012)  
University of Manitoba, Department of Biological Sciences  
Co-instructor with Dr. Steven Whyard

**Cellular, Molecular and Microbial Biology 505 – Advanced Developmental Biology**  
**University of Calgary, Alberta.**

Guest Lecturer for “MicroRNAs in *C.elegans*.” January 24<sup>th</sup>, 2012, “Pha-4 – Pharynx organ identity transcription factor in *C.elegans*.” January 26<sup>th</sup>, 2012 and “FoxA – Pioneer transcription factor in mouse endoderm.” January 31<sup>th</sup>, 2012

**Medical Sciences 402 – Organismal Biology**

**University of Calgary, Alberta.**

Guest Lecturer for “Endoderm development – Specification and patterning during vertebrate embryo development.” November 24<sup>th</sup>, 2011

**Developing Effective Course Outcomes Workshop**, University of Calgary, October 13, 2011.

**Medical Sciences 508 – Honours Thesis**

**University of Calgary, Alberta.**

Oral Exam and Written Thesis Evaluator. April 8<sup>th</sup>, 2011.

**Cellular, Molecular and Microbial Biology 505 – Advanced Developmental Biology**

**University of Calgary, Alberta.**

Guest Lecturer for “MicroRNAs in *C.elegans*.” February 10<sup>th</sup>, 2011, “Pha-4 – Pharynx organ identity transcription factor in *C.elegans*.” February 15<sup>th</sup>, 2011 and “FoxA – Pioneer transcription factor in mouse endoderm.” February 17<sup>th</sup>, 2011

**Medical Sciences 402 – Organismal Biology**

**University of Calgary, Alberta.**

Guest Lecturer for “Endoderm development – Specification and patterning during vertebrate embryo development.” November 30<sup>th</sup>, 2010

**Instructional Skills Workshop Certificate** (24 hours) University of Calgary, June 11, 2010.

**Medical Sciences 402 – Organismal Biology University of Calgary, Alberta.**

Guest Lecturer for “Endoderm development – Specification and patterning during vertebrate embryo development.” November 25<sup>th</sup>, 2009

**HYRS High school Summer Student Introductory Lab Teaching Assistant, University of Calgary, Alberta. :** July, 2003

**High school Biology 30 and Chemistry 30 Personal Tutor, Calgary, Alberta:** February 1<sup>st</sup>, 2003 to April 20<sup>th</sup>, 2003

# Jeffrey M. Marcus

Department of Biological Sciences  
Faculty of Science, 208 Biological Sciences Building,  
University of Manitoba,  
Winnipeg, MB, R3T 2N2 CANADA  
(204) 474-9741, FAX (204) 474-7604  
*marcus@cc.umanitoba.ca*

## EDUCATION

- 2002 Ph. D., Department of Biology, Duke University, Durham, North Carolina, USA.  
Advisor: H. Frederik Nijhout. Thesis title: "Color patterns, crossveins, and cell signaling".
- 1996 Master of Philosophy, Department of Genetics, Cambridge University,  
Cambridge, UK. Advisor: Michael Akam. Thesis title: "Molecular markers in  
*Artemia* development: developmental genetics and arthropod evolution".
- 1995 Bachelor of Arts, Section of Ecology and Systematics, Division of Biological  
Sciences, Cornell University, Ithaca, New York, USA. Advisor: Amy R.  
McCune.

## HONORS AND AWARDS

- 2009-2014 Tier II Canada Research Chair in Phylogenomics, University of Manitoba  
2013 Students' Outstanding Teacher Recognition Award, University of Manitoba  
2013 Rocky Mountain Biological Laboratory Research Fellow  
2008 Carl Cornett Award for contributions to Kentucky Lepidopterology, Society of  
Kentucky Lepidopterists  
2003 Named one of the Top Ten Participants in the Howard Hughes Medical  
Institute "Ask a Scientist" Program  
1996-2001 Howard Hughes Predoctoral Fellowship in Biomedical Sciences  
1995 Churchill Scholarship (Cambridge University)  
1995 Phi Beta Kappa Honor Society, Cornell University  
1994 Pew Charitable Trusts Fellowship for Research in Systematics  
1993 NSF REU at the Rocky Mountain Biological Laboratory

## EXPERIENCE

- 2009-Present Associate Professor, Department of Biological Sciences, University of  
Manitoba, Winnipeg, Canada.  
2009-2014 Tier 2 Canada Research Chair in Phylogenomics, Department of Biological  
Sciences, University of Manitoba, Winnipeg, Canada.  
2003-2009 Assistant Professor, Department of Biology, Western Kentucky University,  
Bowling Green, Kentucky.  
2005 Participant, Burroughs Wellcome Fund-Howard Hughes Medical Institute

Course in Scientific Management

- 2003 Participant, Complex Systems Summer School, Santa Fe Institute, Santa Fe, New Mexico.
- 2002-2003 Postdoctoral Associate, Department of Biological Sciences, SUNY Buffalo. Creating transgenic butterflies to use as tools for the understanding of the development and evolution of color patterns. Supervisor: Antonia Monteiro
- 1996-2002 Ph. D. Student, Program in Genetics and Departments of Zoology and Biology, Duke University, Durham, North Carolina. Evolution and development of crossveins and crossvein-associated pigmentation patterns in insects.
- 2002 Awarded Certificate in Teaching College Biology, Preparing Future Faculty Program, Duke University
- 1995-1996 M. Phil. Student, Department of Genetics, Cambridge University, Cambridge, England. Molecular markers in brine shrimp (*Artemia*) development and evolution.
- 1993-1995 Undergraduate Researcher, Division of Biological Sciences, Section of Ecology and Systematics, Cornell University. Ontogeny and phylogeny in the northern swordtail clade of the genus *Xiphophorus*.
- 1993 Research Assistant, Rocky Mountain Biological Laboratory, Crested Butte, Colorado. Behavioral effects of conspecific predation in tiger salamanders (*Ambystoma tigrinum*).

## PUBLICATIONS

### Manuscripts in Preparation: 2

- Lalonde, M. M. L. <sup>†</sup>, B. S. McCullagh<sup>†</sup>, and J. M. Marcus. In prep. Clarifying the taxonomy and population structure of the buckeye butterflies (genus *Junonia*, Nymphalidae: Nymphalini) of Florida, USA. To be submitted to Journal of the Lepidopterists' Society.
- Marcus, J. M., Johnson, M. R. <sup>†</sup>, Miller, J. B. <sup>\*</sup>, Rumbolt, C. B. C. <sup>\*</sup>, Ritland, D. B., and Covell, C. V. In prep. Phylogenetics and hybridization in the North American butterfly genus *Limenitis* (Nymphalidae) and the origins of the aberrant *Limenitis* form *rubidus* (Strecker). To be submitted to Systematic Entomology.

### Submitted Manuscripts: 4

- Abbasi, R. <sup>†</sup> and J. M. Marcus Submitted 7/27/2014. Color pattern evolution in *Vanessa* butterfly wing eyespots suggests an additional posterior wing compartment boundary. *Evolution & Development*. Manuscript # 14-056.
- McCullagh, B. S. <sup>†</sup> and J. M. Marcus. Submitted 5/19/2015. The complete mitochondrial genome of Lemon Pansy, *Junonia lemonias* (Lepidoptera: Nymphalidae: Nymphalinae). Submitted to the Journal of Asia-Pacific Entomology. Manuscript # JAPE-D-15-00192.

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<sup>†</sup> Graduate Student

<sup>\*</sup> Undergraduate Student

- Edberg, K.<sup>†</sup>, P. Lienesch, R. Wood, and J.M. Marcus. Resubmitted 5/31/2015. After the Dam: Population Genetics of Two Darter Species (Percidae: Etheostomatinae) near Barren River Lake in South Central Kentucky. Submitted to Proceedings of the Southeastern Fishes Council. Manuscript # 1058.
- Marquardt, J. R.\* and J. M. Marcus. Submitted 6/25/2015. Molecular tools for understanding the population genetic effects of habitat restoration on butterflies. Submitted to Psyche. Manuscript # 427646.

### Peer Reviewed Publications: 20

- Abbasi, R.<sup>†</sup> and J. M. Marcus. In Press. Color pattern evolution in *Vanessa* butterflies (Nymphalidae: Nymphalini): Eyespot characters. *Journal of Evolutionary Biology*, doi: 10.1111/jeb.12716 Accepted 7/31/2015
- McCullagh, B. S.<sup>†</sup>, S.A. Wissinger, and J. M. Marcus. In Press. Identifying PCR primers to facilitate molecular phylogenetics in Caddisflies (order Trichoptera). *Zoological Systematics*. Manuscript # 15043003. Accepted 5/18/2015.
- Marcus, J. M. and J. E. Seiff. In Press. The human genome: Blueprint or Bible? In A. Bix, M. Rothschild, B. Daly, M. Golec, and L. Tweed, eds. *Genomic Promises and Perils: Public Dialogues Across the Arts, Humanities, and Sciences*. NIH-funded Literary Genome Project, Iowa State University.
- Gemmell, A. P. \*, and J. M. Marcus. 2015. A tale of two haplotypes: Evaluating the New World *Junonia* ring species hypothesis using the distribution of divergent *COI* haplotypes. *Systematic Entomology* **40** (3): 532-546. doi: 10.1111/syen.12120
- Abbasi, R. <sup>†</sup> and J. M. Marcus. 2015. Color pattern evolution in *Vanessa* butterflies (Nymphalidae: Nymphalini): Non-eyespot characters. *Evolution & Development* **17** (1): 63-81. doi: 10.1111/ede.12109
- Gemmell, A. P. \*, Borchers, T. E. \*, and J. M. Marcus. 2014. Genetic Population Structure of Buckeye Butterflies (*Junonia*) from French Guiana, Martinique, and Guadeloupe. *Psyche* **2014** (897596): 1-21. doi: 10.1155/2014/897596
- Beaudette, K.\*, T. M. Hughes<sup>†</sup>, and J. M. Marcus. 2014. Improved injection needles facilitate germ-line transformation of the buckeye butterfly *Junonia coenia*. *Biotechniques* **56** (3): 142-144. doi: 10.2144/000114147
- Borchers, T. E.\*, and J. M. Marcus. 2014. Genetic Population Structure of Buckeye Butterflies (*Junonia*) from Argentina. *Systematic Entomology* **39** (2): 242-255. doi: 10.1111/syen.12053.
- Marcus, J.M., T. M. Hughes<sup>†</sup>, D. M. McElroy, and R. E. Wyatt. 2010. Engaging First Year Undergraduates in Hands-On Research Experiences: The Upper Green River Barcode of Life Project. *Journal of College Science Teaching* **39** (3): 39-45.
- Covell, C. V., Jr., B. D. Marcus, and J. M. Marcus. 2009. KY Butterfly Net: An Interactive Web Database to facilitate Lepidoptera research and education in Kentucky. *Journal of the Lepidopterists' Society* **63** (4): 209-213.
- Marcus, J.M., D. B. Bell\*, A. N. Bryant\*, E. C. Burden\*, M. E. Carter\*, T. J. Cataldo\*, K. R. Clark\*, H. E. Compton\*, L. S. DeJarnette\*, V. B. Faulkner\*, R. W. Gregory\*, J.

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\* Undergraduate Student

† Graduate Student



- R. Hall\*, L. N. Houchin\*, M. E. Hudson\*, P. F. Jenkins\* III, J. M. Jordan\*, B. K. Logan\*, N. R. Long\*, H. F. Maupin\*, S. R. McIntyre\*, J. K. Mitchell\*, J. K. Mobley\*, A. N. Nehus\*, B. N. Potts\*, C. R. Read\*, K. N. Slinker\*, C. E. Thompson\*, T. M. Hughes†, D. M. McElroy, and R. E. Wyatt. 2009. The Upper Green River Barcode of Life Project. *Journal of the Kentucky Academy of Science* **70** (1): 75-83.
- Marcus, J. M. and T. M. Hughes†. 2009. Transposon Insertions as Unknowns for Structured Inquiry Recombination Mapping Exercises in an Undergraduate Genetics Course. *Genetics* **182** (1): 1-6. doi:10.1534/genetics.109.101774
- Marcus, J. M. and T. M. Evans\*. 2008. A Simulation Study of Mutations in the Genetic Regulatory Hierarchy for Butterfly Eyespot Focus Determination. *BioSystems* **93**: 250-255. doi:10.1016/j.biosystems.2008.05.006
- Evans, T. M.\* and J. M. Marcus. 2006. A Simulation Study of the Genetic Regulatory Hierarchy for Butterfly Eyespot Focus Determination. *Evolution & Development* **8** (3): 273-283.
- Marcus, J. M. 2005. A Partial Solution to the C-Value Paradox. *Lecture Notes in Computer Science (Bioinformatics)* **3678**: 97-105.
- Marcus, J. M. 2005. Jumping Genes and AFLP Maps: Transforming Lepidopteran Color Pattern Genetics. *Evolution & Development* **7** (2): 108-114.
- Marcus, J. M., D. M. Ramos, A. Monteiro. 2004. Transformation of the butterfly *Bicyclus anynana*. *Proceedings of the Royal Society of London B (Supplement: Biology Letters)* **27** (S5): S263-S265. doi: 10.1098/rsbl.2004.0175
- Marcus, J. M. 2003. Female site-specific transposase-induced recombination (FaSSTIR): A high-efficiency method for fine-mapping mutations on the X-chromosome in *Drosophila*. *Genetics* **163** (2): 591-597.
- Marcus, J. M. 2001. The development and evolution of crossveins in insect wings. *Journal of Anatomy*. **199** (1&2): 211-216.
- Marcus, J. M. and A.R. McCune. 1999. Ontogeny and phylogeny in the northern swordtail clade of the genus *Xiphophorus*. *Systematic Biology* **48** (3): 491-522.

#### Other Publications: 14

- Marcus, J.M. 2014. A response to Marty Green's search for an "intelligent designer". *The Jewish Post & News (Winnipeg)* **27**(12): 7.
- Marcus, J.M. (2013) Celebrate Teaching: All great teaching moments essentially boil down to teachers making connections with students, one teaching and one student at a time. *Path to Pedagogy (University of Manitoba)* **22**(1): 34.
- Marcus, J.M. 2012. The Prairie Butterfly Garden. *The Prairie Garden* **73**: 150-155.
- Marcus, J. M. 2011. Butterflies take flight. *Winnipeg Free Press*, July 2, 2011: F1, F8.
- Marcus, J. M. 2010. Book Review: *Forms of Becoming: The Evolutionary Biology of Development* by Alessandro Minelli. *Quarterly Review of Biology* **85** (1): 104-105.

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† Graduate Student

\* Undergraduate Student

- Marcus, J. M. 2010. Designing Butterfly Conservatories. *The Leaflet: Journal of the Friends of the Assiniboine Park Conservatory*. **2010** (1): 4-5.
- Seiff, J. E. and J. M. Marcus (photographer). 2009. *Fiber Gathering*. Hoboken, New Jersey: John Wiley & Sons.
- Marcus, J. M. 2007. Strange Bedfellows: Report of a Red-Spotted Purple (*Limenitis arthemis astyanax*) mating with an Eastern Comma (*Polygonia comma*). *News of the Lepidopterists' Society* **49** (4): 129, 136.
- Marcus, J. M., B. D. Marcus, and C. V. Covell. 2007. KY Butterfly Net: An Interactive Web Database to facilitate Lepidoptera research and education in Kentucky. <http://www.kybutterfly.net>
- Marcus, J. M. 2005. Point of View: Students, Butterflies, and Cancer. *Journal of College Science Teaching*. **35** (3): 8-10.
- Hughes, T. M. \* and J. M. Marcus. 2004. Recombination mapping of P[*lacW*] transposons. *Drosophila Information Service* **87**: 49-52.
- Marcus, J. M. 2003. Recombination mapping of P-element transposon inserts: A new set of laboratory exercises for an undergraduate genetics course. *Drosophila Information Service* **86**: 168-171.
- Marcus, J. M. 2001. A Teaching Statement. *Chronicle for Higher Education Career Network*. <http://www.chronicle.com/jobs/2001/10/2001100901c.htm>
- Marcus, J. M. and J. E. Seiff. 2000. Why don't creationists use private schools? *Nature* **407** (6805): 671.
- Marcus, J. M. 1997. Book Review of "Phenotypes: their epigenetics, ecology and evolution" by C. David Rollo. *Systematics Association Newsletter* **8**: 6-8.

### Published Abstracts: 10

- Hughes, T. M.<sup>†</sup> and J. M. Marcus. 2008. Coregulation of a neighboring EST with *crossveinless-c* (*cv-c*). *Annual Drosophila Research Conference* **49**: 434B.
- Marcus, J. M. 2007. Using *Junonia coenia*, the buckeye butterfly, as a model system to study the evolutionary developmental genetics of lepidopteran color patterns. *Journal of Insect Science* **2007.7**: 29.
- Hughes, T. M.<sup>†</sup> and J. M. Marcus. 2007. Molecular phylogenetics and the evolution of mimicry in the butterfly genus *Basilarchia*. *Journal of Insect Science* **2007.7**: 29.
- Marcus, J. M. 2007. Kentucky Butterfly Net: An online database to facilitate research and education programs about the Lepidoptera of Kentucky. *Journal of the Kentucky Academy of Science* **86**(1): 115.
- Marcus, J.M. 2004. Recombination mapping of P-element transposon inserts: A new set of laboratory exercises for an Undergraduate Genetics Course. *Annual Drosophila Research Conference* **45**: 892A.
- Monteiro, A., J. M. Marcus, D. M. Ramos. 2004. Using germ line transformations to test the function of genes implicated in the development of butterfly wing patterns. *Annual Drosophila Research Conference* **45**: 940A

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\* Undergraduate Student

† Graduate Student

- Marcus, J.M. and A. Monteiro. 2002. Progress in the development and evolution of lepidopteran color patterns. *Integrative and Comparative Biology* **42** (6): 1272.
- Marcus, J. M. 2001. When is an eyespot not an eyespot? *Developmental Biology* **235** (1): 309.
- Marcus, J. M. 2001. Epigenetic landscapes, signal transduction, and models of crossvein development. *Annual Drosophila Research Conference* **42**: 573C
- Marcus, J. M. 1999. The development and evolution of crossveins and associated pigmentation patterns in the Lepidoptera and Diptera. *Developmental Biology* **210** (1): 192.

## GRANT AWARDS

- 2015-2016 University of Manitoba Teaching and Learning Enhancement Fund, “Annotation and Analysis of Novel Complete Mitochondrial Genomes as a Means for Enhancing Inquiry-Based Learning in Evolutionary Biology Teaching Laboratories”, \$15,000.
- 2011-2016 NSERC Discovery Grant RGPIN386337-2011, “Developmental genetics and evolution of butterfly colour patterns”, \$180,000.
- 2010-present Canada Foundation for Innovation, Infrastructure Operating Fund Grant, “Phylogenomics Research Laboratory” PI-Jeffrey Marcus, \$37,500.
- 2009-2014 Tier 2 Canada Research Chair in Phylogenomics, Canada Research Chair Program Grant 950-212382, “Phylogenomic approaches to butterfly color pattern development and evolution” PI-Jeffrey Marcus, \$500,000.
- 2013 University of Manitoba University Research Grants Program, \$4503.50
- 2013 University of Manitoba Faculty of Science Field Work Support Program \$3000.
- 2010-2012 Canada Foundation for Innovation, Leaders Opportunity Fund Grant 212382, “Phylogenomics Research Laboratory Startup” PI-Jeffrey Marcus, \$330,751.
- 2011 Office of Vice-President (Research) NSERC CREATE Proposal Development Funding “From Microchips to Gene Chips”. PI-Jeffrey Marcus \$7000.
- 2004-2009 KY-IDeA Networks of Biomedical Research Excellence Program. National Institutes of Health and the National Center for Research Resources Grant P20 RR016481. PI Nigel Cooper, University of Louisville Medical Center. \$5,500,000. Subcontract for “A Butterfly Transposon Mutagenesis Screen for the Study of Wingless Signal Transduction.” Subcontract PI-Jeffrey Marcus \$519,000.
- 2006-2008 US Environmental Protection Agency Grant X796463906-0 “Green River Biological Diversity and Monitoring Project” PI Ouida Meier \$396,800. Subcontract for “Changes in Gene Flow Patterns in Butterflies Associated with Altered Land Use.” Subcontract PI-Jeffrey Marcus \$11,000.
- 2007 Kentucky NSF EPSCoR REG Grant EPS-0447479 “REG: Creation of an EST (Expressed Sequence Tag) Library for the Developing Wings of the Buckeye Butterfly *Junonia coenia*.” PI-Jeffrey Marcus. \$25,000.
- 2003-2004 Kentucky NSF EPSCoR REG Grant EPS-0132295. “Genetic transformation and AFLP mapping in the butterfly *Precis coenia*.” PI-Jeffrey Marcus. \$25,000.

## **MAJOR GRANT INITIATIVES**

- 2012 Genome Canada Small Scale Innovation Project Proposal, “BioLegato: A general purpose graphical user interface for genomics.” \$250,000 requested. PI Brian Fristensky (Plant Science), Co-PI Jeffrey Marcus (Biological Science).
- 2011 NSERC CREATE Proposal Submission “NSERC CREATE & COMBINE Training Program in Computational Biology, Omics, Molecular Biology, BioInformatics, Nanotechnology and the Environment” Submitted April 2011. This proposal involved the creation of a network of 38 collaborators from across the University of Manitoba (Faculties of Science, Agriculture, Medicine, and Engineering), as well as from the University of Winnipeg, Brandon University, Canadian Mennonite University, the National Microbiology Laboratory, the NRC Institute for Biodiagnostics, and the Life Sciences Association of Manitoba. The proposal was to create a new interdisciplinary graduate training program that required students to cross departments, faculties, and institutions as part of their training. \$1.65 million requested.

## **REVIEWING ACTIVITY**

I have reviewed papers for *Advances in Insect Physiology*, the *Biological Journal of the Linnean Society*, *BioTechniques*, *BMC Evolutionary Biology*, *BMC Genomics*, *Caribbean Journal of Science*, *Copeia*, *Entomological Science*, *Evolution & Development*, *Genetica*, *Genetics*, *Heredity*, *Journal of Experimental Zoology Part B: Molecular and Developmental Evolution*, *Journal of Insect Physiology*, *Journal of Insect Science*, *Proceedings of the Royal Society of London Series B*, *Systematic Entomology*, and *Zoological Science*.

I have reviewed grant proposals for the Natural Sciences and Engineering Research Council of Canada, the Canada Research Chairs Program, the US National Science Foundation, the British Biological Science Research Council, Hungarian Scientific Research Fund (OTKA), the Netherlands Organization for Scientific Research, and for the National Science Foundation of the Republic of Georgia.

I was a pre-publication reviewer for “Manitoba Butterflies: A Field Guide” by Simone Hébert Allard for Turnstone Press. I have reviewed Genetics textbooks for John Wiley & Sons, Pearson Benjamin Cummings, Thomson Learning-Brooks/Cole, W. H. Freeman, and Cambridge University Press; and an Introductory Biology Textbook for W. H. Freeman.

## **TEACHING EXPERIENCE**

As a faculty member, I have taught courses in Evolution, Evolution and Development, Genes and Development, Genetics I, Genetics II, Genomics, Introductory Biology, “University Experience” for first year undergraduates, and the History of Biology. While in Graduate school, I served as a teaching assistant for Genetics,

Cell Biology, Microbiology, and Introductory Biology at Cambridge University, Duke University, and Elon College.

## **DEPARTMENTAL AND UNIVERSITY SERVICE**

- 2012-Present Service on the University of Manitoba Faculty of Agriculture and Food Sciences, Internal Panel for NSERC Discovery Grant Review
- 2012-2013 Departmental Representative, University of Manitoba, Faculty of Graduate Studies, Faculty Council
- 2011 Developmental Biology Faculty Search Committee, Department of Biological Sciences, University of Manitoba
- 2012 University of Manitoba Libraries Ad Hoc Committee for Strategic Agenda Development for E-Science (Duraspace/ARL E-Science Institute)
- 2009-Present Service on the University of Manitoba Faculty of Health Sciences, College of Medicine Internal Panel for CIHR Grant Review
- 2009-Present Member of 3 Department of Biological Sciences, University of Manitoba theme group committees: Cell, Molecular, and Development; Evolution and Systematics; and Integrative Biology
- 2008-2009 Chair Evolution Faculty Search Committee, Department of Biology, Western Kentucky University
- 2008-2009 Chairperson, Ogden College Library Committee
- 2006-2009 WKU Goldwater Scholarship Selection Committee
- 2006-2009 Member, Bioinformatics and Information Sciences Center
- 2005-2009 Departmental Representative, Ogden College Library Committee
- 2005 Sygen Chair in Biotechnology Faculty Search Committee, Department of Biology, Western Kentucky University
- 2004 Neuroscience Faculty Search Committee, Department of Biology, Western Kentucky University
- 2003-2009 Member, Center for Biodiversity Studies
- 2003-2009 Chair of Biotechnology Grants Committee; Member of Ad Hoc Committee for Mission Statement Review, Search Committee for Core Laboratory Manager, and Admissions Committee Biotechnology Certification Program, Biotechnology Center, Western Kentucky University
- Graduate Student Supervision
- Manitoba:** Roohollah Abbasi (Ph.D. 2011-present)  
Melanie Lalonde (M.Sc. 2014-present)  
Atabak Mahjour Azad (M.Sc. 2010-2011)  
Bonnie McCullah (M.Sc. 2013-present)
- Kentucky:** Kerstin Edberg (M.Sc.Lienesch/Marcus completed 2009)  
Tia Hughes (M.Sc. completed 2009)  
Mollie Johnson (M.Sc. completed 2008)  
Ashley Wint (M.Sc. Alice/Marcus completed 2008)
- Graduate Student Committee Service
- University External:** Marie-Julie Favé, (Ph.D. Biology, McGill Univ., Abouheif, completed 2013)
- Manitoba:** John Brubacher (Ph.D. Biol. Sciences, Huebner, completed 2010)  
Justin Bzovy (M.A. Philosophy, Martens, dept. external, completed 2012)

Abdulsalam Dakouri (Ph.D. Plant Sci., Cloutier, dept. external, completed 2012)  
George Heath (M.Sc. Biol. Sciences, Whyard, completed 2012)  
Youyang Li (M.Sc. Biol. Sciences, Docker, completed 2014)  
Craig McFarlane (M.Sc. Biol. Sciences, Docker)  
Anthony Signore (Ph.D. Biol. Sciences, Campbell)  
Miles Zhang (Ph.D. Entomology, Sharonowski, dept. external)  
**Kentucky:** Srikanth Aakula (M.Sc. Crawford, completed 2004)  
Cassandra Cantrell (M.Sc. Davis/Stokes, completed 2009)  
Madhuri Jonnalagadda (M.Sc. King, completed 2008)  
Bryan Mason (M.Sc. Doerner, completed 2009)  
Julie Schuck (M.Sc. Smith, completed 2007)  
John Starnes (M.Sc. Meier, completed 2004)  
Bridget Sutton (M.Sc. Stokes, completed 2009)

#### Honours Student Supervision

**Manitoba:** Tanja Borchers (Genetics, 2012)  
Amber Gemmell (Genetics, 2013)  
Ashley Haverstick (Biological Sciences, 2016)  
Melissa Peters (Genetics, 2016)  
Stephanie Rozbacher (Genetics, 2013)  
**Kentucky:** Bonnie McCullagh (Biology, 2011)  
Joseph Marquardt (Biology, 2010)

#### Undergraduate Student Researcher Supervision

**Manitoba:** 2010: 3 students, 2011: 2, 2012: 5, 2013: 4, 2014: 4, 2015: 2.  
**Kentucky:** 2004: 3 students, 2005: 5, 2006: 5, 2007: 5, 2008: 4, 2009: 2.

## PROFESSIONAL SERVICE

2015-present, Treasurer, Pan-American Society of Evolutionary Developmental Biology  
2013-2015 Press Officer and Executive Board Member, Pan-American Society of  
Evolutionary Developmental Biology  
2010-2011, 2013-2014 Vice President, the Lepidopterists' Society (USA)  
2009-present Consultant Butterfly Conservatory, Friends of Gardens Manitoba  
(formerly Friends of the Assiniboine Park Conservatory), Winnipeg, Manitoba,  
Canada  
2009-present Web Master, Society of Kentucky Lepidopterists  
2007-2008 National Churchill Scholarship Selection Committee, The Winston Churchill  
Foundation of the United States.  
2005-2009 Permit holder and organizer of the All Taxa Biological Inventory of  
Lepidoptera in Mammoth Cave National Park. Responsible for coordinating the  
activities of amateur and professional lepidopterists and park employees to  
generate a comprehensive list of butterfly and moth species found in the park, and  
to make recommendations for conservation and land use strategies that will  
protect rare, threatened, or endangered species of Lepidoptera that are found  
during the inventory.  
2005-2008 President, Society of Kentucky Lepidopterists  
2004-2005 Executive Board Member-At-Large, Society of Kentucky Lepidopterists

2004-2009 Consultant, Butterfly Pavillion, Lost River Cave Foundation, Bowling Green, Kentucky  
2003-2009 Coordinator of Lepidoptera Surveys, Upper Green River Biological Preserve, Hart County, Kentucky  
1999-2009 Correspondent, Ask a Scientist Program, Howard Hughes Medical Institute  
Named one of the "Top ten" scientist participants in September 2003  
Profile featured as part of "Scientist of the Month" May 2001

## **SOCIETY MEMBERSHIPS**

Entomological Society of Manitoba, the Lepidopterists' Society, Society of Kentucky Lepidopterists, Sigma Xi, Pan-American Society of Evolutionary Developmental Biology

## **CONFERENCE PRESENTATIONS**

- Inaugural Meeting of the Pan-American Society of Evolutionary Developmental Biology, Berkeley, California, August 2015. "Report of an additional A-P developmental compartment boundary and organizer in the far posterior of butterfly and *Drosophila* wings" Roohollah Abbasi<sup>†</sup> and Jeffrey Marcus.
- 70<sup>th</sup> Annual Meeting of the Entomological Society of Manitoba, Winnipeg, Canada, October 2014, "Population structure of *Junonia* butterflies across the western hemisphere"; "Identifying PCR primers to facilitate molecular phylogenetics in caddisflies (order Trichoptera)" Bonnie McCullagh<sup>†</sup> and Jeffrey Marcus; "Possible evidence for a new wing compartment boundary and its role in eyespot colour pattern development in *Vanessa* butterflies (Nymphalidae: Nymphalini)" Roohollah Abbasi<sup>†</sup> and Jeffrey Marcus.
- 9<sup>th</sup> International Workshop on Molecular Biology and Genetics of the Lepidoptera, Kolymbari, Crete, Greece, August 2014. "Population structure of *Junonia* butterflies across the Western Hemisphere."
- 69<sup>th</sup> Annual Meeting of the Entomological Society of Manitoba, Winnipeg, Canada, November 2013, "Improved injection needles facilitate germline transformation of the buckeye butterfly *Junonia coenia*"; "Identifying PCR primers to facilitate molecular phylogenetics in caddisflies (Order Trichoptera)" Bonnie McCullagh<sup>†</sup> and Jeffrey Marcus.
- 1<sup>st</sup> International Congress of Evolutionary Biology, Ottawa, Ontario, Canada, July 2012 "Genetic population structure of a ring species: The New World buckeye butterflies (genus *Junonia*)"; "Phylogenomics approaches to *Vanessa* colour pattern evolution" Roohollah Abbasi<sup>†</sup> and Jeffrey Marcus
- 59<sup>th</sup> Annual LepSoc Meeting, Leavenworth, Washington, July 2010. "Caterpillars Taking Wing"
- 6<sup>th</sup> International Biology of Butterflies Conference, Edmonton, Alberta, Canada, June 2010. "Phylogenetics and patterns of hybridization in *Limenitis* butterflies";

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<sup>†</sup> Graduate Student

- “DNA sequence variation in the *wingless* gene product in buckeye butterflies (genus *Junonia*)” Bonnie McCullagh\* and Jeffrey Marcus.
- 48<sup>th</sup> Annual Meeting of the Canadian Society of Zoology, Vancouver, British Columbia, Canada, May 2010. “Computational models for butterfly eyespot development and evolution.”
- Society of Kentucky Lepidopterists 36<sup>th</sup> Annual Meeting, Lexington, Kentucky, November 2009. “Progress in butterfly color pattern genetics.
- 8<sup>th</sup> International Workshop on Molecular Biology and Genetics of the Lepidoptera, Kolymbari, Crete, Greece, August 2009. “Phylogenomic approaches to color pattern evolution and development.”
- 8<sup>th</sup> Annual UT-ORNL-KBRIN Bioinformatics Summit, Fall Creek Falls, Tennessee, April 2009. “Genetic regulatory networks in mutant butterflies.”
- Kentucky Academy of Science. 94<sup>th</sup> Annual Meeting and Society of Kentucky Lepidopterists 35<sup>th</sup> Annual Meeting, Lexington, Kentucky, November 2008. “One *Celastrina*, two *Celastrina*, three *Celastrina*, four; five, six, how many more?”; “Population structure of buckeye butterflies (genus *Junonia*) in Texas based on Cytochrome Oxidase II DNA sequences.” Jauan Burbage\* and Jeffrey Marcus; “DNA Sequence Variation in the wingless Gene Product, A Putative Morphogen for Patterning the Eyespot Foci of Buckeye Butterflies (genus *Junonia*).” Bonnie McCullagh\* and Jeffrey Marcus.
- 59<sup>th</sup> Annual Meeting of the Lepidopterists’ Society, Starksville, Mississippi, June 2008. “A Simulation Study of the Genetic Regulatory Hierarchy for Butterfly Eyespot Focus Determination”; “Randomly Amplified Fingerprints (RAF) and Their Applications to Butterfly Population Structure” Joseph Marquardt\* and Jeffrey Marcus; “Population Structure of *Junonia* Butterflies in Texas using COI sequences” Alan Simmons\* and Jeffrey Marcus.
- Kentucky Academy of Science. 93<sup>rd</sup> Annual Meeting, Louisville, Kentucky, November 2007. “Phylogenetics and hybridization in the butterfly genus *Limenitis* (Nymphalidae) and the origins of the aberrant *Limenitis* form *rubidus* (Strecker).”; “Creation of an EST (Expressed Sequence Tag) Library from the Developing Wings of a Butterfly.” T. Michelle Dodson\* and Jeffrey Marcus; “Randomly Amplified Fingerprints (RAF) Highlight Patterns of Hybridization in *Junonia* Butterflies.” Joseph R. Marquardt\* and Jeffrey Marcus.
- Society of Kentucky Lepidopterists 34<sup>th</sup> Annual Meeting, Lexington, Kentucky, November 2007. “A history of invasion and hybridization in the buckeye butterflies (genus *Junonia*) of Florida”; “Population structure of *Limenitis* butterflies at a hybridization hotspot in Hickman, Kentucky” Mollie R. Johnson<sup>†</sup> and Jeffrey Marcus.
- 13<sup>th</sup> Annual Kentucky EPSCoR Conference, Lexington, Kentucky, October 2007. “The Making of a Model Organism: *Junonia coenia*, the Buckeye Butterfly”
- 58<sup>th</sup> Annual Meeting of the Lepidopterists’ Society, Bakersfield, California, July 2007. “A history of invasion and hybridization in the buckeye butterflies (genus

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\* Undergraduate Student

\* Undergraduate Student

† Graduate Student



- Junonia*) of Florida”; “On the origins of *Limenitis form rubidus*” Tia Hughes<sup>†</sup> and Jeffrey Marcus; “Applications of DNA fingerprinting to the study of Lepidoptera” Tim Shehan\* and Jeffrey Marcus; “Population structure of *Limenitis* butterflies in Hickman, Kentucky” Mollie R. Johnson<sup>†</sup> and Jeffrey Marcus.
- 5<sup>th</sup> International Biology of Butterflies Conference, Frascati, Rome, Italy, July 2007. “Eco Geno Evo Devo: Converging approaches for the study of color patterns in buckeye butterflies (*Junonia sp.*)”
- 6<sup>th</sup> Annual UT-ORNL-KBRIN Bioinformatics Summit, Paris Landing, Tennessee, April 2007. “A Simulation Study of the Genetic Regulatory Hierarchy for Butterfly Eyespot Focus Determination” Jeffrey Marcus and Travis Evans\*.
- Society of Kentucky Lepidopterists 33<sup>rd</sup> Annual Meeting, Lexington, Kentucky, December 2006. “Kentucky Butterfly Net: An online database to facilitate research and education programs about the Lepidoptera of Kentucky”; “Applications of DNA Fingerprinting to the Study of the Lepidoptera” Tim Shehan\* and Jeffrey Marcus.
- Kentucky Academy of Science 92<sup>nd</sup> Annual Meeting, Morehead, Kentucky, November 2006 “Kentucky Butterfly Net: An online database to facilitate research and education programs about the Lepidoptera of Kentucky”; “Molecular phylogenetics and the evolution of mimicry in the butterfly genus *Basilarchia*.” Tia Hughes<sup>†</sup> and Jeffrey Marcus; “Assessing Mitochondrial Haplotype Diversity in Two Sympatric Species of Butterflies” Mollie R. Johnson<sup>†</sup> and Jeffrey Marcus; “Germ-line Transformation Experiments in the buckeye butterfly *Junonia coenia*”; Brooke Polen\* and Jeffrey Marcus; “Molecular Forensics in Butterflies: The Origins of *Basilarchia* form “*rubidus*” in Kentucky” Tara Powell\* and Jeffrey Marcus; “Applications of DNA Fingerprinting to the Study of the Lepidoptera” Tim Shehan\* and Jeffrey Marcus.
- 7<sup>th</sup> International Workshop on Molecular Biology and Genetics of the Lepidoptera, Kolymbari, Crete, Greece, August 2006. “Using *Junonia coenia*, the buckeye butterfly, as a model system to study the evolutionary developmental genetics of lepidopteran color patterns”; “Molecular phylogenetics and the evolution of mimicry in the butterfly genus *Basilarchia*.” Tia Hughes<sup>†</sup> and Jeffrey Marcus.
- 1<sup>st</sup> National IDeA Symposium of Biomedical Research Excellence (NISBRE), Washington, D.C., July 2006. “Using Transgenic Butterflies to Study Wingless Signal Transduction”
- 57<sup>th</sup> Annual Meeting of the Lepidopterists’ Society, Gainesville, Florida, June 2006, “Population structure of the genus *Junonia* in Florida”; “Molecular phylogenetics and the evolution of mimicry in the butterfly genus *Basilarchia*” Tia Hughes<sup>†</sup> and Jeffrey Marcus; “Molecular Forensics in Butterflies: The Origins of *Basilarchia* form “*rubidus*” in Kentucky” Tara Powell\* and Jeffrey Marcus; “Applications of AFLP-based DNA fingerprinting to the study of the Lepidoptera” Tim Shehan\* and Jeffrey Marcus.
- Society of Kentucky Lepidopterists 32<sup>nd</sup> Annual Meeting, Lexington, Kentucky, November 2005 “Molecular phylogenetics and the evolution of mimicry in viceroys (*Basilarchia (Limenitis) archippus archippus*) and related butterflies.”

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\* Undergraduate Student

Kentucky Academy of Science 91<sup>st</sup> Annual Meeting, Richmond, Kentucky, November 2005 “Molecular phylogenetics and the evolution of mimicry in viceroys (*Basilarchia (Limenitis) archippus archippus*) and related butterflies”; “A Simulation Study of the Genetic Regulatory Hierarchy for Butterfly Eyespot Focus Determination” Travis Evans\* and Jeffrey Marcus; “Recombination mapping of P-element transposons in *Drosophila*: A new set of gene mapping exercises for an undergraduate genetics course” Tia Hughes† and Jeffrey Marcus; “PiRaTe-PYG: A New Genetic Construct for Studying Gene Expression in Butterflies” Brooke Polen\* and Jeffrey Marcus; “Development of a fluorescent Southern Blot protocol for use with a Molecular Dynamics Storm Imaging System” Tara Powell\* and Jeffrey Marcus.

3<sup>rd</sup> RECOMB Comparative Genomics Satellite Workshop, Dublin, Ireland, September 2005 “A partial solution to the C-value paradox.”

Evolution 2005, Fairbanks, Alaska, June 2005 “Simulation models of gene expression during butterfly color pattern development.”

Posters at the Capitol, Frankfort, Kentucky, February 2005, “PiRaTe-PYG: A New Genetic Construct for Studying Gene Expression in Butterflies” Brooke Polen\* and Jeffrey Marcus.

Society of Kentucky Lepidopterists 31<sup>st</sup> Annual Meeting, Lexington, Kentucky, November, 2004 “Making Genetic Maps in the Lepidoptera.”

Kentucky Academy of Science 90<sup>th</sup> Annual Meeting, Murray, Kentucky, November, 2004 “Jumping Genes and AFLP Maps: Transforming Lepidopteran Color Pattern Genetics.”

XXII International Congress of Entomology, Brisbane, Australia, August 2004. Symposium: Understanding Microevolution & Development in the Arthropods, “Jumping Genes and AFLP Maps: Transforming Lepidopteran Color Pattern Genetics”; Symposium: Genomics of Lepidoptera, “New Transgenic Tools for use in Lepidopterans.”

Evolution of Developmental Diversity Conference, Cold Spring Harbor Laboratory, Cold Spring Harbor, New York, April 2004. “New Genetic Tools for Understanding the Developmental Basis of Lepidopteran Color Pattern Diversity.”

45<sup>th</sup> Annual *Drosophila* Research Conference, Genetics Society of America, Washington, District of Columbia, March 2004. “Recombination mapping of P-element transposon inserts: A new set of laboratory exercises for an Undergraduate Genetics Course.”

Society of Kentucky Lepidopterists 30<sup>th</sup> Annual Meeting, Louisville, Kentucky, November, 2003 “Lepidopteran field trips: Past and prospective.”

Kentucky Academy of Science 89<sup>th</sup> Annual Meeting, Bowling Green, Kentucky, November, 2003 “How butterflies and moths get their spots.”

Society of Integrative and Comparative Biology Annual Meeting, Toronto, Canada, January 2003. “Progress in the development and evolution of lepidopteran color patterns.”

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† Graduate Student

\* Undergraduate Student

First Annual Conference on Recent Work in Biology and Philosophy: The Relationship between Evolution and Development, Durham, North Carolina, June 2002. "The development of crossveins in insect wings and the evolution of modes of insect flight."

Howard Hughes Medical Institute Fellows Meeting, Chevy Chase, Maryland, November 2001. "A new high-efficiency method for fine-mapping mutations on the X chromosome in *Drosophila*."

8th Congress of the European Society of Evolutionary Biology, Aarhus, Denmark, August 2001. "When is an eyespot not an eyespot?"

Society for Developmental Biology Annual Meeting, Seattle, Washington, July 2001. "When is an eyespot not an eyespot?"

UNC-Duke Biology Graduate Student Symposium, Chapel Hill, North Carolina, April, 2001. "The development and evolution of crossveins in insect wings."

42nd Annual *Drosophila* Research Conference, Genetics Society of America, Washington, District of Columbia, March 2001. "Epigenetic landscapes, signal transduction, and models of crossvein development."

Evolution of Developmental Mechanisms Symposium, Anatomical Society of Great Britain and Ireland, Egham, Surrey, England, January 2001. "The evolution of crossvein development in insect wings."

Evolution 2000, Society for the Study of Evolution, Bloomington, Indiana, June 2000. "The development and evolution of crossveins and their associated pigmentation patterns."

Graduate Student Symposium, Durham, North Carolina, October 1999. Invited Speaker representing the Department of Zoology, Duke University. "Color patterns, crossveins, and cell-signaling."

Evolution '99, Society for the Study of Evolution, Madison, Wisconsin, June 1999. "Morphometric analysis of a *Drosophila* mutant with a wing phenotype of variable expressivity."

Society for Developmental Biology Annual Meeting, Charlottesville, Virginia, June 1999. "The development and evolution of crossveins and associated pigmentation patterns in the Lepidoptera and Diptera."

Evolution '97, Society for the Study of Evolution, Boulder, Colorado, June 1997. "Ontogeny and phylogeny of *Xiphophorus*."

## **INVITED TALKS**

Living Prairie Museum, Winnipeg, Manitoba, Canada, July 2015

McGuire Center for Lepidoptera and Biodiversity, University of Florida, Gainesville, USA, May 2015

Lanny Remis Speaker Series, Shaarey Zedek Synagogue, Winnipeg, Canada, May 2014

Department of Entomology, University of Manitoba, Winnipeg, Canada, January 2014

Torah Tots Preschool, Winnipeg, Canada, December 2013

The New Shul/Jewish National Fund, Winnipeg, Canada, November, 2012

Rocky Mountain Biological Laboratory, Crested Butte, Colorado, USA, August 2012

Biological Sciences Undergraduate Students' Association, University of Manitoba, November 2012

Seedy Saturday, Friends of Gardens Manitoba, Canadian Mennonite University,  
Winnipeg, Canada, March 2012

Club 55, Westwood Presbyterian Church, Winnipeg, Manitoba, Canada, March 2012

Manitoba Hydro X-Club (Retired Employees), Winnipeg, Manitoba, Canada, April 2011

Dept. Biological Sciences, North Dakota State University, Fargo, USA, March 2011

Institute of Electrical & Electronics Engineers: Engineering in Medicine & Biology  
Society, U. Manitoba Chapter, Winnipeg, Canada, January 2011

Vincent Massey Collegiate, Winnipeg, Manitoba, Canada, December 2010

Living Prairie Museum, Winnipeg, Manitoba, Canada, July 2010

Friends of the Assiniboine Conservatory, Canadian Mennonite University, Winnipeg,  
Manitoba, Canada, January 2010

Department of Immunology, University of Manitoba, Winnipeg, Canada, January 2010

Department of Biology, Brandon University, Brandon, Manitoba, Canada, January 2010

Department of Entomology, University of Manitoba, Winnipeg, Canada, January 2010

Department of Biology, University of Winnipeg, Manitoba, Canada, January 2010

Faculty of Medicine, University of Manitoba, Winnipeg, Canada, January 2010

Department of Computer Science, University of Manitoba, Winnipeg, Canada, November  
2009

Friends of the Assiniboine Conservatory, Canadian Mennonite University, Winnipeg,  
Manitoba, Canada, October 2009

McGuire Center for Lepidoptera and Biodiversity, University of Florida, Gainesville,  
USA, February 2009

Department of Biological Sciences, University of Manitoba, Winnipeg, April 2008

Department of Biology, Gonzaga University, Spokane, Washington, USA, April 2008

Department of Biological Sciences, State University of New York College at Brockport,  
USA, March 2008

Department of Biology, Widener University, Chester, Pennsylvania, USA, March 2008

Department of Biology, Yeshiva University, New York, New York, USA, March 2008

Department of Biology, Rutgers University, Camden, New Jersey, USA, March 2008

Department of Biology, Elon University, Elon, North Carolina, USA, February 2008

Biology Department, University of Louisville, Kentucky, USA, February 2008

Department of Biology, Adelphi University, Garden City, New York, February 2008

Department of Earth Sciences, The Open University, Milton-Keynes, England, May 2007

Department of Biological Science, University of Hull, England, May 2007

Department of Biology and Lyceum Lecture Series (Groseclose Lecture), Emory and  
Henry College, Emory, Virginia, USA, February 2007

Daviess County Audubon Society, Owensboro, Kentucky, USA, October 2006

Faculty of Life Sciences, University of Manchester, England, June 2006

Departments of Entomology and Biology, Clemson University, Clemson, South Carolina,  
USA, January 2006

Department of Biological Sciences, Murray State University, Murray, Kentucky, USA,  
February 2004

Department of Biology, Western Kentucky University, Bowling Green, March 2003

Department of Biology, Indiana University, Bloomington, USA, February 2003

Department of Biology, University of North Carolina-Greensboro, USA, April 2002

Department of Biology, University of Montana, Missoula, USA, March 2002

Department of Biological Sciences, State University of New York at Buffalo, USA,  
February 2002  
Cambridge University Museum of Zoology, Cambridge, England, January 2001

# CURRICULUM VITAE

## JOHN MARKHAM

Date of Birth: January 13, 1964

Address: Department of Biological Sciences  
481 Duff Roblin  
University of Manitoba  
Winnipeg Manitoba  
R3T 2N2

Citizenship: Canadian

Phone: (204) 474-7180  
email: john.markham@umanitoba.ca

### EDUCATION

**Ph.D.** 1996. University of British Columbia, Forest Sciences Department. Thesis: A Field Test of the Degree of Coevolution Between Red Alder and *Frankia* Populations. Supervisor: C. P. Chanway.

**B.Ed.** (Science Education). 1989. Dalhousie University.

**B.Sc.** (specialized honors - Ecology). 1987. University of Guelph.

### RESEARCH FUNDING

- 2015 Markham, J. Ecology of Nitrogen Fixation. NSERC Discovery. \$21 000 pa for 5 years.  
Markham, J. Sustainable Biofuel Production. NSERC Engage. \$23 000.
- 2014 Markham, J. Sustainable Biofuel Production. Manitoba Hydro Forest Enhancement Program. \$30 000 over 3 years.  
Markham, J. Manitoba Biomass Energy Support Program, Manitoba Agriculture, Food and Rural Development. \$45 590.  
Markham, J. Understory nitrogen fixation in alders. Faculty of Science Field Work Support Program. \$ 1 155.  
Markham, J. Manitoba Career Focus Contract. \$1,180.
- 2013 Renault, S. and Markham, J. Salinity tolerance of nitrogen-fixing woody species. Total E&P Canada. \$180 000 (3 years).  
Markham, J. Understory nitrogen fixation in alders. Faculty of Science Field Work Support Program. \$ 3190  
Markham, J. and Renault, S. Science without Borders. \$3000.
- 2012 Renault S., Markham J. & Avila Sakar G. Crosstalk between salinity and herbivory. University of Manitoba, University Research Grant Program (URGP), \$7,497

Markham, J.H. and Renault, S. Salt Tolerance of Lake Winnipegosis Plants. Faculty of Science Field Work Support Program. \$2768

Markham, J.H. Understory nitrogen fixation in alders. Faculty of Science Field Work Support Program. \$ 1645

2009 Markham, J.H. Controls on Tallgrass Prairie Diversity. Year 4. Manitoba Conservation Sustainable Development Initiatives Fund. \$17 500.

2008 Markham, J. H. and Renault, S. Evaluating the success of Manitoba mine tailings revegetation efforts. Manitoba Mines Branch. \$192 960 (3 years).

Markham, J.H. Controls on Tallgrass Prairie Diversity. Year 3. Manitoba Conservation Sustainable Development Initiatives Fund. \$20 500.

2007 Markham, J. H. Controls on Tallgrass Prairie Diversity. Manitoba Conservation Sustainable Development Initiatives Fund. Project \$17,500.

2006 Markham, J. H. Controls on Tallgrass Prairie Diversity. Manitoba Conservation Sustainable Development Initiatives Fund. Project \$17,500.

### **Graduate Students**

Jon Makar, MSc candidate

Jianfie Shao, MSc. candidate

Haoran Chen, MSc. candidate

Kathy Murray. MSc. candidate. Started September 2009.

Christain Naguit. MSc.

Ian Young, MSc.

Ryan Sheffield, MSc. candidate.

Erin Essery, MSc.

Sandi Faber, MSc.

Cara Gill, MSc.

Corinthe Zekveld. Ph.D. candidate

Melissa Day. MSc.

## **AWARDS AND DISTINCTIONS**

- 2004 Lionel Cinq-Mars Award for best student presentation at the Canadian Botanical Association Annual Meeting, Winnipeg, Manitoba. Presentation: Day, M. and Markham, J. Competition between two *Frankia* strains and two fungi species in the tripartite *Frankia/ectomycorrhizae/Alnus rubra* mutualism.
- 1994 UBC University Graduate Fellowship.
- 1992 NSERC Postgraduate Scholarship (PGS2).  
UBC University Graduate Fellowship. Declined.
- 1990 NSERC Postgraduate Scholarship (PGS1).
- 1988 NSERC Postgraduate Scholarship (PG1). Deferred until 1990.
- 1987 B.Sc.(Honors) degree granted with distinction.  
Deans Honors list.  
NSERC University Undergraduate Research Award, University of Guelph. Declined.
- 1986 NSERC University Undergraduate Research Award, University of Guelph.
- 1984 University of Guelph Early In-course Scholarship.
- 1983 University of Guelph Early In-course Scholarship.  
Ontario Scholarship.

## **COURSES TAUGHT**

- |                        |   |
|------------------------|---|
| University of Manitoba | Plant Interactions (BOTN 4150)<br>Field Ecology (BOTN 3420)<br>Principles of Ecology (BOTN 2370)<br>Introductory Ecology (BOTN 2280)<br>Foundations of Life (BIOL 1000)<br>Special Topics in Botany (BOTN 7410)<br>Advanced Plant Ecology (BOTN 7490) |
| Douglas College        | The Biosphere (Bio 110)<br>The Organism (Bio 210)<br>Anatomy and Physiology (Bio 103)<br>Environmental Science Sci 107<br>Introduction Environmental Issues (Sci 100)   |

## **WORK EXPERIENCE**

- 1999 Assistant Professor. Botany Department, University of Manitoba.
- 1997 Term Faculty. Science and Technology Department, Douglas College, New Westminster, B.C. Instructor in Introductory Biology (BIO 110, BIO 210), Environmental Issues (Sci



100), Environmental Science (Sci 107), and Human Biology (BIO 103).

- 1996 Post Doctoral Fellow, Forest Sciences Department, UBC. Examination of the distribution of *Frankia* spore types in southwestern British Columbia. Supervisor: C. P. Chanway.
- 1996 Research Contract. B.C. Ministry of Forests. Comparison of software designed to evaluate the light environment of forests using hemispherical photographs.
- 1989 Research Assistant. Dept. of Biology, Dalhousie University. Assisted Maria Laura Lazo with field work and data analysis on a project designed to look at plant-herbivore interactions in a harvested population of *Ascophyllum nodosum*.
- Substitute teacher. Halifax City School board.
- 1988 Lab and Tutorial Instructor. Biology Department, Dalhousie University. Course: Biology 1000.
- 1987 Research Assistant. Dept. of Biology, Dalhousie University. Designed and conducted experiments with Dr. Richard B. Lowell (PDF) on inducible changes in mechanical properties and palatability of furoid algae caused by simulated herbivore damage.
- 1986 NSERC University Undergraduate Research Award & Technician, University of Guelph. Set up my own study to investigate the effect of plant litter on the distribution of an old field species, *Hieracium floribundum*. Assisted Dr. R. J. Reader in vegetation censusing and habitat analysis of an experiment designed to examine the effect of small scale tree harvesting on the floral diversity of Carolinian forest stands in S. E. Ontario.

### **PUBLICATIONS – refereed**

- Markham, J.**, and Essery, E. 2015. Stand and plot level changes in a boreal forest understory community following wildfire. Submitted to Plant Ecology and Diversity 8: 585-590.
- Young, I. Renault, S. and **Markham, J.** 2014. Low levels organic amendments improve fertility and plant growth on non-acid generating gold mine tailings. Ecological Engineering. 74:250-257.
- Markham, J.** 2014. Rare species occupy uncommon niches. Scientific Reports. 4. Article 6012. <http://dx.doi.org/10.1038/srep06012>
- Szczerski, C., C Naguit, **J. Markham**, T.B. Goh and S. Renault. 2013. Short- and long-term effects of modified humic substances on plant growth and fertility of gold mine tailings. Water, Air and Soil Pollution. 224: 1-14.
- Young, I. C.Naguit, S.Halwas, S.Renault, J.Markham. 2012. Natural revegetation of a boreal gold mine tailings pond. Restoration Ecology. 21: 498-505. DOI: 10.1111/j.1526-100X.2012.00913.x
- Faber, S. and **Markham, J.** 2012. Biotic and abiotic effects of remnant and restoration soils on the performance of tallgrass prairie species. Ecological Restoration. 30:106-115.

- Markham, J. H.** and Halwas, S. 2011. Effect of neighbour presence and soil volume on the growth of *Andropogon gerardii* Vitman. *Plant Ecology and Diversity*. 4: 265-268.
- Faber, S. and **Markham, J.** 2011. Temporal and spatial dynamics in a northern tallgrass prairie. *Plant Ecology*. 212: 1577-1588.
- Markham, J.** Young, I. and Renault, S. 2011. Plant facilitation on a mine tailings dump. *Restoration Ecology*. 19: 569-571.
- Zekveld, C. and **Markham, J.** 2011. Exposure to aphids increases alder growth. *Botany*. 89: 255-261.
- Markham, J.H.** 2009. Does *Dryas integrifolia* Vahl. fix nitrogen? *Botany*. 87:1106-1109.
- Markham, J. H.** 2009. Variation in moss associative nitrogen fixation in boreal forests. *Oecologia*. 161:353-359.
- Markham, J. H.**, Grime, J.P. and Buckland, S. 2009 Reciprocal interactions between plants and soil in an upland grassland. *Ecological Research*. 24:93-98.
- Markham, J. H.** 2008. Variability of *Frankia* spore types on *Alnus*. *Botany*. 86:501-510.
- Markham, J. H.** 2008. Population size effects on germination, growth and symbiotic nitrogen fixation in an actinorhizal plant at the edge of its range. *Botany*. 86:398-407.
- Markham, J.H.** and Zekveld, C. 2007. Nitrogen fixation makes biomass allocation to roots independent of nitrogen supply. *Canadian Journal of Botany*. 85: 787-793.
- Markham, J.** 2005 . The effect of *Frankia* and *Paxillus involutus* on the performance of *Alnus incana* spp. *rugosa* in mine tailings *Canadian Journal of Botany*. 83: 1384 – 1390.
- Markham, J.** 2002. A Hierarchical Analysis of Seed Production by *Alnus rubra*. *Am. Mid. Nat.* 148: 246 – 252.
- Chanway, C.P., Shishido, M., Nairn, J., Jungwirth, S., **Markham, J.**, Xiao, G. And Holl, F. B. 2000 Endophytic colonization and field responses of hybrid spruce seedlings after inoculation with plant growth-promoting rhizobacteria. *For. Ecol. and Man.* 133: 81-88.
- Markham, J. H.** and Chanway, C. P. 1999. Does past contact reduce the degree of mutualism in the actinorhizal plant/*Frankia* symbiosis? *Canadian Journal of Botany*. 77: 434 - 441.
- Markham, J. H.** Chanway, C. P. 1998. Response of red alder (*Alnus rubra* Bong.) seedlings to a woolly alder sawfly (*Eriocampa ovata* L.) outbreak. *Canadian Journal of Forest Research*. 28: 591 - 595.
- Markham, J. H.** and Chanway, C. P. 1998. *Alnus rubra* (Bong.) nodule spore type distribution in southwestern British Columbia. *Plant Ecology*. 135: 197 - 205.
- Chanway, C. P., Shishido, M., Jungwirth, S., Nairn, J., **Markham, J.**, Xiao, G. and Holl, F.B. 1997. Second year growth responses of outplanted conifer seedlings inoculated with PGPR. pp. 172 - 176. In: *Plant growth-promoting rhizobacteria: present status and future prospects*. Proceedings

of the fourth international workshop on plant growth promoting rhizobacteria. Eds: Ogoshi, A., Kobayashi, K., Homma, Y., Kodama, F., Kondo, N. and Akino, S. Sapporo, Japan.

**Markham, J. H.** 1997. Measuring and modeling plant neighbour effects: reply to Freckleton and Watkinson. *Functional Ecology*. 11: 534 - 535.

**Markham, J. H.** and Chanway, C. P. 1996. Measuring plant neighbour effects. *Functional Ecology*. 10: 548 - 549.

**Markham, J. H.** and Chanway, C. P. 1996. *Alnus rubra* nodulation capacity of soil under 5 species in harvested sites in coastal British Columbia. *Plant and Soil*. 178: 283 - 286.

Lazo, L., **Markham, J. H.** and Chapman, A. R. O. 1994. Herbivory and harvesting: effects on sexual recruitment and vegetative modules of *Ascophyllum nodosum*. *Ophelia*. 40: 95 - 113.

Lowell, R. B., **Markham, J. H.** and Mann, K. H. 1991. Herbivore-like damage induces increased strength and toughness in a seaweed. *Proc. Roy. Soc. Lond. B*. 243: 31 - 38.

Denton, A., Chapman, A. R. O. and **Markham, J. H.** 1990. Size specific concentrations of phlorotannins (antiherbivore compounds) in two species of *Fucus*. *Mar. Ecol. Prog. Ser.* 65:103-104.

### **PUBLICATIONS – in Review**

Gharajehdaghypour, T., Roth, J.D., Fafard, P.M. & Markham, J.H. Arctic foxes as ecosystem engineers: increased soil nutrients lead to increased plant productivity on fox dens. Submitted to Scientific Reports. September 6, 2015.

Fernandez, M. and Markham, J. Forests in a Changing World. In: The paradigm of forests and survival of the fittest. Molina, S. A. and Rojas, C. (Eds). Science Publisher, CRC Press.

### **PUBLICATIONS – nonrefereed**

Naguit, C., Young, I., Markham, J., Renault, S. 2011. Leaf elemental analysis of plants growing on the Gunnar mine tailings, Manitoba (NTS 52L14) in Report of Activities 2011, Manitoba Science, Technology, Energy and Mines, Manitoba Geological Survey.

Young, I., Sczserski, C., Newediuk, J., Markham, J., Renault, S. 2009: Natural Revegetation of Gunnar Minesite, Manitoba (NTS 52L14); in Report of Activities 2009, Manitoba Science, Technology, Energy and Mines, Manitoba Geological Survey.

Markham, J. and Sheffield, R. 2008. Controls on Tallgrass Prairie Diversity. Year 3 Final Report. Sustainable Development Initiative Fund. Manitoba Conservation.

Markham, J., Renault, S. Young, I. Halwas, S. and Kunkel, S. 2008: Natural Revegetation of the Gunnar Minesite, Manitoba (NTS52L14); in Report of Activities 2008, Manitoba Science, Technology, Energy and Mines, Manitoba Geological Survey, pp. 139 – 143.

- Renault, S., Markham, J., Davis, L. Sabra, A., and Szczerski, C. 2007: Revegetation of tailings at the Gunnar minesite, Manitoba (NTS 52L/14): plant growth in tailings amended with paper-mill sludge; in Report of Activities 2007, Manitoba Science, Technology, Energy and Mines, Manitoba Geological Survey, 5p
- Gill, Cara. 2007. On the Use of Enduring Features Analysis for Protected Areas Planning. Sustainable Development Initiative Fund. Manitoba Conservation.
- Markham, J. 2006. Controls on Tallgrass Prairie Diversity. Final Report. Sustainable Development Initiative Fund. Manitoba Conservation.
- Markham, J. 2006. Enhancement of Soil Fertility and Conifer Growth By Nitrogen-fixing Alders. Manitoba Hydro Forest Enhancement Program Grant. Project B-IF-0564-2004. Final report.
- C.P. Chanway, M. Shishido, J. Nairn, S. Jungwirth, J. Markham, G. Xiao and F.B. Holl. 1998. Endophytic colonization and field responses of hybrid spruce seedlings after inoculation with plant growth-promoting rhizobacteria. In: Ecology and Management of Northern Forest Soils, Proceedings. Edited by J.D. Lousier. Beekman Printing, Prince George, B.C. pp.194-202.
- Markham, J. and Chanway, C. 1997. *Frankia* distribution in southwestern B.C. Forest Renewal Plan of British Columbia. Research Award HQ96117-RE. Final Report.
- Kimmins, J. P., Markham, J. H. and Mailly, D. 1996. Hemispherical photographs as a tool to characterize understory light environments and regeneration success under various canopy covers. Forest Renewal Plan of British Columbia. Research Award #OPS.LR-164. Final Report.

## **PRESENTATIONS**

- 2015 Gharajehdaghpoor, T., Roth, J.T. and Markham, J. Ecosystem engineering by arctic foxes: Effects on soil nutrient dynamics and benefits to herbivores. PUBS. Feb 19 – 21, University of Winnipeg
- Chen, H. and Markham, J. The effect of *Frankia* and ectomycorrhizal fungi on *Alnus viridis* growing in salt stress soil. PUBS. Feb 19 – 21, University of Winnipeg
- Jianfei Shao, John Markham and Sylvie Renault. Effects of salinity on the nitrogen fixing boreal shrub (*Elaeagnus commutata*). 2015 - CLRA/ ACRSD – MSSS Joint Conference. June 15-18. Winnipeg, Manitoba.
- 2014 Renault S., Young I, Naguit C and Markham J. Revegetation of abandoned gold mine tailings in the Manitoba boreal forest. Canadian Land Reclamation Association Annual Meeting. Mount Trembant, QC. Sept 22-25.

Fafard, P., Roth, J. and Markham, J. Do arctic foxes act as ecosystem engineers in the Canadian subarctic? Parks and Protected Areas Research Forum Manitoba. November 20-21,2014 Winnipeg.

Gharajehdaghipoor, T., Roth, J.D., Markham, J. Arctic foxes as ecosystem engineers: Estimating the benefits of fox dens to plants and herbivores. Parks and Protected Areas Research Forum Manitoba. November 20-21,2014 Winnipeg.

2013 Markham, J. Hydrological niches in tall grass prairie plant communities. Tall Grass Prairie Research Symposium. Oct. 1. Invited talk.

Wolfe, S., Avila-Sakar, G. Markham, J. and Renault, S. Does salinity stress improve defense against herbivores in *Brassica juncea*? Canadian Botanical Association Annual Meeting. Kamloops, British Columbia. June 2013.

Markham, J. and Sheffield, R. Rare species occupy peripheral niches in tallgrass prairies. Canadian Botanical Association Annual Meeting. Kamloops, British Columbia. June 2013.

Naguit, C. Young, I., Markham, J. and Renault, S. Evaluating the Success of Manitoba Mine Tailings Revegetation Efforts. Canadian Institute of Forestry Meeting. Winnipeg, Manitoba.

2012 Naguit C., Markham J. and Renault S. Evaluating the Success of Manitoba Mine Tailings Revegetation Efforts. Poster presentation at the 23<sup>rd</sup> North American Prairie Conference. Awarded best poster presentation.

2011 I. Young, J. Markham, and S. Renault. Revegetation of a boreal Gold Mine Tailings Pond. 28th National Meeting of the American Society of Mining and Reclamation, June 2011. Bismarck, North Dakota.

Markham, J. The ecology of symbiotic nitrogen fixation. Invited seminar. Invited talk. University of Winnipeg. January 14.

Markham, J. New Perspectives on Nitrogen in Boreal Forests. Invited talk. Manitoba Forest Research Symposium. March 25.

Markham, J. Renault, S. Naguit, C. and Young. Natural and anthropogenic revegetation of hard rock mine tailings. Invited talk. North American Forest Ecology Workshop. Roanoke, Virginia

Markham, J. Boreal forest moss-associated nitrogen fixation in a changing climate. Plant Canada 2011. Halifax. July 17-21.

Markham, J. Undergraduate scientific writing trends in biology programs across Canada. Teaching Symposium. Plant Canada 2011. Halifax. July 17-21.

Naguit, C., Young, I., Markham, J., and Renault, S. Ecological evaluation of revegetated mine tailings in Manitoba and Saskatchewan. Poster presented as part of the 36<sup>th</sup> CLRA/ACRS National conference, Sudbury, Ontario, 25-30 June 2011.

- Naguit, C., Young, I., Markham, J., and Renault, S. Growth and stress responses of *Medicago sativa* L. (alfalfa) in mine tailings under greenhouse conditions. Poster presented as part of the Plant Canada conference, Halifax, Nova Scotia, 17-21 July 2011.
- 2010 Sheffield, R. and Markham, J. Hydrological niches in tallgrass prairies. Canadian Botanical Association Annual Meeting. Ottawa Ontario.
- Young, I., Renault, S. and Markham, J. Revegetation of non-acid generating mine tailings in South-East Manitoba. Canadian Land Reclamation Association Annual Meeting.
- 2009 Markham, J. Ecological limitations to symbiotic nitrogen fixation. Ecological limitations to symbiotic nitrogen fixation. Winnipeg. May 4, 2009.
- Markham, J. Associative nitrogen fixation in boreal forest mosses. Canadian Botanical Association Annual Meeting. Wolfville, NS. May 18-22, 2009.
- Markham J., Renault S., Young, I., Halwas, S. and Kunkel, S. Natural revegetation of Gunnar minesite in Nopiming Provincial Park, Manitoba. Annual Meeting of the Canadian Land Reclamation Association. Quebec-city, Canada. August 23-25, 2009.
- 2008 Faber, S. and Markham, J. Plant and soil relationships in Manitoba tallgrass prairie. Botany Without Borders Conference, UBC, Vancouver, BC. July 26-30.
- Renault S., Markham J., Davis L. and Martin, M (2008). Revegetation of gold mine tailings in Nopiming Provincial Park, Manitoba. 25<sup>th</sup> Annual Meeting of the American Society of Mining and Reclamation and the 10<sup>th</sup> Meeting of the International Affiliation of Land Reclamationists (IALR), Richmond, VA, June 14-19, 2008.
- 2007 Markham, J. Why aren't nitrogen fixing plants more common? Department of Entomology, University of Manitoba. Nov. 20, 2007.
- Renault S., Markham J., Sabra A., Davis L. and Martin, M. Revegetation of gold mine tailings at Gunnar Mine site. Poster presented at the Manitoba Mining and Minerals Convention 2007, Nov 15-17, Winnipeg.
- 2006 S. Renault, J. Markham, C. Szczerski, C. Nakata, A. Sabra, L. Davis, S. Green and D. Overton. Revegetation of Gold Mine Tailings in Nopiming Park. Manitoba Mining & Minerals Convention. Nov. 20 – 22. Winnipeg, Mb.
- 2005 Zekveld, C. and Markham, J. Effects of Nitrogen on Growth and Nodulation of *Alnus crispa*. Manitoba Association of Plant Biologists Annual Meeting. Winnipeg, Manitoba.
- Markham, J. and Zekveld, C. Negative effects of soil biota on *Andropogon gerardii*. Manitoba Association of Plant Biologists Annual Meeting. Winnipeg, Manitoba.

- Markham, J. and Zekveld, C. Negative effects of soil biota on *Andropogon gerardii*. Ecological Society of America Annual meeting and IX International Congress of Ecology. Montreal, Quebec.
- 2004 Markham, J. The effect of mycorrhizae and nitrogen fixing nodules on the performance of *Alnus incana* spp. *rugosa* in mine tailings. Canadian Botanical Association Annual Meeting. Winnipeg, Manitoba.
- Day, M. and Markham, J. Competition between two *Frankia* strains and two fungal species in the tripartite *Frankia*/ectomycorrhizae/*Alnus rubra* mutualism. Canadian Botanical Association Annual Meeting. Winnipeg, Manitoba.
- 2003 Day, Melissa and Markham, J. Interactions between *Frankia* and *Paxillus involutus* on a shared *Alnus rubra* host. Plant Canada. Antigonish, Nova Scotia.
- 2000 Markham, J. The other nitrogen fixing system. Plant Science Seminar, University of Manitoba. Oct. 19
- 2000 Markham, J. Ecology of the nitrogen fixing symbiont, *Frankia*, and its hosts. Microbiology department Seminar Series. University of Manitoba. Feb. 3
- 1997 C. Chanway, M. Shishido, S. Jungwirth, J. Nairn, J. Markham, G. Xiao and F. B. Holl. Second year growth responses of outplanted conifer seedlings. 4th International PGPR Workshop. Sapporo, Japan.
- 1995 Markham, John H. and Chris P. Chanway. A test of coadaptation between red alder and its nitrogen fixing symbiont *Frankia*. Ecological Society of America 80th Annual Meeting. Snowbird, Utah.
- 1995 Markham, John and Chris Chanway. A field test of coadaptation between *Frankia* and *Alnus rubra* populations. The 10th International conference on *Frankia* and Actinorhizal Plants. University of California, Davis.
- 1995 Markham, J. H. and C. P. Chanway. Something ate my thesis. 15th Annual Forest and Tree Related Research Colloquium. University of Victoria.
- 1994 Markham, John and Chris Chanway. Effect of parent elevation, planting elevation and *Frankia* source on red alder growth: preliminary results. Joint Meeting of the Canadian Society of Plant Physiologists (Western Region) and the 14th Annual University of Victoria Forest and Tree Research Colloquium. University of British Columbia.

### **Professional organizations**

Ecological Society of America. Member since 1991  
 Canadian Botanical Association. Member since 2002  
     President Elect 2012 - 2014  
     President 2014  
 Plant Canada, Board of Directors since 2013

Canadian Scientific Publishing, Board of Directors  
Manitoba Association of Plant Biologists. Member since 2001  
American Botanical Association. Member since 2006



# CURRICULUM VITAE

OF

**JENNIFER MARY McLEESE**

(October, 2015)

Current Position: Senior Instructor,  
Dept. of Biological Sciences,  
University of Manitoba,  
Winnipeg, Manitoba  
R3T 2N2

Telephone: (204) 474-6305  
e-mail: Jennifer.McLeese@umanitoba.ca

Nationality: Canadian Citizen

Degrees: B.Sc. (University of Guelph)  
M.Sc. (University of Guelph)  
Ph.D. (University of Ottawa)

## EDUCATION

Ph.D. University of Ottawa, 1987  
Thesis Title: Seasonal changes in uptake of L-phenylalanine by the intestine of winter flounder, *Pseudopleuronectes americanus*.

M.Sc. University of Guelph, 1983  
Thesis Title: The effect of temperature on trypsin and chymotrypsin from rainbow trout and bluefin tuna.

B.Sc. University of Guelph, 1980  
Honours Marine Biology

## AWARDS AND SCHOLARSHIPS

1980-1982 Natural Sciences and Engineering Research Council Postgraduate  
1983-1985 Scholarship

1982-1983 Ontario Graduate Scholarship  
1985-1986

1982-1985	University of Ottawa Entrance Scholarship
1997	Nominated, University of Prince Edward Island Award of Excellence in Teaching.
2002	Faculty Access Award, University of Manitoba
2005, 2006	Named "Popular Professor" in MacLean's Guide to Canadian Universities

### **POSITIONS HELD:**

2006 - present:	Senior Instructor, University of Manitoba, Dept. of Biological Sciences
2000 - 2006:	Instructor II, University of Manitoba, Dept of Zoology
1997 - 2000	Research Associate, University of Manitoba, Dept. of Zoology In the lab of Dr. J.G. Eales
1997	Graduate Faculty, Dept. of Anatomy and Physiology, Atlantic Veterinary College, University of Prince Edward Island
1996 - 1997	Assistant Professor (term position), University of Prince Edward Island, Dept. of Biology
1993 - 1996	Research Associate, University of Manitoba, Dept. of Zoology In the lab of Dr. J.G. Eales
1990 - 1993	Postdoctoral Fellow, Dept. of Biology, University of Regina In the lab of Dr. M. Weisbart
1991	Visiting Researcher (4 months), DID Biotechnology Division Health and Welfare Canada, Ottawa, Ontario In the lab of Dr. Remy Aubin
1988 - 1990	Research Associate, Dept. of Animal and Poultry Science, University of Saskatchewan In the lab of Dr. J. Patience
1986 - 1988	Postdoctoral Fellow, Faculté de Médecine, Dépt. de Physiologie, Université de Montréal In the lab of Dr. M. Bergeron
1979	Technician (5 months), Research and Development Laboratory, Fiberglas Canada, Ltd. Sarnia, Ontario
1979	Toxicology Technician (5 months), Fisheries and Oceans Canada Biological Station, St Andrews, New Brunswick

### **TEACHING EXPERIENCE:**

I have experience both in teaching lectures and laboratories. Laboratory sections were required for each course taught at the University of Prince Edward Island, and I organized and taught each section for each course. Additionally, I helped to advise and guide graduate students in the laboratories of Dr. M. Bergeron, Dr. M. Weisbart, and Dr. J.G. Eales, and served on the graduate

committee of Joanne Dennis (M.Sc. student) at the Atlantic Veterinary College at the University of P.E.I.

### **University of Manitoba**

**Anatomy of the Human Body and Physiology of the Human Body:** 1st year service courses for students intending to enter health care fields (nursing, dental hygiene etc), kinesiology, biomedical engineering, human nutrition, and medical rehabilitation; with laboratory. Over time and with my input, the labs have gradually been modified in both courses to improve coordination with the lectures and modernize and improve delivery. I added a second midterm in anatomy to improve student outcomes. In 2009, I became supervisor of Kristie Lester, the lab steward.

(Numbers in brackets indicate starting enrolment).

**Anatomy of the Human Body:** Became course coordinator in 2009

Fall: 1999: ½ section (58)

2000, '06, '07: 1 section (180, 298, 299)

2001, '02, '03: 1½ sections (421, 421, 500)

2004, '08, '09, '10, '11: 2 sections (506, 517, 520, 520, 740 (½ of 2 sections + 1 section), 509)

2012, '13, '14, '15: 2½ sections (750, 741, 744, 734)

Winter: 1999, 2001: ½ section (143, 140)

2000: 1 section (180)

Summer: 1998, '99, '00, '01, '02, '03, '04, '05, '06, '07, '08, '12, '13, '14, '15: ½ section (48, 141, 143, 190, 206, 211, 210, 210, 210, 211, 220, 201, 210, 241, 233)

2009, '10, '11: 1 section (225, 216, 216)

**Physiology of the Human Body:** (Became course coordinator in 2010)

Winter: 2001, '05: 1 section (143, 169)

1999, '02, '03, '04: 1½ sections (183, 357, 390, 297)

2005, '06, '07, '08, '09, '10, '11, '12, '13, '14, 15 (339, 260, 272, 334, 374, 376, 406, 364, 437)

Summer: 1998, '99, '00, '01, '02, '03, '04, '05, '06, '07, '08, '12: ½ section (69, 169, 117, 182, 175, 151, 135, 128, 137, 135, 151, 149)

2009, '10, '11, '13, '14, '15: 1 section (157, 133, 159, 156, 184, 209)

In March 2009, a fire occurred in Duff Roblin Building (where offices and course labs were located), and we were able to successfully offer both courses in the two subsequent summer sessions and in regular session. We had to move labs (mostly done by the lab coordinator) and organize labs exams, health and safety permits and other logistics in different rooms for those sessions, until we were able to move into renovated labs in the Biological Sciences Building.

**Human Physiology:** 2<sup>nd</sup> year course without lab; initially a 6 credit hour course but subsequently divided into two 3 credit hour courses

Fall: 1995, '07, '08: 1 section (60, 326, 349)

2005: 7 lectures, endocrine system (315)

2009: 6 lectures, reproductive system (245)

Winter: 1996; 1 section (60)

Summer I: 1994: ½ section (96)

1995, '96, '09: 1 section (58, 60, 84)

Summer II: 1994: ½ section (96)  
 1995, '96, '00: 1 section (58, 60, 36)

**Endocrinology:** 4<sup>th</sup> year course, without a lab  
 Winter: 1994, '95: 3 lectures on calcium regulation (15, 15)  
 2005, '06: 1 section (11, 9)

**Introductory Biology:** 1<sup>st</sup> year distance education course  
 1995/'96: developed 1 module on animal biology

**Skills in Biology:** 3<sup>rd</sup> year course, no lab, required for honours students  
 2010, '11, '12, '13, '14, '15: 1 lecture on applying for awards (15 - 25 students/year)

**University of Prince Edward Island:**

This was a 1 year replacement position for a sick leave. I prepared the notes and almost all of the lab exercises for all courses, and also taught the labs (no TAs). I was nominated for the UPEI Award for Excellence in Teaching for the fall and winter term courses.

**Cell Physiology**

Fall, 1996: 1 section, 3 labs /week (69)

**Biology of Fishes**

Fall, 1996: 1 section, 1 lab/week (8)

**Animal Physiology**

Winter, 1997: 1 section, 2 labs/ week (54)

**Human Biology**

Winter 1997: 1 section, 2 labs/week (38)

**Marine Biology**

Summer 1997: 1 lecture, 2 labs/week (8)

**University of Regina**

**Human Physiology:** 3 guest lectures (approx 100 students)

**University of Ottawa**

**Comparative Physiology**

Winter: TA in lab-only course (no lectures) (30)

**TEXTBOOK REVIEWS:**

General review of text and supplementary materials, plus detailed review of chapters 17 (The Endocrine System) and 25 (The Digestive System) of *Anatomy & Physiology: The Unity of Form and Function*, 4<sup>th</sup> edition, by Kenneth S. Saladin; for the 5<sup>th</sup> edition.

General review of text and supplementary materials of *Hole's Human Anatomy & Physiology*, 11<sup>th</sup> edition, by David Shier, Jackie Butler and Ricki Lewis, for 12<sup>th</sup> edition.

**COMMITTEES:**

- Scholarships and Awards Committee, Dept of Zoology/Biological Sciences, University of Manitoba, 2002 - present; Chair, 2003 - present
- Physiology Teaching Committee, Dept. of Zoology, University of Manitoba, 2000 - 2009.
- Environmental and Integrative Physiology Theme Group, Dept. of Biological Sciences, University of Manitoba, 2010 - present
- Integrative Biology Theme Group, Dept. of Biological Sciences, University of Manitoba, 2010 - present
- University of Manitoba Graduate Fellowship (UMGF) Selection Committee, Faculty of Science, University of Manitoba, 2007 - present
- Honours and Awards Committee, Faculty of Science, University of Manitoba, 2008 - present
- Bernice Warkoff Safer Prize for Excellence in Mathematics Committee, Chair, Dept of Mathematics, University of Manitoba, 2009
- Disability Services Faculty Advisory Committee, University of Manitoba, Sept 2001 - present
- Search Committees:
  - Anatomy & Physiology/Ecology instructor position, University of Manitoba, 2011
  - Head, Dept of Mathematics, University of Manitoba, 2008, 2009, 2010
  - Lab steward position for ZOOL1320/1330, Dept of Zoology, University of Manitoba, 2008
  - Tenure track neurophysiologist position, Dept. of Zoology, University of Manitoba, 2007
  - Introductory Biology/physiology instructor position, Dept. of Zoology, University of Manitoba, 2006
  - Tenure track physiologist position, Dept. of Zoology, University of Manitoba, 2004
- Management Committee, Canadian Aquaculture Institute (UPEI). 1996-1997.
- Graduate Committee of Joanne Dennis, Dept of Anatomy and Physiology, Atlantic Veterinary College, UPEI. February, 1997- October, 1997.
- Various Faculty committees, Biology Dept., UPEI. 1996-1997, including the search committee for a three year term position in cell biology.

### **OUTREACH AND MENTORING**

2009: Judge, University of Manitoba undergraduate poster competition

1997: Faculty advisor for UPEI Biology students attending the Atlantic Canada Undergraduate Research Conference in Biology

### **PROFESSIONAL MEMBERSHIPS**

Canadian Society of Zoologists, 1983 - present

Aquatic Biology Research Group (a consortium of researchers from the University of Manitoba, the Freshwater Institute (DFO), and other institutes) 2006.

### **PUBLICATIONS**

- LOTAR, T.C., D.S. MacKENZIE, **J.M. McLEESE**, and J.G. EALES. 2007. Seasonal changes in channel catfish thyroid hormones reflect increased magnitude of daily thyroid hormone cycles. *Aquaculture* 262:451-460.
- EALLES, J.G., R. DEVLIN, D.A. HIGGS, **J.M. McLEESE**, J.D. OAKES and J. PLOHMAN. 2004. Thyroid function in growth-hormone-transgenic coho salmon, *Oncorhynchus kisutch*. *Can. J. Zool.* 82:1225-1229.
- McLEESE, J.M.**, G.A. WRIGHT, J.H. YOUSON and J.G. EALES. 2000. Deiodination activity in extrathyroidal tissues of the Atlantic hagfish, *Myxine glutinosa*. *J. Exp. Zool.* 287:445-452.
- EALLES, J.G., **J. McLEESE**, J.A. HOLMES and J.H. YOUSON. 2000. Changes in intestinal and hepatic thyroid hormone deiodination during spontaneous metamorphosis of the sea lamprey, *Petromyzon marinus*. *J. Exp. Zool.* 286:305-312.
- FINNISON, K.W., **J. McLEESE**, and J.G. EALES. 1999. Hepatic deconjugation and deiodination of thyroid hormone conjugates and reverse T<sub>3</sub> deiodination in rainbow trout, *Oncorhynchus mykiss*. *Gen. Comp. Endocrinol.* 115:387-397.
- LIM, C., R.M. BEAMES, J.G.EALES, A.F.PRENDERGAST, **J.M.McLEESE**, K.D.SHEARER, and D.A. HIGGS. 1999. Nutritive values of low and high fibre canola meals for shrimp (*Penaeus vannamei*). *Aquacult. Nut.* 4:115-122.
- McLEESE, J.**, and J.G. EALES. 1998. Factors influencing T<sub>3</sub> transport into red blood cells of rainbow trout, *Oncorhynchus mykiss*. *Can. J. Zool.* 76:1325-1328.
- McLEESE, J.**, A. WAYTIUK and J.G. EALES. 1998. Factors influencing the steady-state distribution and exchange of thyroid hormones between red blood cells and plasma of rainbow trout, *Oncorhynchus mykiss*. *Gen. Comp. Endocrinol.* 109:259-268.
- CYR, D.G., D.I. IDLER, C. AUDET, **J.M.McLEESE** and J.G. EALES. 1998. Effects of long-term temperature acclimation on thyroid hormone deiodinase function, plasma thyroid hormone levels, growth, and reproductive status of male Atlantic cod, *Gadus morhua*. *Gen. Comp. Endocrinol.* 109:24-36.
- EALLES, J.G., J.A. HOLMES, **J.M.McLEESE** and J.H. YOUSON. 1997. Thyroid hormone deiodination in various tissues of larval and upstream migrant sea lampreys, *Petromyzon marinus*. *Gen. Comp. Endocrinol.* 106:202-210.
- McLEESE, J.M.** and J.G. EALES. 1996. Characteristics of the uptake of 3,5,3'-triiodo-L-thyronine and L-thyroxine into red blood cells of rainbow trout, *Oncorhynchus mykiss*. *Gen. Comp. Endocrinol.* 103:200-208.
- McLEESE, J.M.** and J.G. EALES. 1996. 3,5,3'-triiodo-L-thyronine and L-thyroxine uptake into

- red blood cells of rainbow trout, *Oncorhynchus mykiss*. Gen. Comp. Endocrinol. 102:47-55.
- McLEESE, J.**, G. THIERY and M. BERGERON. 1996. Maleate modifies apical endocytosis and permeability of endoplasmic reticulum membranes in kidney tubular cells. Cell Tiss. Res. 283:29-37.
- McLEESE, J.M.**, J. JOHANSSON, F.M. HUNTLEY, W.C. CLARKE and M. WEISBART. 1994. Seasonal changes in osmoregulation, cortisol and cortisol receptor activity in the gills of parr/smolt of steelhead trout and steelhead-rainbow trout hybrids, *Oncorhynchus mykiss*. Gen. Comp. Endocrinol. 93:103-113.
- WEISBART, M., P.K. CHAKRABORTI, A. CHAKRABORTI, F.M. HUNTLEY and A. MANECKJEE and **J.M. McLEESE**. 1994. Steroid receptors in fish: membrane and intracellular preparations. In: Biochemistry and Molecular Biology of Fishes. Vol. III: Analytical techniques. P.W. Hochachka and T.P. Mommsen, eds. Elsevier, Amsterdam - New York. pp. 457-468.
- YANG, H., **J. McLEESE**, M. WEISBART, J.-L. DIONNE, I. LEMAIRE and R.A. AUBIN. 1993. Simplified high throughput protocol for Northern hybridization. Nucl. Acids Res. 21:3337-3338.
- McLEESE, J.M.**, M.L. TREMBLAY, J.F. PATIENCE and G.I. CHRISTISON. 1992. Water intake patterns in the weanling pig: effect of water quality, antibiotic and probiotic. Anim. Prod. 54:135-142.
- McLEESE, J.M.**, J.F. PATIENCE, M.S. WOLYNETZ and G.I. CHRISTISON. 1991. Evaluation of the quality of ground water supplies used on Saskatchewan swine farms. Can. J. Anim. Sci. 71:191-203.
- FRASER, D., J.F. PATIENCE, P.A. PHILLIPS and **J.M. McLEESE**. 1990. Water for piglets and lactating sows: quantity, quality and quandaries. In: Recent Advances in Nutrition, W. Haresign and D.J.A. Cole (ed.). Butterworths, London. pp. 137-160.
- PAIEMENT, J.M., J.M. DOMINGUEZ, **J.M. McLEESE**, J. BERNIER, L.ROY and M. BERGERON. 1990. Morphogenesis of endoplasmic reticulum in *Xenopus* oocytes after microinjection of smooth liver microsome. Amer. J. Anat. 187:183-192.
- McLEESE, J.M.**, AND M. BERGERON. 1990. Fasting induces modifications of the endoplasmic reticulum in intestinal cells. J. Electron Microsc. Tech. 16:56-68.
- McLEESE, J.M.**, J.F. PATIENCE and G.I. CHRISTISON. 1989. Water quality of wells on Saskatchewan hog farms. Annual Report, Prairie Swine Centre, University of Saskatchewan, Saskatoon, Saskatchewan. pp. 31-34.
- McLEESE, J.M.**, and T.W. MOON. 1989. Seasonal changes in the intestinal mucosa of winter

flounder, *Pseudopleuronectes americanus* (Walbaum), from Passamaquoddy Bay, New Brunswick. J. Fish Biol. 35:381-393.

**McLEESE, J.M.**, and E.D. STEVENS. 1986. Trypsin from two strains of rainbow trout, *Salmo gairdneri*, is influenced by assay and acclimation temperature. Can. J. Fish. Aq. Sci. 43:1664-1667.

STEVENS, E.D., and **J.M. McLEESE**. 1984. Why bluefin tunas have warm tummies: temperature effect on trypsin and chymotrypsin. Am. J. Physiol. 246:R487-R494.

**McLEESE, J.M.**, and E.D. STEVENS. 1982. The effect of acclimation temperature and ration on the specific activity of trypsin and chymotrypsin from rainbow trout (*Salmo gairdneri*). Comp. Biochem. Physiol. 73B:631-634.

### **ABSTRACTS AND CONFERENCE PRESENTATIONS**

**McLEESE, J.M.**, and J.G. EALES. 2000. Regulation of thyroid hormone deiodination pathways in isolated hepatocytes of rainbow trout, *Oncorhynchus mykiss*. Bull. Can. Soc. Zoologists 31(2):85. (Presented, St Andrews, N.B., May 2000).

**McLEESE, J.M.**, and J.G. EALES. 1994. Characteristics of the uptake of 3,5,3'-triiodothyronine and thyroxine into erythrocytes of rainbow trout, *Oncorhynchus mykiss*. Bull. Can. Soc. Zoologists 25(2):76. (Presented, Winnipeg, MB, 1994).

WEISBART, M., **J.M. McLEESE**, J. JOHNSON, F.M. HUNTLEY and W.C. CLARKE. 1993. Seasonal changes in cortisol and cortisol receptor activity in the gills of parr/smolt of steelhead trout, and steelhead-rainbow trout hybrids, *Oncorhynchus mykiss*. Proceedings, XIIth International Congress of Endocrinology. (Presented, Toronto, Ontario, 1993).

WEISBART, M., **J.M. McLEESE**, J. JOHNSON, F.M. HUNTLEY and W.C. CLARKE. 1992. Seasonal changes in gill cortisol receptor characteristics in two strains of *Oncorhynchus mykiss*. Proc. Can. Soc. Zool. (Presented, Antigonish, Nova Scotia, 1992).

**McLEESE, J.M.**, M. WEISBART and F.M. HUNTLEY. 1992. Seasonal effects of chronic and acute injection of cortisol on intestine and gill of juvenile brook trout, *Salvelinus fontinalis*. Proc. Can. Soc. Zool. (Presented, Antigonish, Nova Scotia, 1992).

PATIENCE, J.F., **J.M. McLEESE** and M.L. TREMBLAY. 1989. Water quality - implications in pork production. Proc. 10th Western Nutrition Conference. (Presented, Saskatoon, Saskatchewan, 1989).

**McLEESE, J.M.**, and M. BERGERON. 1988. Osmium reactivity of the endoplasmic reticulum is reduced during fasting in winter flounder intestine. IVth International Congress of Cell Biology. (Presented, Montréal, Québec, 1988).

**McLEESE, J.M.**, and M. BERGERON. 1988. Modification of endoplasmic reticulum (ER)



reactivity during generalized transport derangement. *Can. J. Physiol. Pharmacol.* 66:xxix. (Presented to the Canadian Physiological Society, Mont Tremblant, Québec., 1988)

**McLEESE, J.M.**, and M. BERGERON. 1987. Calcium uptake by rat kidney microsomes is stimulated by maleate. *Kid. Int.* 33:165. Nephrology meetings, Washington, D.C., 1987.

**McLEESE, J.M.**, and T.W. MOON. 1987. Seasonal changes in in vitro intestinal uptake of L-phenylalanine by winter flounder, *Pseudopleuronectes americanus*. *Proc. Can. Soc. Zool.* (Presented, Montréal, Québec, 1987.).

**McLEESE, J.M.**, and T.W. MOON. 1985. Phenylalanine uptake by the intestine of winter flounder, *Pseudopleuronectes americanus*, measured in vivo. Canadian Congress of Biology. (Presented, London, Ontario, 1985).

**McLEESE, J.M.**, and T.W. MOON. 1985. Intestinal uptake of phenylalanine in winter flounder, *Pseudopleuronectes americanus*, just prior to the resumption of feeding. Presented at the Marine Biology Symposium, Huntsman Marine Laboratory, St. Andrews, New Brunswick, 1985.

**McLEESE, J.M.**, and T.W. MOON. 1984. A light microscopic examination of the intestine of the winter flounder (*Pseudopleuronectes americanus*). Presented at the Marine Biology Symposium, Huntsman Marine Laboratory, St Andrews, New Brunswick, 1984.

**McLEESE, J.M.**, and T.W. MOON. 1984. A light microscopic examination of winter flounder (*Pseudopleuronectes americanus*) intestine. *Proc. Can. Soc. Zool.* (Presented, Wolfville, Nova Scotia, 1984.)

**McLEESE, J.M.** 1983. The effect of starvation on the intestinal structure of the American eel (*Anguilla rostrata*). *Proc. Can. Soc. Zool.* (Presented, Ottawa, Ontario, 1983).

#### **INVITED PRESENTATIONS:**

“Mitosis and Meiosis” Dept. of Zoology, University of Manitoba, Winnipeg, Manitoba, March, 2000

“Thyroid hormone peripheral metabolism in rainbow trout, *Oncorhynchus mykiss*: the role of the red blood cell.” Dept. of Zoology, The University of Western Ontario, London, Ontario. February, 1999.

“Osmoregulatory strategies in animals.” Dept of Zoology, The University of Western Ontario, London, Ontario. February, 1999.

“The physiology of hibernation.” Dept. of Biology, University of Prince Edward Island, Charlottetown, PEI. May, 1997.

“Uptake of Thyroxine (T<sub>4</sub>) and Triiodothyronine (T<sub>3</sub>) by Red Blood Cells of Rainbow Trout, *Oncorhynchus mykiss*”. Dept. of Biology, University of Prince Edward Island, Charlottetown, PEI. May, 1997.

“The renal counter-current multiplier mechanism and the kidney's role in ion homeostasis”. Dept. of Biology, University of Prince Edward Island, Charlottetown, PEI. May, 1996.

**CURRICULUM VITAE  
PAUL G. MESSING**

Department of Biological Sciences  
Faculty of Science  
University of Manitoba  
50 Sifton Road  
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Canada, R3T 2N2  
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**Education:**

- 2013 Ph. D., Thesis Title: Pesticides in the Air, Atmospheric Deposits, and Surface Waters of Canada, University of Manitoba  
2005 Bachelor of Environmental Science Honours Co-op University of Manitoba

**Awards:**

- 2014 University 1 Teaching Excellence award winner  
2007/12/13 Nominated for University 1 Teaching Excellence award  
2010 Natural Sciences and Engineering Research Council, Meteorological Service of Canada Graduate Supplement  
2010 Sixth Prairie Conservation and Endangered Species Conference Fellowship  
2009 Ph. D. NSERC Alexander Graham Bell Scholarship  
2007 M. Sc. NSERC Alexander Graham Bell Scholarship  
2007 Canadian International Development Scholarship: Students for Development Internship  
2005 Outstanding Graduate in the Clayton H. Riddell Faculty of Environment, Earth, and Resources  
2004/05 NSERC Undergraduate Student Research Award  
2004 World Petroleum Congresses Millennium Scholarship  
2004 Stinson Bursary in Environmental Science  
2003 Appreciation award from Transport Canada's Assistant Deputy Minister in recognition of extraordinary efforts put forth during the preparation for the Workshop on Aviation Operational Measures for Fuel and Emissions Reductions

**Employment History:**

- 2012 - current Instructor, Biological Sciences, University of Manitoba  
2005 - 2011 Sessional Instructor, Department of Zoology/Biological Sciences, University of Manitoba  
2009 - 2011 Sessional Instructor, Department of Biology, Canadian Mennonite University  
2000 - 2006 Teaching Assistant (4 courses in total), University of Manitoba.  
2004 - 2005 Research Assistant, Department of Soil Sciences, University of Manitoba  
2003 - 2004 Freight Efficiency and Technology Initiative Program Assistant, Environmental Affairs, Transport Canada  
2002 Epidemiologist Research Assistant, Centre for Aboriginal Health Research, University of Manitoba

## Research:

### *Refereed Journal Publications; Published, in press or accepted*

1. **Messing, P.**, Farenhorst, A., Waite, D., Sproull, J. 2014. Current-Use Herbicides in Air as Influenced by Their Estimated Agricultural Use at Various Distances From Six Sampling Locations. *Water, Air, & Soil Pollution* 225 (6).
2. **Messing, P.**, Farenhorst, A., Waite, D., Sproull, J. 2014. Air Concentrations of Currently Used Herbicides and Legacy Compounds in the Canadian Prairies, Subarctic, and Arctic. *Journal of Environmental Science and Health, Part B* 49 (5): 338–43.
3. **Messing, P.**, Farenhorst, A., Waite, D., Sproull, J. 2013. Influence of usage and chemical-physical properties on the atmospheric transport and deposition of pesticides to agricultural regions of Manitoba, Canada. *Chemosphere*, 90, 1997–2003.
4. Degenhardt, D., Humphries, D., Cessna, A. J., **Messing, P.**, Badiou, P. H., Raina, R., Farenhorst, A., Pennock, D. J. 2012. Dissipation of glyphosate and aminomethylphosphonic acid in water and sediment of two Canadian prairie wetlands. *Journal of Environmental Science and Health, Part B* 47 (7): 631–39.
5. **Messing, P.**, Farenhorst, A., Waite, D., McQueen, D. A. R., Sproull, J., Humphries, D., Thompson, L. 2011. Predicting wetland contamination from atmospheric deposition measurements of herbicides in the Canadian Prairie Pothole region. *Atmospheric Environment*.
6. Gaultier, J., Farenhorst, A., Kim, S.M., Saiyed, I., **Messing, P.**, Cessna, A. J., Glozier, N.E. 2009. Sorption-Desorption of 2,4-Dichlorophenoxyacetic Acid by Wetland Sediments. *Wetlands*, 29, 3: 837-844.
7. Farenhorst, A., McQueen, D.A.R., Saiyed, I., Hilderbrand, C., Li, S., Lobb, D.A., **Messing, P.**, Schumacher, T.E., Papiernik, S.K., Lindstrom, M.J. 2009. Variations in soil properties and herbicide sorption coefficients with depth in relation to PRZM (Pesticide Root Zone Model) calculations. *Geoderma*, 150: 267-277.
8. Farenhorst, A. Papiernik, S.K., Saiyed, I., **Messing, P.**, Stephens, K.D., Schumacher, J.A., Lobb, D.A., Li, S., Lindstrom, M.J., Schumacher, T.E. 2008. Herbicide Sorption Coefficients in relations to soil properties and terrain attributes on a cultivated prairie. *J. Environ. Qual.*, 37, 3: 1201-1208.

### *Oral/poster presentations with full-papers in conference proceedings*

1. **Messing, P.**, Farenhorst, A., Waite, D., Sproull, J. 2008. Atmospheric Detections of Pesticides in Manitoba - Preliminary Results. 51st Manitoba Soil Science Society Meeting, Winnipeg, MB. Jan. 31 - Feb. 1, 2008 (oral presentation).

### *Oral/poster presentations with abstracts in conference proceedings*

1. **Messing, P.**, Farenhorst, A., Waite, D., Sproull, J., Humphries, D., McQueen, R., Atmospheric pesticide impacts on Prairie Pothole Wetlands. 2<sup>nd</sup> SETAC Prairie Northern conference Pole to

- Pothole: Ecotoxicology in a changing climate. Winnipeg, Manitoba, Canada. June 24, 2011 (oral presentation).
2. **Messing, P.**, Farenhorst, A., Waite, D., Humphries, D., Thompson, L., Coulthard, L. 2011. Atmospheric Concentrations of Currently Used Pesticides in Relation to Wetland Water Quality in Manitoba, Canada. 2<sup>nd</sup> Young Environmental Scientists Meeting. Aachen, Germany. February 28 – March 3, 2011 (oral presentation).
  3. **Messing, P.**, Farenhorst, A., Ross, L., Beaudry, M., Thompson, L., and Coulthard, L. 2011. Impacts of a Mixture of Herbicides on Aquatic Invertebrates in Prairie Pothole Wetlands. 2<sup>nd</sup> Young Environmental Scientists Meeting. Aachen, Germany. February 28 – March 3, 2011 (oral presentation).
  4. **Messing, P.**, Farenhorst, A., Waite, D., Sproull, J., Humphries, D., McQueen, R. 2011. A Regional Study on the Pesticide Concentrations in the Air. 54th Manitoba Soil Science Society Meeting, Winnipeg, MB. Feb. 3-4, 2010 (oral presentation).
  5. **Messing, P.**, Farenhorst, A., Waite, D., Humphries, D., Thompson, L., Coulthard, L. 2011. Atmospheric concentrations of currently used pesticides in relation to wetland water quality in Manitoba, Canada. 54th Manitoba Soil Science Society Meeting, Winnipeg, MB. Feb. 3-4, 2010 (poster presentation).
  6. **Messing, P.**, Farenhorst, A., Waite, D., Humphries, D., Laura Thompson, L., Coulthard, L. 2010. Atmospheric Concentrations of Currently Used Pesticides in Relation to Wetland Water Quality in Manitoba, Canada. Joint Conference of the Canadian Society of Soil Science and the Canadian Society of Agronomy. Saskatoon, Canada. June 20 – 24, 2010 (oral presentation).
  7. **Messing, P.**, Farenhorst, A., Ross, L., Beaudry, M., Thompson, L., and Coulthard, L. 2010. The Impact of Eight Herbicides at Environmentally Relevant Concentrations in Prairie Pothole Wetlands on Aquatic Invertebrates. Joint Conference of the Canadian Society of Soil Science and the Canadian Society of Agronomy. Saskatoon, Canada. June 20 – 24, 2010 (oral presentation). (poster presentation).
  8. Farenhorst, A., McQueen, D.A.R., Saiyed, I., McQueen, P., Lobb, D., **Messing, P.**, Goh, T.B., Li, S., Schumacher, T., and Papiernik, S. 2010. Soil chemistry can be used in predicting 2,4-D sorption variations in soil-landscapes. Huang Memorial Symposium, Joint Conference of the Canadian Society of Soil Science and the Canadian Society of Agronomy. Saskatoon, Canada. June 20 – 24, 2010 (oral presentation).
  9. **Messing, P.**, Farenhorst, A., Waite, D., Humphries, D., Laura Thompson, L., Coulthard, L. 2010. Atmospheric Concentrations of Currently Used Pesticides in Relation to Wetland Water Quality in Manitoba, Canada. Society of Environmental Toxicology and Chemistry Europe 20th Annual Meeting. Seville, Spain. May 23 – 27, 2010 (oral presentation).
  10. **Messing, P.**, Farenhorst, A., Ross, L., Beaudry, M., Thompson, L., and Coulthard, L. 2010. The Impact of Eight Herbicides at Environmentally Relevant Concentrations in Prairie Pothole Wetlands on Aquatic Invertebrates. Society of Environmental Toxicology and Chemistry Europe 20th Annual Meeting. Seville, Spain. May 23 – 27, 2010 (poster presentation).
  11. **Messing, P.**, Farenhorst, A., Waite, D., Sproull, J., Laura Thompson, L.,

- Coulthard, L. 2010. Atmospheric concentrations of currently used pesticides in Manitoba, Canada in relation to wetland water quality. Annual Series of Elizabeth Dafoe Library Graduate Student Lectures, University of Manitoba, Winnipeg, MB. March 5, 2010 (oral presentation).
12. **Messing, P.**, Farenhorst, A., Waite, D., Humphries, D., Laura Thompson, L., Coulthard, L. 2010. Atmospheric Concentrations of Currently Used Pesticides in Relation to Wetland Water Quality in Manitoba, Canada. 53rd Manitoba Soil Science Society Meeting, Winnipeg, MB. Feb. 4-5, 2010 (oral presentation).
  13. **Messing, P.**, Farenhorst, A., Ross, L., Beaudry, M., Thompson, L., and Coulthard, L. 2010. The Impact of Eight Herbicides at Environmentally Relevant Concentrations in Prairie Pothole Wetlands on Aquatic Invertebrates. 53rd Manitoba Soil Science Society Meeting, Winnipeg, MB. Feb. 4-5, 2010 (poster presentation).
  14. Farenhorst, A., McQueen, D.A.R., Saiyed, I., McQueen, P., Lobb, D., **Messing, P.**, Goh, T.B., Li, S., Schumacher, T., Papiernik, S. 2010. 2,4-D Sorption Variations. 53rd Manitoba Soil Science Society Meeting, Winnipeg, MB. Feb. 4-5, 2010 (oral presentation).
  15. **Messing, P.**, Farenhorst, A., Waite, D., Sproull, J., Humphries, D. 2009. Atmospheric Concentrations of Currently Used Pesticides (CUPs) and their Contribution to Prairie Pothole Wetland Contamination in Manitoba, Canada. Manitoba Agronomists Conference 2009, Winnipeg, MB. December 15 and 16, 2009 (poster presentation).
  16. **Messing, P.**, Farenhorst, A., Waite, D., Sproull, J., Humphries, D. 2009. Atmospheric Concentrations of Currently Used Pesticides (CUPs) and their Contribution to Prairie Pothole Wetland Contamination in Manitoba, Canada. Society of Environmental Toxicology and Chemistry North America 30th Annual Meeting, New Orleans, LA, U.S.A. November 19-23, 2009 (oral presentation).
  17. Farenhorst, A., **Messing, P.**, Waite, D., Sproull, J., Humphries, D., Thompson, L., Coulthard, L., McQueen, D.A.R. 2009. Atmospheric Concentrations of Pesticides in Canada in Relation to Wetland Water Quality. IUPAC 3rd International Workshop on Crop Protection Chemistry in Latin America, Rio De Janeiro, Brazil. November 9-12, 2009 (poster presentation).
  18. **Messing, P.**, Farenhorst, A., Waite, D., Sproull, J., Humphries. 2009. Atmospheric deposition by pesticides in Prairie Pothole Wetlands and the impacts of herbicide mixtures on Aquatic Invertebrates. Department of Soil Science seminars, Winnipeg, MB. November 3, 2009 (oral presentation).
  19. Thompson, L., **Messing, P.**, Farenhorst, A. 2008. The Effect of Pesticides on Wetland Invertebrates. University of Manitoba NSERC Undergraduate Poster Presentation Competition, Winnipeg, MB. October 10, 2008 (poster presentation)
  20. **Messing, P.**, Farenhorst, A., Ross, L., Thompson, L., Waiser, M., Tumber, V., Sura, S. 2009. Impacts of a Mixture of Herbicides on Aquatic Invertebrates in Prairie Pothole Wetlands. The 44th Annual Western Canada Trace Organic Workshop, Winnipeg, MB. May 3-6, 2009 (oral presentation).
  21. **Messing, P.**, Carazo, E., Farenhorst, A. 2008. Pesticide Concentrations in Sediments and Irrigation Waters Entering a Protected Wetland Environment in Costa Rica – Preliminary Results. 51st Manitoba Soil Science Society Meeting, Winnipeg, MB. Jan. 31 - Feb. 1, 2008 (poster presentation).

22. **Messing, P.**, Farenhorst, A., Waite, D., Sproull, J. 2007. Atmospheric Detections of Pesticides in Manitoba, Canada: An NSERC-SPG. Centro de Investigacion en Contaminacion Ambiental, Universidad de Costa Rica, San José, Costa Rica. Sept. 5, 2007 (oral presentation).



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## **Dr. Michele Piercey-Normore**

Correspondence language: English

Sex: Female

### **Contact Information**

The primary information is denoted by (\*)

#### **Address**

Primary Affiliation (\*)

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## Dr. Michele Piercey-Normore

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### Language Skills

Language	Read	Write	Speak	Understand	Peer Review
English	Yes	Yes	Yes	Yes	Yes

### Degrees

- 1997/10                      Doctorate, Biology, Memorial University of Newfoundland  
Supervisors: Dr. Keith Egger, 1993/9 - 1996/10
- 1993/8                      Master's Thesis, Biology, Memorial University of Newfoundland
- 1990/12                     Bachelor's Honours, Biology, Memorial University of Newfoundland

### User Profile

Research Specialization Keywords: lichen, fungus, alga, evolution, DNA, RNA, lichen systematics, biodiversity, polyketides

Research Disciplines: Biology and Related Sciences

Areas of Research: Biodiversity and Biocomplexity

Fields of Application: Environment

### Employment

- 2015/5                      Associate Head  
Biological Sciences, Faculty of Science, The University of Manitoba  
Full-time, Professor  
Tenure Status: Tenure  
The work involves administration of undergraduate student affairs such as curriculum, advising and discipline within the department.
- 2011/3                      Professor  
Biological Sciences, Faculty of Science, The University of Manitoba  
Full-time, Professor  
Tenure Status: Tenure
- 2011/1 - 2015/3           Associate Dean  
Biological Sciences, Faculty of Science, The University of Manitoba  
Full-time, Professor  
Tenure Status: Tenure  
The work involved administrative duties to support the Dean of the Faculty of Science. The portfolio of the position included undergraduate student affairs, their programs including undergraduate research and experiential education; as well as other activities when needed such as chairing tenure/promotion committees.



- 2008/7 - 2013/6 Associate Professor/Professor  
Biology, adjunct to Memorial University of Newfoundland, The University of Manitoba  
Full-time, Adjunct, Professor  
Tenure Status: Tenure  
My adjunct position to the Biology Department at MUN was a nil salary position. I was asked to serve on a student thesis committee and to be an examiner for two MSc theses.
- 2006/7 - 2011/3 Associate Professor  
Biological Sciences, Faculty of Science, The University of Manitoba  
Full-time, Associate Professor  
Tenure Status: Tenure
- 2010/1 - 2010/6 Associate Head  
Biological Sciences, The University of Manitoba  
Full-time, Associate Professor  
Tenure Status: Tenure  
I served as Associate Head for 6 months to replace someone who was on research leave. During the 6 months my work involved administration of undergraduate student affairs including curriculum, discipline, and teaching related issues.
- 2000/9 - 2006/7 Assistant Professor  
Botany, Faculty of Science, The University of Manitoba  
Full-time, Assistant Professor  
Tenure Status: Tenure Track
- 1998/9 - 2000/8 Post doctoral fellow  
Botany, Duke University  
Full-time  
Tenure Status: Non Tenure Track  
My research involved coevolution of the lichen symbionts in the genus *Cladonia*.
- 1997/10 - 1998/8 Post doctoral fellow  
Botany, Duke University  
Full-time  
Tenure Status: Non Tenure Track  
My research involved polyketide synthase gene expression in *Cladonia grayi*.
- 1989/9 - 1997/8 Lab demonstrator  
Biology, Memorial University of Newfoundland  
Part-time  
Tenure Status: Non Tenure Track  
I was a student Teaching Assistant in a number of course labs throughout my graduate programs where I interacted with students and marked lab reports.
- 1990/9 - 1993/8 Research Assistant  
Biology, Memorial University of Newfoundland  
Part-time  
Tenure Status: Non Tenure Track  
This undergraduate part-time work with several professors involved culturing fungi, collecting insects, and compiling bibliographies.
- 1988/9 - 1989/8 Quality control manager  
Newfoundland Enviroponics  
The work involved management of a quality control department in a commercial greenhouse.
- 1987/9 - 1988/8 Quality control technician  
Matthew McAvan Enterprises  
The work involved lab testing for quality control of food products.

1986/9 - 1987/8 Product development technician  
Treloar Product Development  
The work involved lab testing for quality control and development of new food products.

## Leaves of Absence and Impact on Research

2009-01-01 - 2009-06-30 Sabbatical, The University of Manitoba  
I collaborated with Elfie Stocker-Worgotter at the University of Salzburg (Austria) for two months on culturing and HPLC analyses of *Ramalina* and *Cladonia* species. My training from this collaboration resulted in my ability to train my graduate students on the difficult culturing methods for lichen symbionts, which has now resulted in a large number of publications, incorporation of the techniques within the work of four graduated PhD students, a culturing facility, and potential new collaborations because of the skill. The ability to generate pure cultures has also resulted in my ability to expand my research program into gene transcription studies. These studies have resulted in several high impact publications.

## Research Funding History

### Awarded [n=1]

2011/4 - 2016/3 Evolutionary dynamics of lichen-forming algae, fungi, and natural products (NSERC  
Principal Investigator Discovery grant), Grant

#### Funding Sources:

2011/4 - 2016/3 Natural Sciences and Engineering Research Council of Canada  
(NSERC)  
Discovery Grant  
Total Funding - 130,000  
Portion of Funding Received - 104,000  
Funding Competitive?: Yes

### Completed [n=5]

2014/7 - 2015/12 University Research Grants Program (URGP). Comparative genome analysis of fungal  
Principal Investigator polyketide synthase genes from lichens, Grant

#### Funding Sources:

2014/7 - 2015/12 University of Manitoba  
University of Manitoba Research Grants Program  
Total Funding - 6,788  
Portion of Funding Received - 6,788  
Funding Competitive?: Yes

2012/1 - 2015/3 Faculty of Science - Dean's office research support  
Principal Investigator

#### Funding Sources:

2012/1 - 2015/3 Faculty of Science - Dean's office  
Research support for Associate Deans  
Total Funding - 30,250  
Portion of Funding Received - 30,250  
Funding Competitive?: No

2011/12 - 2012/12 Joint Genome Institute. Sequencing of the three cultured partners of the lichen *Lobaria*  
Co-applicant *pulmonaria* and the sequencing of the transcriptomes. (Community Sequencing  
Program – in-kind support, Grant

**Funding Sources:**

2011/7 - 2012/7 Joint Genome Institute  
 Total Funding - 0  
 Portion of Funding Received - 0  
 Funding Competitive?: Yes

2002/6 - 2010/12 Floristic survey of Wapusk National Park, Grant  
 Principal Applicant

**Funding Sources:**

2002/6 - 2010/12 Parks Canada, Department of the Environment  
 Total Funding - 30,000  
 Portion of Funding Received - 25  
 Funding Competitive?: Yes

2009/4 - 2010/3 NSERC-RTI. RNA from fungal cultures. Departments of Biological Sciences and  
 Principal Investigator Microbiology, University of Manitoba (PI with 1 other, \$42,927.00), Grant

**Funding Sources:**

2009/4 - 2010/3 Natural Sciences and Engineering Research Council of Canada  
 (NSERC)  
 RTI  
 Total Funding - 42,927  
 Portion of Funding Received - 42,927  
 Funding Competitive?: Yes

**Student/Postdoctoral Supervision****Bachelor's [n=11]**

- 2015/5 - 2015/8 Kamaldeep Chhoker (In Progress) , University of Manitoba  
 Principal Supervisor Thesis/Project Title: Summer research course project on chemical ecology and PKS gene transcription in *Cladonia*.  
 Present Position: Undergraduate student.
- 2015/5 - 2015/8 Ahmed Kidawai (In Progress) , University of Manitoba  
 Principal Supervisor Thesis/Project Title: Summer project on chemical ecology and PKS gene transcription in *Cladonia*.  
 Present Position: Undergraduate student
- 2015/5 - 2015/8 Colton Pasternak (In Progress) , University of Manitoba  
 Principal Supervisor Thesis/Project Title: Summer research course project on chemical ecology and PKS gene transcription in *Cladonia*.  
 Present Position: Undergraduate student.
- 2014/5 - 2014/9 Patricia Ordonez (Completed) , University of Manitoba  
 Principal Supervisor Thesis/Project Title: Summer project to sequence genes in *Leptogium rivulare*.  
 Present Position: Student is still working on her degree.
- 2014/5 - 2014/9 Kate Parkinson (Completed) , University of Manitoba  
 Principal Supervisor Thesis/Project Title: Summer research on genetic variation in *Bartramia hallierana* and *B. pomiformis*.  
 Present Position: Student is completing an Honours BSc.
- 2012/9 - 2012/12 Yengin Loay (Completed) , University of Manitoba  
 Principal Supervisor Thesis/Project Title: Summer project on lichen secondary metabolites.  
 Present Position: Student is completing his BSc.
- 2012/9 - 2012/12 Alex Barnes (Completed) , University of Manitoba  
 Principal Supervisor Thesis/Project Title: Research course project on lichen secondary metabolites.  
 Present Position: Student is completing his BSc.

- 2012/5 - 2012/9  
Principal Supervisor Claire Woodbury (Completed) , University of Manitoba  
Thesis/Project Title: Summer project on lichen diversity and species identification.  
Present Position: Zookeeper at Assiniboine Park Zoo.
- 2012/4 - 2012/9  
Principal Supervisor Adam Hedley (Completed) , University of Manitoba  
Thesis/Project Title: Summer project and other volunteer work on molecular diversity in symbionts of *Lobaria pulmonaria*.  
Present Position: Student is completing his BSc and applying for Medical school.
- 2012/4 - 2012/12  
Principal Supervisor Faisal Haji (All But Degree) , University of Manitoba  
Student Degree Expected Date: 2015/4  
Thesis/Project Title: Summer and other volunteer work on diversity of cyanobacterial symbionts in *Stereocaulon condensatum*.  
Present Position: Student is finishing his Honours degree in medical microbiology.
- 2011/5 - 2011/8  
Principal Supervisor Dan Brautigan (Completed) , University of Manitoba  
Thesis/Project Title: Summer research on lichen and bryophyte ecology.  
Present Position: MSc student in my lab.

**Bachelor's Honours [n=5]**

- 2014/9 - 2015/4  
Principal Supervisor Jared Field (Completed) , University of Manitoba  
Thesis/Project Title: Variation in secondary metabolites and polyketide synthase genes in *Cladonia cariosa* lichens from two distinct geographic regions in Manitoba.  
Present Position: Student is starting a MSc in health related discipline.
- 2013/9 - 2014/4  
Principal Supervisor Jennifer Lawyer (Doering) (Completed) , University of Manitoba  
Thesis/Project Title: Chemical ecology and species assemblages of the Foam lichen (*Stereocaulon* spp.) on three geological substrates within the boreal forest of northwestern Manitoba.  
Present Position: Student is currently doing a MSc under my supervision.
- 2012/9 - 2013/4  
Principal Supervisor Sydney Toni (Completed) , University of Manitoba  
Thesis/Project Title: Cryptogam species composition and chemical ecology of lichens among three boreal habitats in eastern Manitoba.  
Present Position: Student is finishing her MSc in ecology at Dalhousie University.
- 2011/9 - 2012/4  
Co-Supervisor Gena Wang (Completed) , University of Manitoba  
Thesis/Project Title: Investigation of secondary metabolite production in *Cladonia uncialis*.  
Present Position: unknown.
- 2007/9 - 2011/4  
Principal Supervisor Mark Kowalski (Completed) , University of Manitoba  
Thesis/Project Title: The antibiotic effects of usnic acid, atranorin, and vulpinic acid on *Sclerotinia schlerotiorum* and *Ophiostoma ulmi* in culture.  
Present Position: Student is pursuing a career in agriculture.

**Master's Thesis [n=3]**

- 2014/9 - 2016/12  
Principal Supervisor Jennifer Doering (In Progress) , University of Manitoba  
Student Degree Expected Date: 2016/12  
Thesis/Project Title: Haplotype diversity and population structure of *Diplosphaera chodatii* in semi-aquatic lichen communities of Payuk Lake, Manitoba.  
Present Position: Student is entering her second year of a MSc program.
- 2013/9 - 2015/8  
Principal Supervisor Vivian (Dan) Brautigan (In Progress) , University of Manitoba  
Student Degree Expected Date: 2015/8  
Thesis/Project Title: Lichens and bryophyte communities on coarse woody debris in the Manitoba boreal forest.  
Present Position: Student is completing her MSc thesis.

- 2010/9 - 2012/12  
Principal Supervisor Kyle Fontaine (Completed) , University of Manitoba  
Thesis/Project Title: Population genetics of an aquatic lichen, *Dermatocarpon luridum*.  
Present Position: Student was employed with a consulting company and is now completing an Education degree.
- Doctorate [n=9]**
- 2014/9 - 2018/12  
Principal Supervisor Carlos Pisache Lisboa (In Progress) , University of Manitoba  
Student Degree Expected Date: 2018/12  
Thesis/Project Title: Dispersal of the vegetative structures of mosses and lichens.  
Present Position: Student is completing the first year of his PhD.
- 2013/1 - 2017/4  
Principal Supervisor Mohanad Zraik (In Progress) , University of Manitoba  
Student Degree Expected Date: 2017/4  
Thesis/Project Title: Chemical ecology and phenotype in lichens: examining some environmental factors that influence variability and secondary metabolite production.  
Present Position: student is completing all data collection and beginning analyses for his PhD.
- 2012/12 - 2014/12  
Co-Supervisor Mostafa Elshobary (Completed) , Tanta University  
Thesis/Project Title: Molecular basis of the effects of algal polysaccharides on polyketide biosynthesis in lichen fungi  
Present Position: Student has graduated and has a full time academic position.
- 2010/9 - 2015/4  
Principal Supervisor Chris Deduke (Completed) , University of Manitoba  
Thesis/Project Title: Synergism between environmental variation and biology of three saxicolous lichens, *Arctoparmelia centrifuga*, *Xanthoparmelia viriduloumbrina*, and *X. cumberlandia*.  
Present Position: Student has recently graduated and is currently seeking an academic position.
- 2010/1 - 2010/7  
Academic Advisor Patricia Francisco (Completed) , University of Campinas  
Thesis/Project Title: Population genetics in *Ramalina sinensis*, a rare lichen.  
Present Position: Student is currently finishing her PhD at Universidade Estadual de Campinas, Brazil.
- 2009/9 - 2015/4  
Principal Supervisor Sarangi Athukorala (Completed) , University of Manitoba  
Thesis/Project Title: Evolution and gene expression in three early stages of resynthesis of Reindeer lichens.  
Present Position: Student has a full time academic position.
- 2009/7 - 2011/10  
Co-Supervisor Mostafa Ismaiel (Completed) , Zagazig University  
Thesis/Project Title: Gene expression of superoxide dismutase in green algae and cyanobacteria.  
Present Position: Student has a full time academic position.
- 2008/9 - 2014/12  
Academic Advisor Mona Abdel-Hameed (Completed) , University of Manitoba  
Thesis/Project Title: Putative identification of the usnic acid biosynthetic gene cluster in *Cladonia uncialis*  
Present Position: Student has recently graduated and is looking for an academic position.
- 2007/9 - 2013/12  
Principal Supervisor Brinda Timsina (Completed) , University of Manitoba  
Thesis/Project Title: Environmental effect on polyketide synthase gene expression in *Cladonia* and *Ramalina*.  
Present Position: Student was on maternity leave after she graduated and is now applying for academic positions.

**Post-doctorate [n=1]**

2015/1 - 2015/7 Mostafa Ismaiel (In Progress) , Zagazig University  
 Principal Supervisor Student Degree Expected Date: 2015/7  
 Thesis/Project Title: SOD gene expression in free-living and lichenized algae.  
 Present Position: Student is on leave to do post doctoral research with me and will return academic research position.

**Event Administration**

2015-06-15 - Organized and taught a 3 hour workshop on lichen identification in disturbed habitats,  
 2015-06-18 Land Reclamation and Soil Science (CLRA/ACRSD-MSSS) Joint Conference in  
 Winnipeg, Manitoba, Workshop, 2015-06-15 - 2015-06-15

2011-07-17 - Organized and chaired a conference symposium for the mycological section, Canadian  
 2011-07-21 Botanical Association Annual Meeting in Halifax, Nova Scotia, Conference, 2011-07-18  
 - 2011-07-18

2009-09-11 - Co-host for a COSEWIC subcommittee meeting. My role was to organize  
 2009-09-13 accomodations and a field trip., Annual COSEWIC meeting for the Plants and Lichens  
 Subcommittee in Winnipeg, Manitoba, Conference, 2009-09-11 - 2009-09-13

**Editorial Activities**

2009/6 - 2013/6 Editor, Evansia, Journal

**Organizational Review Activities**

2014-11-12 - Member of a Co-op program review committee, The University of Manitoba  
 2014-11-14 Review of all co-operative and work integrated educational programs at the University  
 of Manitoba. I was the internal member of three reviewers.

**International Collaboration Activities**

2012-07-03 Co-applicant; JGI grant proposal for *Lobaria pulmonaria* Iceland  
 As a co-applicant on a grant proposal I contributed to the writing of the proposal,  
 participated in Skype meetings, and provided preliminary studies to support the  
 proposal. Since the awarding of the in-kind community sequencing grant, I published a  
 paper with another co-applicant.

2009-07-01 - Co-supervisor of 2 PhD students and a postdoctoral fellow, Egypt  
 2015-07-31 I served as co-supervisor of two PhD students (Ismaiel and Elshobary) who both  
 conducted all research activity in my lab and were supported by a scholarship from the  
 Egyptian government in collaboration with the University of Manitoba. Both students  
 have graduated with their PhD degrees. One student (Ismaiel) has returned on a  
 postdoctoral fellowship to collaborate with me in my lab. His award will expire July  
 31, 2015. These awards could not have been acquired by the students without an  
 international collaboration.

2009-04-01 - Collaboration with E. Stocker-Worgotter (University of Salzburg), Austria  
 2009-06-25 Collaboration on the culturing of lichen symbionts from *Cladonia* and determination of  
 secondary metabolites with Elfie Stocker-Worgotter, University of Salzburg, Austria. My  
 MSc student (K. Fontaine) visited Austria at a later date for 5 months using an NSERC  
 travel award for field work and to learn culturing techniques.

## Committee Memberships

- 2002/1 - 2015/12      Committee Member, Plants and Lichens Subcommittee for the Committee on the Status of Endangered Wildlife in Canada, Environment Canada  
I attend annual meetings, discuss proposals for species to be designated, and review status reports.
- 2000/6 - 2015/12      Committee Member, American Bryological and Lichenological Association (ABLS), Academic  
I have been a member of ABLS since 2000 and was Editor of the journal, *Evansia*, from 2009 - 2013.
- 2014/6 - 2015/6      Committee Member, Aboriginal Focus Advisory Committee, The University of Manitoba  
I was one of many members to contribute to the enhancement of Aboriginal achievement opportunities and initiatives at the University of Manitoba.
- 2012/6 - 2015/6      Committee Member, Experiential Education Working Group and Steering Committee, The University of Manitoba  
I contributed to the establishment of a committee and a strategic plan for implementing experiential education as formal programs at the University of Manitoba.
- 2009/6 - 2015/6      Committee Member, Selection committees (Faculty of Graduate Studies), The University of Manitoba  
I am a member of various selection committees to for the Faculty of Graduate Studies that meet to discuss and rank student NSERC awards (Vanier, PGS/CGS-M and -D).
- 1990/1 - 2015/6      Committee Member, Canadian Botanical Association (CBA), Saskatchewan  
I have been a member of the CBA since 1990, contributing to conference symposia, serving as judge for student awards, and I became the Treasurer in 2014.
- 2014/6 - 2015/3      Co-chair, Academic Integrity Working Group (University of Manitoba), The University of Manitoba  
I co-chaired bi-monthly meetings for university level discussions on academic integrity. I was a member of the committee since 2013 and became co-chair in 2014.
- 2014/3 - 2015/3      Committee Member, Hiring committees (Faculty of Science and University of Manitoba), The University of Manitoba  
I served on various hiring committees for positions such as the Advising Coordinator; Student Life Director; and two hiring committees for confidential secretaries to the Dean and Associate Deans. My role was to vet applications for the positions, rank candidates, and interview candidates as a member of a committee.
- 2011/1 - 2015/3      Committee Member, Senate Committee on Admissions, The University of Manitoba  
This committee reviewed and approved all changes to program admission regulations in the University of Manitoba.
- 2011/1 - 2015/3      Chair, Committee on Student Standing (Faculty of Science), The University of Manitoba  
This committee reviewed and approved academic requests from students looking for accommodations in the Faculty of Science.
- 2011/1 - 2015/3      Chair, Endowment Fund Committee (Faculty of Science), The University of Manitoba  
This committee vetted applications for funding from various departments within the Faculty of Science.
- 2011/1 - 2015/3      Chair, Committee on Courses and Academic Programs (Faculty of Science), The University of Manitoba  
This committee vetted and approved all program and course changes in the Faculty of Science before they are submitted to senate committees.
- 2011/1 - 2015/3      Committee Member, Senate Committee on Curriculum and Course Changes, The University of Manitoba  
This committee reviewed and approved course and program changes from all Faculties in the University of Manitoba for endorsement to Senate.



- 2011/1 - 2015/3 Chair, Tenure and Promotion committees (Faculty of Science), The University of Manitoba  
I chaired Faculty of Science tenure and promotion committees yearly for faculty members who applied for tenure and/or promotion.
- 2011/1 - 2015/3 Committee Member, Award selection committees, The University of Manitoba  
I served on selection committees for student awards and exchange programs through the International Centre for Students (ICS); and awards for instructors through the Summer Session Innovation Fund.
- 2014/3 - 2014/12 Committee Member, Program review for Co-operative education at the University of Manitoba, The University of Manitoba  
I was the internal member of three members to review all co-op and work integrated learning programs at the University of Manitoba. It involved three intense days of meeting with co-op coordinators and deans of Faculties across the university, recording information, engaging in discussions, and writing a final report.
- 2013/6 - 2014/6 Committee Member, Strategic Enrollment Management Committee, The University of Manitoba  
I contributed to the development of a strategic plan for student enrollment at the University of Manitoba.
- 2013/1 - 2014/6 Committee Member, Departmental hiring committees, The University of Manitoba  
I was a committee member of two committees who reviewed applications and interviewed two applicants for faculty positions in the Department of Biological Sciences.
- 2011/6 - 2014/6 Committee Member, Animal care and Infrastructure Planning Committee, The University of Manitoba  
As Associate Dean I represented the Faculty of Science on the university animal care committees.
- 2011/1 - 2014/6 Committee Member, University 1 committees, The University of Manitoba  
Two committees (Discipline and Appeals) vetted Year 1 student disciplinary infractions and academic requests. I was member and Chair of these committees for two years. The Advisory council was advisory to first year administration. The Teaching Awards was a selection committee for first year instructor teaching awards.
- 2008/1 - 2011/1 Chair, Graduate Studies Committee, The University of Manitoba  
This committee reviewed student applications and followed the programs of graduate students in the department.
- 2010/1 - 2010/7 Chair, Undergraduate Curriculum Committee, The University of Manitoba  
This committee reviewed undergraduate course and program changes in the department. I chaired this committee during 2010 and again from May 2015 to present.
- 2009/6 - 2010/6 Committee Member, Presidential committee for reappointment of the Dean, Faculty of Graduate Studies, The University of Manitoba  
This committee was established by the university to review and make a recommendation on the reappointment of the Dean of the Faculty of Graduate Studies.

## Other Memberships

- 2014-07-01 - 2015-06-30 Treasurer, Canadian Botanical Association  
I work with the accountant to keep financial records for the association.
- 2004-06-01 - 2015-06-30 Member, International Symbiosis Society  
I participate in membership activities, attend conferences, and provide journal submissions.
- 2003-06-03 - 2015-06-30 Member, British Lichen Society  
I participate in membership activities, attend conferences, and provide journal submissions.



2000-06-01 - 2015-06-30	Member, American Bryological and Lichenological Society I attend and present at conferences. I was editor of one of two ABLS society journals (Evansia) for 3 years (2009-2013).
1994-06-01 - 2015-06-30	Member, Mycological Society of America I participate in membership activities, attend conferences, and provide journal submissions.
1990-06-01 - 2015-06-30	Member, Canadian Botanical Association I attend and present at conferences and participate in membership activities.
2009-06-02 - 2013-06-20	Member, Manitoba Association of Plant Biologists I attend and present at conferences and participate in membership activities.
2003-06-02 - 2013-06-05	Member, International Association of Lichenologists I attend and present at conferences and participate in membership activities.

## Presentations

1. \* Abdel-Hameed, M., \* Bertrand, R., Sorensen, J. L. and Piercey-Normore, M. D.(2015). Genome sequencing of the lichen *Cladonia uncialis* reveals a rich biosynthetic potential. Canadian Chemistry Conference (CMC), Ottawa, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
2. \* Doering, J., \* Deduke, C. and Piercey-Normore, M. D.(2015). Chemical ecology of three lichen assemblages in three geographic regions in northwestern Manitoba. Prairie Universities Biological Symposia (PUBS), Winnipeg, Canada  
Main Audience: Knowledge User  
Invited?: No, Keynote?: No
3. Hughes, E., Maltman, C., Head, B., Piercey-Normore, M. D. and Yurkov, V.(2014). Diversity and distribution of aerobic anoxygenic phototrophs at the Central Gold Mine Sites, Nopiming Provincial Park, Canada. IUMS 2014, Montreal, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
4. \* Athukorala, S. N. P., \* Doering, J., Stenroos, S., Ahti, T., Huebner, E. and Piercey-Normore, M. D. (2014). Species delimitation in *Cladonia* and photobiont selection. Botanical Society of America, Boise, United States  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
5. \* Athukorala, S. N. P. and Piercey-Normore, M. D.(2014). Recognition and defence-related gene expression in the early resynthesis stages in *Cladonia rangiferina*. Canadian Botanical Association, Montreal, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
6. \* Brautigan, V. and Piercey-Normore, M. D.(2014). Lichen and bryophyte communities on coarse woody debris in the Manitoba boreal forest. Canadian Botanical Association, Montreal, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
7. \* Zraik, M. and Piercey-Normore, M. D.(2014). Chemical ecology and phenotype in arid species of *Cladonia*. Canadian Botanical Association, Montreal, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No

8. \* Deduke, C. and Piercey-Normore, M. D.(2014). Substrate preference of two Shield lichens: an experimental approach.Canadian Botanical Association, Montreal, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
9. \* Elshobary, M. E., Osman, M. E., Abushady, A. M., Komatsu, E., Perreault, H. and Piercey-Normore, M. D.(2014). Effect of algal sugars on growth and polyketide synthesis of the lichen-forming fungus *Cladonia rangiferina*.Canadian Botanical Association, Montreal, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
10. \* Abdel-Hameed, M., Bertrand R., Sorensen J. L. and Piercey-Normore M. D.(2014). Identification of the usnic acid biosynthetic gene cluster by de novo genome sequencing of the lichen *Cladonia uncialis*.97th Canadian Chemistry Conference, Vancouver, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
11. \* Athukorala, S. N. P., Heubner, E. and Piercey-Normore, M. D.(2013). Quantitative comparison of morphology and gene expression of *Cladonia rangiferina* during the interaction with compatible and incompatible algae.Botany 2013, New Orleans, United States  
Main Audience: Researcher  
Invited?: No, Keynote?: No
12. Braaksma, E., Armann-Keown, V. and Piercey-Normore, M. D.(2013). Information Literacy in undergraduate research: transforming an old idea into a new environment.Western Conference on Science Education (WCSE), London, Canada  
Main Audience: Knowledge User  
Invited?: No, Keynote?: No
13. \* Deduke, C. and Piercey-Normore, M. D.(2013). Saxicolous lichen community dynamics on the precambrian shield.Canadian Botanical Association, Kamloops, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
14. \* Elshobary, M. E., Osman, M. E., Abushady, A. M. and Piercey-Normore, M. D.(2013). Characterization of cyanobacterial and green algal photobionts associated with taxonomically diverse lichen-forming ascomycetes.Canadian Botanical Association, Kamloops, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
15. \* Fontaine, K., Stocker-Worgotter, E. and Piercey-Normore, M. D.(2013). Genetic variation in the photobiont of *Dermatocarpon luridum* between North America and Europe.Canadian Botanical Association, Kamloops, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
16. \* Doering, J. and Piercey-Normore, M.D.(2013). Mining for RNA: Optimal RNA isolation from *Lobaria pulmonaria* (L.) Hoffm.Prairie University Biology Symposium (PUBS), Winnipeg, Canada  
Main Audience: Knowledge User  
Invited?: No, Keynote?: No
17. \* Deduke, C. and Piercey-Normore, M. D.(2013). Neighbourhood affair: lichen community impact on sexual fecundity and Secondary metabolites.Prairie University Biology Symposium (PUBS), Winnipeg, Canada  
Main Audience: Knowledge User  
Invited?: No, Keynote?: No
18. \* Athukorala, S. N. P., Huebner, E. and Piercey-Normore, M. D.(2013). Mycobiont gene expression in three early resynthesis stages of *Cladonia rangiferina*.Prairie University Biology Symposium (PUBS), Winnipeg, Canada  
Main Audience: Knowledge User  
Invited?: No, Keynote?: No

19. \* Abdel-Hameed, M., Piercey-Normore, M. D. and Sorensen, J. L.(2012). Sequencing of the non-reducing polyketide synthase responsible for usnic acid biosynthesis in the lichen *Cladonia uncialis*. Directing Biosynthesis III, Nottingham, United Kingdom  
Main Audience: Researcher  
Invited?: No, Keynote?: No
20. \* Timsina, B., Sorensen, J. and Piercey-Normore, M. D.(2012). Effects of growth conditions on phenotype in the lichen-forming fungus *Ramalina dilacerata*. Botany 2012 - The Next Generation, Columbus, United States  
Main Audience: Researcher  
Invited?: No, Keynote?: No
21. \* Fontaine, K. M., Beck, A., Stocker-Wörgötter, E. and Piercey-Normore, M. D.(2012). Photobiont relationships with *Dermatocarpon luridum* var. *luridum* and related *Dermatocarpon* species. Botany 2012 - The next generation., Columbus, United States  
Main Audience: Researcher  
Invited?: No, Keynote?: No
22. \* Deduke, C. and Piercey-Normore, M. D.(2012). Trade-offs between sexual fecundity and secondary compounds in three Shield lichens. Botany 2012 - The Next Generation., Columbus, United States  
Main Audience: Researcher  
Invited?: No, Keynote?: No
23. \* Athukorala, S. A., Huebner, E. and Piercey-Normore, M. D.(2012). In vitro resynthesis of *Cladonia rangiferina* to identify three early stages of resynthesis: expression of recognition and defense related genes. Botany 2012 - The Next Generation., Columbus, United States  
Main Audience: Researcher  
Invited?: No, Keynote?: No
24. \* Timsina, B., \* Francisco, P., Sorensen, J. and Piercey-Normore, M. D.(2011). Effects of environmental change on the lichen-forming fungal genus, *Ramalina*. Canadian Botanical Association, Halifax, Canada  
Invited?: No, Keynote?: No
25. \* Athukorala, S. and Piercey-Normore, M. D.(2011). Evolution and gene expression of Reindeer lichens. Canadian Botanical Association, Halifax, Canada  
Invited?: No, Keynote?: No
26. \* Deduke, C. and Piercey-Normore, M. D.(2011). Effect of different environmental conditions on fecundity of three saxicolous lichens on the Precambrian Shield in Manitoba. Canadian Botanical Association, Halifax, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
27. Crittenden, P. D. and Piercey-Normore, M. D.(2011). *Stigonema* in the cephalodia of *Stereocaulon condensatum* differs between Canada and the U.K. Canadian Botanical Association, Halifax, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
28. \* Deduke, C. and Piercey-Normore, M. D.(2010). Sexual fecundity of three saxicolous lichens on the Precambrian shield. Manitoba Association of Plant Biologists (MAPB), Winnipeg, Canada  
Main Audience: Knowledge User  
Invited?: No, Keynote?: No
29. \* Fontaine, K. M. and Piercey-Normore, M. D.(2010). Population genetics and reproductive fitness of *Dermatocarpon luridum*, and the phycobionts. Manitoba Association of Plant Biologists (MAPB), Winnipeg, Canada  
Main Audience: Knowledge User  
Invited?: No, Keynote?: No

30. \* Timsina, B., Sorensen, J., Stocker-Wörgötter, E. and Piercey-Normore, M. D.(2010). Two types of polyketide synthase genes in species of *Ramalina* suggest high chemical diversity. Manitoba Association of Plant Biologists (MAPB), Winnipeg, Canada  
Main Audience: Knowledge User  
Invited?: No, Keynote?: No
31. \* Ismaiel, M., El-Ayouty, Y. and Piercey-Normore, M. D.(2010). Molecular characterization, diversity and gene expression studies of Iron Superoxide Dismutase (Fe-SOD) in two freshwater algae under ecological stresses. Manitoba Association of Plant Biologists, Winnipeg, Canada  
Main Audience: Knowledge User  
Invited?: No, Keynote?: No
32. \* Bharaj, A. K., Yurkov, V. and Piercey-Normore, M. D.(2010). Lichen associated bacterial communities. Manitoba Association of Plant Biologists (MAPB), Winnipeg, Canada  
Main Audience: Knowledge User  
Invited?: No, Keynote?: No
33. \* Kotelko, R. and Piercey-Normore, M. D.(2010). Biodiversity of species and natural products of lichen-forming fungi in the genus *Cladonia*. Canadian Botanical Association (CBA), Ottawa, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
34. \* Francisco de Oliveira, P. M., Pereira de Souza, A. and Piercey-Normore, M. D.(2010). Conservation genetics of a rare lichen *Ramalina sinensis* through the analysis of DNA sequence data. Canadian Botanical Association (CBA), Ottawa, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
35. \* Ismaiel, M., El-Ayouty, Y. and Piercey-Normore, M. D.(2010). Characterization and diversity of superoxide dismutase (SOD) in two freshwater algae. Canadian Botanical Association (CBA), Ottawa, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
36. \* Athukorala, S. and Piercey-Normore, M. D.(2010). Morphological diversity, phylogenetics, and mating systems of single spore cultures from two Reindeer lichens. Canadian Botanical Association (CBA), Ottawa, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
37. \* Abdel-Hameed, M., Sorensen, J. and Piercey-Normore, M. D.(2010). Diversity of Type I Polyketide Synthase genes in *Cladonia uncialis*. Canadian Botanical Association (CBA), Ottawa, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
38. \* Abdel-Hameed, M., Sorensen, J. and Piercey-Normore, M. D.(2010). Polyketide synthase genes in lichen fungi. 93rd Canadian Chemistry Conference and Exhibition, Ottawa, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
39. \* Liao, C. R. J., Sorenson, J. L., Piercey-Normore, M. D. and Gough K. M.(2010). In-situ Imaging of Usnic Acid in Selected *Cladonia* spp. by Vibrational Spectroscopy. Pittcon, Orlando, United States  
Main Audience: Researcher  
Invited?: No, Keynote?: No
40. \* Athukorala, S. N.P. and Piercey-Normore M. D.(2009). Phylogenetic relationship, mating systems and symbiotic association of *Cladonia* species. Manitoba Association of Plant Biologists (MAPB), Winnipeg, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No

41. \* Ismaiel, S. M. M., El-Ayouty, Y. M. and Piercey-Normore, M. D.(2009). Isolation and sequence analysis of superoxide dismutase (SOD) gene two green algae and a cyanobacterium. Manitoba Association of Plant Biologists (MAPB), Winnipeg, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
42. \* Timsina, B. A. and Piercey-Normore, M. D.(2009). Polyketide synthase gene in the Lichen fungal genera *Cladonia* and *Ramalina*. Manitoba Association of Plant Biologists (MAPB), Winnipeg, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
43. \* Piercey-Normore, M. D.(2009). Lichen adaptation to environmental changes: natural products and algal sharing. Manitoba Association of Plant Biologists (MAPB), Winnipeg, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
44. \* Abdel-Hameed, M., Sorensen, J. and Piercey-Normore, M. D.(2009). Polyketide synthase gene responsible for usnic acid biosynthesis in a lichen fungus. Manitoba Association of Plant Biologists (MAPB), Winnipeg, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
45. \* Fontaine, K., Sorensen, J., Huebner, E. and Piercey-Normore, M. D.(2009). Growth and species differentiation in *Cladonia rangiferina* and *C. stygia*. Botany and Mycology Congress, Snowbird, United States  
Main Audience: Researcher  
Invited?: No, Keynote?: No
46. Piercey-Normore, M. D.(2009). Botanical survey of Wapusk National Park: a synopsis of seven years. Wapusk National Park Research and Monitoring Conference, Winnipeg, Canada  
Invited?: No, Keynote?: No

## Text Interviews

- |            |  |
|------------|--|
| 2010-09-01 | The topic for MacLean's Magazine was the use of secondary metabolites from lichens for future antibiotics., Interview with MacLean's Magazine by Kate Lunau. The title was Superbug: Meet your maker.  |
| 2009-07-01 | The topic for "YES" magazine was lichen research on the Hudson's Bay Lowlands. The article was about a nine-year survey of lichens in Wapusk National Park., Contribution to article for a children's science magazine "YES" by Emile Chung. The article title was: Canada's Geological Wonders – Hudson Bay Lowlands. |

## Publications

### Journal Articles

1. \* Doering, J., \* Deduke, C. and Piercey-Normore, M. D.(2016). Variation in lichen species assemblages and secondary metabolites surrounding *Stereocaulon* species in the boreal forest of northwestern Manitoba. *Evansia*. 33(3)  
Accepted  
Refereed?: Yes, Open Access?: No
2. \* Deduke, C., Halden, N., and Piercey-Normore, M. D.(2015). Comparing element composition of rock substratum with lichen communities and fecundity of *Arctoparmelia* and *Xanthoparmelia* species. *Botany*.  
Submitted  
Refereed?: Yes, Open Access?: No

3. \* Abdel-Hameed, M., \* Bertrand, R., Piercey-Normore, M. D. and Sorensen, J.(2015). Putative identification of the usnic acid biosynthetic gene cluster by *de novo* whole-genome sequencing of a lichen-forming fungus. *Fungal Biology*.  
Revision Requested  
Refereed?: Yes, Open Access?: No
4. \* Deduke C. and Piercey-Normore M. D.(2015). Substratum preference of two species of *Xanthoparmelia*. *Fungal Biology*.  
In Press  
Refereed?: Yes, Open Access?: No
5. Yazici, K., Aptroot, A., Aslan, A., Sipman, H., and Piercey-Normore, M. D.(2015). The lichen biota of Burdur province (Turkey). *Mycotaxon*. 130(3)  
Accepted  
Refereed?: Yes, Open Access?: No
6. Maltman, C., Piercey-Normore, M., and Yurkov, V.(2015). Tellurite-, tellurate-, and selenite-based anaerobic respiration by strain CM-3 isolated from gold mine tailings. *Extremophiles*.  
Accepted  
Refereed?: Yes
7. \* Athukorala, S. N. P. and Piercey-Normore, M. D.(2014). Effect of temperature and pH on the resynthesis of compatible partners of the lichen, *Cladonia rangiferina*. *Symbiosis*. 64(2): 87-93.  
Published  
Refereed?: Yes, Open Access?: No
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## Book Chapters

1. \* Deduke, C., \* Timsina, B. and Piercey-Normore, M. D.(2011). Effect of environmental change on secondary metabolite production in lichen-forming fungi. Young, S. S. and Silvern, S. *Global Environmental Change*. : 197-230.  
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## Reports

1. \* Deduke, C., Ahti, T. and Piercey-Normore, M. D.(2014). Lichen report for the Newfoundland and Labrador (NL) Mycological Foray.8. Newfoundland and Labrador Mycological Foray
2. Wiersma, Y. and Piercey-Normore, M. D.(2014). *Collema furfuraceum* - published in a non-refereed journal (*Omphalina* 5(9):13-15).3. *Omphalina*
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6. Punter, C. E., Punter, D., Piercey-Normore, M. D. and Ford, B.(2010). Botanical survey of the northeastern coastal region of Wapusk National Park.30. Parks Canada
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8. Piercey-Normore, M. D.(2009). Caribou lichens in Wapusk National Park - published in a non-refereed journal (*The Voice of Wapusk National Park* 2(1):8-9).2. Parks Canada newsletter

# Curriculum Vitae

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### Education

- 1991 "Doctorat d'Universite de Poitiers " (PhD), Plant Biochemistry and Physiology, University of Poitiers (France).
- 1986 "DEA de Sciences et Technologie des Productions Vegetales et Alimentaires" (M.Sc. equivalent), Plant Biochemistry and Physiology, University of Poitiers (France).
- 1984 "Licence de Biologie des Organismes" (B. Sc. Hons. Equivalent), Biology, University of Poitiers (France).

### Research experience

- 2005 - present Associate Professor, University of Manitoba, Department of Biological Sciences (former Botany), Winnipeg, Canada - Plant stress physiology
- 1999- 2005 Assistant Professor, University of Manitoba, Department of Botany, Winnipeg, Canada – Plant Stress Physiology
- 1994 - 1999 Research Associate, University of Alberta, Department of Renewable Resources, Edmonton, Canada. Research on the effects of oil sand tailings materials on plant species of the boreal forest. Effects of hydrocarbons and salts on shrubs and trees.
- 1991 - 1994 Postdoctoral Fellow, University of Saskatchewan, Department of Crop Science and Plant Ecology and Plant Biotechnology Institute (NRC), Saskatoon, Canada. Study of diclofop methyl (acetyl CoA carboxylase inhibitor) resistance in wild oat (*Avena fatua*) populations using plasma membrane vesicles as a model system.

1986 - 1991 Ph.D. University of Poitiers, France. Physiological and biochemical aspects of nutrient exchange between the gametophyte and the sporophyte of *Polytrichum formosum*.

## Research Interests

- Plant Stress Physiology
- Physiological and biochemical responses of plants to abiotic stresses (salinity and stresses associated with mining activities, cold stress)
- Interaction between salinity stress and other stresses (abiotic and biotic)
- Land reclamation/ mine tailings revegetation

## Refereed chapters in books

Zwiazek, J.J., Renault, S., Croser, C., Hansen, J. & Beck, E. (2001) Biochemical and biophysical changes in relation to cold hardiness. *In* Conifer cold hardiness. F. Bigras and S. Colombo (Eds), Kluwer Publishers, Amsterdam pp 165-186

Bonnemain, J.L., Bourquin, S. Renault, S. Offler, C. Fisher, D.G. (1991). Transfer cells: structure and physiology. *In* Bonnemain J.L., Delrot S., Lucas W. and Dainty Eds, Ouest Edition, Recent advances in phloem transport and assimilate compartmentation. pp 74-83

## Articles in refereed publications

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Sabra A, Adam, L., Daayf F and Renault S, (2012) Salinity-induced changes in caffeic acid derivatives and alkamides/ ketones in three *Echinacea* species. *Environmental and Experimental Botany* 77: 234-241

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- Sabra A, Daayf D and Renault S (2012) Differential physiological and biochemical responses of three *Echinacea* species to salinity stress. *Scientia Horticulturae*, 135: 23-31
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- Markham J., Young I. and Renault S. (2011) Plant facilitation on a mine tailings dump. *Restoration Ecology*. 19 (5): 569-571
- Renault S, and Affifi M, (2009) Improving NaCl resistance of red-osier dogwood: Role of CaCl<sub>2</sub> and CaSO<sub>4</sub>. *Plant Soil*. 315: 123-133
- Green S, and Renault S. (2008) Influence of papermill sludge on growth of *Medicago sativa*, *Festuca rubra* and *Agropyron trachylaucum* in gold mine tailings: A greenhouse study. *Environmental Pollution*. 151: 524-531
- Mustard J, and Renault S. (2006) Response of red-osier dogwood (*Cornus stolonifera* Michx) seedlings to NaCl during the onset of bud break. *Canadian Journal of Botany*. 84: 844-851
- Renault S. (2005) Response of red-osier dogwood (*Cornus stolonifera* Michx) seedlings to sodium sulfate salinity: Effects of supplemental calcium. *Physiologia Plantarum*. 123: 75-81
- Renault S. (2005) Tamarack response to salinity: Effects of sodium chloride on growth and ion, pigment, and soluble carbohydrate levels. *Canadian Journal of Forest Research*. 35: 2806-2812
- Mustard J, and Renault S. (2004) Effects of NaCl on water relations and cell wall elasticity and composition of red-osier dogwood (*Cornus stolonifera* Michx) seedlings. *Physiologia Plantarum*. 121: 1.7
- Renault S, MacKinnon M, and Qualizza C. (2004) Suitability of altai wildrye (*Elymus angustus*) and slender wheatgrass (*Agropyron trachycaulum*) for initial reclamation of saline composite tailings of oil sands. *Environmental Pollution*. 128: 339-349
- Renault S, MacKinnon M, and Qualizza C. (2003) Barley a potential species for early reclamation of saline oil sands composite tailings. *Journal of Environmental Quality*. 32: 2245-2253
- Franklin J, Zwiazek J, Renault S, and Croser C. (2002) Growth and elemental composition of jack pine (*Pinus banksiana*) seedlings treated with sodium chloride and sodium sulfate. *Trees*. 16: 325-330
- Franklin J, Renault S, Croser C, Zwiazek J, and MacKinnon M. (2002) Jack pine growth and

elemental composition are affected by saline tailings water. *Journal of Environmental Quality*. 31: 648-653

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Renault S, Croser C, Franklin J, Zwiazek J, and MacKinnon M. (2001) Effects of consolidated tailings water on red-osier dogwood (*Cornus stolonifera* Michx) seedlings. *Environmental Pollution*. 113:27-33

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Renault S, Despeghel-Caussin C, Bonnemain J, and Delrot, S. (1989) The proton electrochemical transmembrane gradients generated by the transfer cells of the haustorium of *Polytrichum formosum* and their use in the uptake of amino acids. *Plant Physiology*. 90. 913-920

## **Refereed Conference Abstract**

Sabra A., El Hadrami A., Daayf F and Renault S. (2009). Changes in Caffeic acid derivatives, alkamides/polyacetylenes and phenylalanine ammonia-lyase (PAL) activity in three Echinacea species in response to salinity stress, *Planta Medica* 2009, 75 (DOI: 10.1055/s-0029-1234307)

## **Non-refereed contributions**

- **Reports**

Naguit C, Young I, Markham J and Renault S (2011) Tissue elemental analysis of plants growing on the Gunnar minesite tailings, southeastern Manitoba (part of NTS 52L14). *in* Report of Activities 2011, Manitoba Innovation, Energy and Mines, Manitoba Geological Survey, 177-179

Young I, Naguit C, Markham J and Renault S (2009-2012) – Evaluating the success of Manitoba mine tailings revegetation efforts. Monthly Report of Activities from May 2009 to May 2011 to Manitoba, Innovation, Energy and Mines. June 2011-present, progress report twice a year.

Young I, Szczerski, C, Newdiuk J, Markham J and Renault S (2009) Natural revegetation of Gunnar minesite, Manitoba ((part of NTS 52L14). *in* Report of Activities 2009, Manitoba Innovation, Energy and Mines, Manitoba Geological Survey, 127-131

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Renault, S., C., Sailerova, E., and Fedikow, M.A.F. (2000) Phytoremediation of mine tailings and bio-ore production: preliminary observation from an orientation survey at Central Manitoba (Au) minesite. *in* Report of Activities, Manitoba Industry, Trades and Mines, Manitoba Geological Survey. p.179-188

Croser, C. Renault, S. Franklin J Redfield E & Zwiazek JJ (1999) The effects of CT materials on the survival, growth and physiology of plants from the boreal forest. Research report prepared for Suncor Energy Inc. and Syncrude Canada Ltd. 72p

Renault, S. & Zwiazek, J.J. (1998) Effects of CT materials on plants. Research report prepared for Suncor Energy Inc. and Syncrude Canada Ltd. 108pp

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Renault, S. & Zwiazek, J.J. (1997) Effects of CT materials on plants. Research report prepared for Suncor Energy Inc. and Syncrude Canada Ltd. 59pp

- **Conference presentations**

Abouelsaad, I. Weihrauch D, and Renault S (2014) Nitrogen transporters expression in salt tolerant and salt sensitive tomato plants. Canadian Botanical Association Conference. Montreal (QC) June 2014

Wolfe, S., Renault, S. and Avila Sakar, G., (2013) Simultaneous responses of *Brassica juncea* to salinity and herbivory, Canadian Society for Ecology and Evolution Conference, Kelowna (BC) May 2013

Wolfe, S., Avila Sakar, G., Markham J., and Renault, S. (2013) Does salinity improve defence against herbivores in *Brassica juncea*? Canadian Botanical Association Conference, Kamloops (BC), June 2013

Wolfe, S., Avila Sakar, and Renault, S. (2013) Crosstalk between salinity and herbivory in *Brassica juncea*, PUBS conference, Winnipeg, February 2013.

Naguit C., Markham J. and Renault S. (2012) Evaluating the Success of Manitoba Mine Tailings Revegetation Efforts. Poster presentation at the 23<sup>rd</sup> North American Prairie Conference. (Awarded best poster presentation).

Naguit C, Markham J and Renault S (2012). North American Prairie Conference, Winnipeg, July 2012

Young, I. Markham J, and Renault S (2011). Revegetation of non-acid generating mine tailings in Manitoba. ASMR (Am. Soc. of Mining Reclamation) Annual conference, June 14-16, Bismark, USA

Naguit, C, Young, I, Markham J, and Renault S(2011). Ecological evaluation of revegetated mine tailings in Manitoba and Saskatchewan, CLRA (Canadian Land Reclamation Association) Annual meeting, Sudbury, June 27-29

Naguit C, Young, I, Markham J Renault, S (2011) Growth and stress responses of *Medicago sativa* in mine tailings. Plant Canada 2011. Halifax, July 18-21

Sabra A., and Renault S. (2010). Gas exchange, electrolyte leakage, elemental analysis and antioxidants activities in salt-stressed *Echinacea*. Society for Experimental Biology Annual Meeting, Prague 30<sup>th</sup> June-3<sup>rd</sup> July.

Davis L and Renault S (2010) The root anatomy of *Cornus sericea* (L.) exposed to NaCl. Plant Biology 2010. Joint Annual Meeting of the American Society of Plant Biologists and the Canadian Society of plant Physiologists. Montreal July 31<sup>st</sup>- aug 4.

Young, I. Markham J, and Renault S (2010). Revegetation of non-acid generating mine tailings in south-east Manitoba. Annual meeting of the Canadian Land Reclamation Association,



Courtney BC, Sept 2010 (Ian received an Award for his poster presentation)

Young, I. Naguit, C, Markham J, and Renault S (2010). Revegetation of non-acid generating mine tailings in south-east Manitoba. Manitoba Mining Convention 2010. Nov 18-20

Sabra A., El Hadrami A., Daayf F and Renault S. (2009). Changes in Caffeic acid derivatives, alkamides/polyacetylenes and phenylalanine ammonia-lyase (PAL) activity in three Echinacea species in response to salinity stress, 57<sup>th</sup> International Congress and Annual Meeting of the Society of Medicinal Plants and Natural Products. Geneva, Switzerland, August 16-20, 2009

Davis L and Renault S (2009) Salinity tolerance of *Cornus Sericea* (L.) from three Southeastern Manitoba sites. Annual Meeting of the Canadian Society of plant Physiologists, Vancouver, Canada. June 12-15 2009.

Renault S, Markham J, Young, I, Halwas, S and Kunkel, S. (2009). Natural revegetation of Gunnar minesite in Nopiming Provincial Park, Manitoba. Annual Meeting of the Canadian Land Reclamation Association. Quebec-city, Canada. August 23-25, 2009.

Sabra A., El Hadrami A., Daayf F and Renault S. (2008). Caffeic acid derivatives and alkamides of salt-stressed Echinacea species, 24<sup>th</sup> International Conference on Polyphenols, Salamanca, Spain, July 8-11, 2008

Renault S. Markham J., Davis L. and Martin, M (2008). Revegetation of gold mine tailings in Nopiming Provincial Park, Manitoba. 25<sup>th</sup> Annual Meeting of the American Society of Mining and Reclamation and the 10<sup>th</sup> Meeting of the International Affiliation of Land Reclamationists (IALR), Richmond, VA, June 14-19, 2008.

Sabra A. and Renault S. (2007). Response of three Echinacea species to salinity stress. Plant Canada 2007 Conference in Saskatoon. June 10-14, 2007

Nakata C and Renault S (2006) Plant response to petroleum coke. CONRAD (Canadian Oil Sands Network for Research and Development) Environmental Research Symposium (January 23 & 24, 2006) Edmonton

Renault S. Markham J., Szczerski C., Nakata C., Sabra A., Davis L., Green S. and Overton D. (2006) revegetation of gold mine tailings in Nopiming Park. Manitoba Mining and Minerals Convention 2006, Nov 20-22, Winnipeg.

Nakata C and Renault S (2006) Petroleum coke and plants: impact on growth and physiology. Reclamation and Remediation: Policy to practice. 31<sup>st</sup> Annual Meeting and Conference of the Land Reclamation Association (CLRA) and the 9<sup>th</sup> Meeting of the International Affiliation of Land Reclamationists (IALR), Ottawa, Ontario. Aug 20-23 2006. (Colin Nakata got the first prize, \$500 for the student oral presentation)

Nakata C and Renault S (2005) Plant response to petroleum coke. Watershed workshop, Edmonton, January 24-25, 2005 organized by Syncrude Canada Ltd.

Renault S and Nakata C (2005) Effects of petroleum coke on plants. Coke Reclamation Research Meeting , Edmonton, March 4, 2005 organized by Syncrude Canada Ltd.

Nakata C and Renault S (2005) Plant response to petroleum coke, Plant Canada 2005 Conference – Joint meeting of the following scientific societies: Canadian Botanical Association, Canadian Plant Physiologist Association, Canadian Society for Horticultural Science, Canadian Society of Agronomy, Canadian Phytopathological Society and Canadian Weed Science Society, Edmonton, June 14-18 (Colin Nakata obtained an Honorable Mention for the CBA Award for the best student poster)

Green S and Renault S (2005) Effects of paper mill sludge on growth of plants in mine tailings, , Plant Canada 2005 Conference, Edmonton, June 14-18

Aziz T, Sri Ranjan R., Renault S and Pepper G.W. (2005) Effectiveness of halophytes species in the remediation of saline/ sodic soils. Meeting of the Canadian Society for Engineering in Agricultural, Food and Biological Systems. Winnipeg, June 26-29

Szczerski, C. & Renault, S. (2004) *Medicago sativa* and *Festuca pratensis* survival, biomass and pigment content in sulfide mine tailings amended with modified humic substances. Restoration on the edge, International Conference on Ecological Restoration, Victoria, August 2004

Szczerski, C. & Renault, S. (2004) *Medicago sativa*, *Agropyron trachycaulum* and *Festuca pratensis* seedling emergence and growth in mine tailings amended with modified humic substances. Annual Meeting of the Canadian Botanical Association, Winnipeg, June 2004.

Nakata C & Renault S (2004) Copper and Iron Phytoextraction from Mine Tailings at Different EDTA (Ethylenediaminetetraacetic acid) Concentrations using white Mustard (*Sinapis alba* L.) Annual Meeting of the Canadian Botanical Association, Winnipeg, June 2004.

Renault S, Szczerski, C., Nakata, C., Sailerova, E., and Fedikow, M.A.F. (2003) Revegetation and phytoremediation of mine tailings. Manitoba Mining and Minerals, Convention 2003, Winnipeg, Nov 13-15

Renault S, Sailerova E & Fedikow M (2003) Reclamation of abandoned gold mine tailings in southeastern Manitoba. Annual Meeting of the Canadian Land Reclamation Association, Sudbury, May 2003

Nakata C & Renault S (2003) Phytoextraction of copper from gold mine tailings by *Sinapis alba*. Annual Meeting of the Canadian Land Reclamation Association, Sudbury, May 2003

Mustard, J. & Renault, S. (2002) Effects of sodium chloride on *Cornus stolonifera* seedlings: a focus on water relations and cell wall elasticity. Annual meeting of the Canadian Society of Plant Physiologists, “Plant Biology Canada 2002”, Calgary, Canada, June 2002.

Renault S, MacKinnon M. & Qualizza C, (2001) Early reclamation strategies on oil sands composite tailings and composite tailings-amended substrates. Annual meeting of the Canadian Land Reclamation Association, Land Reclamation and environmental stewardship. Halifax, Canada, August 26-29

Renault, S., Croser, C., Franklin, J. & Zwiazek, J.J. (1999) The effect of sodium chloride and sodium sulfate salts on germination and early seedling growth of red-osier dogwood (*Cornus stolonifera*). Canadian Society of Plant Physiologists Conference. Saskatoon, Canada, June 19-23, p97

Franklin, J., Croser, C., Renault, S. & Zwiazek, J.J. (1999) The effect of sodium chloride and sodium sulfate salts on germination and seedling growth of jack pine (*Pinus banksiana*). Canadian Society of Plant Physiologists Conference. Saskatoon, Canada, June 19-23, p96

Renault, S., Paton, E., Nilsson, G., Zwiazek, J.J. & Mackinnon, M. (1998) Effects of composite tailings (CT) water on plants of the boreal forest. Canadian Society of Plant Physiologists Conference. Victoria, Canada, April 7-8, p19

Zwiazek, J.J., Renault, S. & Croser, C. (1998) Effects of consolidated tailings and fine tailings materials on plants. TERRE (Terrestrial Reclamation of Challenging Materials in the Oil Sands Industry) Workshop, Jan 29-30, Edmonton, Alberta

Croser, C., Renault, S., Franklin, J., Nilsson, G., & Zwiazek, J.J. (1998) The effect of salts and CT water on conifer seed germination and early seedling viability. Canadian Society of Plant Physiologists Conference. Victoria, Canada, April 7-8

Renault, S., Zwiazek, J.J. & Mackinnon, M. (1997) Salt tolerance of plants treated with consolidated tailings water. Forty Seventh Canadian Chemical Engineering Conference, Oct 5-8, Edmonton, Alberta

Renault, S. and Zwiazek, J. J., (1996) - Phytotoxicity of reclaimed fine tails and tailings sands. 23<sup>rd</sup> Annual Aquatic Toxicity Workshop: October 7-9, Calgary, Alberta

Devine, MD, Downey, JA, Renault S. Hall, JC, Romano & Shimabukuro RH (1992) Genetic and drought-induced diclofop resistance associated with recovery of electrogenic membrane potential of the plasmalemma. Ninth International workshop on plant membrane biology, Monterey, California, July 19-24

Renault, S., Bonnemain, JL, Faye, L. & Gaudillere JP (1990) Physiological and biochemical aspects of sugar exchanges between the gametophyte and the sporophyte of *polytrichum*. International Conference on Phloem Transport and Assimilate Compartmentation, Cognac, France, August 19-24

## **Articles in magazines**

Naguit, C., Young, I. Markham J and Renault S. (2013) Mine tailings revegetation in Manitoba. Canadian Reclamation (magazine from the Canadian Land reclamation Association). Spring/summer 2013 Vol. 13: 12-17 (I was invited by the Editor/Publisher of the magazine to write a paper for the spring/summer issue).

Renault, S (2008) Understanding the impact of saline soils. The Bulletin (University of Manitoba)

This article was also published by the magazine Process West (March, 2008).

## **Invited talks**

Renault, S. Naguit, C. Young, I., and Markham, J. (2014) Revegetation of abandoned gold mine tailings in the Manitoba boreal forest. Canadian Land Reclamation Association Annual Meeting, Mont Tremblant (Quebec), September 2014.

Young, I. , Markham, J. and Renault, S. (2013) Revegetation of non-acid generating mine tailings in Manitoba. Canadian Institute of Forestry Meeting. Winnipeg (MB) March 2013.

Naguit, C. Young, I., Markham, J. and Renault, S. (2013) Evaluating the Success of Manitoba Mine Tailings Revegetation Efforts. Canadian Institute of Forestry Meeting. Winnipeg (MB), March 2013.

Renault, S (2011) New approach to understand boreal plant tolerance to salinity. Invited talk at the TEPCA (Total E&P Canada)/University of Alberta Reclamation Salinity Workshop. Dec 14, 2011. Edmonton, AB

Markham J, Naguit C, Young, I and Renault S (2011) Natural and anthropogenic revegetation of hard rock mine tailings. North American Forest Ecology Workshop in Roanoke, Virginia, USA (June 19 – 23, 2011).

Renault S (2009) Responses of woody plants to salinity stress: how resistant is red-osier dogwood? Seminar Series in Biological Sciences. University of Manitoba

Renault S (2008) Responses of woody plants to salinity stress: how resistant is red-osier dogwood? Seminar Series in Entomology. University of Manitoba

Renault S and Nakata C (2007) Plant response to petroleum coke. Invited talk at the Petroleum Coke. Workshop organized by Syncrude Canada Limited in Edmonton (AB), October 2007.

Renault S (2005) Responses of red-osier dogwood to salinity stress. Plant Sciences Seminar Series. University of Manitoba

Renault S (2001) Survival of boreal forest plants on oil sands. Plant Sciences Seminar Series. University of Manitoba

## **Training of highly qualified personnel**

- **Undergraduate students**

- Katherine Zulac (2001)
- Josie Vettuci (2000-2001)
- Colin Nakata(2002-2003)
- Sarah Medill (2002)
- Scott Green (2004-2005)
- Laura Davis (2006-2007)
- Ian Young (2008)
- Christiane Catellier (2008)
- Sarah Kunkel (2008)
- Christian Naguit (2009, co-supervised)
- Lacey Smith (2010)
- Jill Christensen (2010, co-supervised)
- Kaitlin Kostyra (2010, co-supervised)
- Joel Montgomery (2011, co-supervised)
- Scott Wolfe (2012, co-supervised)
- Jon Makar (2012, co-supervised)
- Bruno Adorno (2013, exchange student from Brazil, Science without Borders program)
- Sarah Cavett-Goodwin (2013)
- Matthew Martens (2014, co-supervised)
- Paige Anderson (2014, co-supervised)
- Corey Carpenter (2014, co-supervised)

- **High school students (Acadia Junior High School)**

- Colin Marsch (Science Fair project) (2013, 2014)
- Talha Suboor (Science Fair Project) (2013)

- **Honours Students**

- Scott Wolfe (2012/2013) (co-supervised with Dr. Avila Sakar from University of Winnipeg)
- Ian Young (2008/2009) (co-supervised with Dr. John Markham)
- Laura Davis (2006/2007)
- Scott green (2004/2005)
- Colin Nakata (2002/2003)
- Liz Grey (2000/2001)
- Katherine Zulak (2000/2001)

- **Graduate students**

- Jennifer Mustard (MSc. 2000-2003)
- Carl Szczerski (MSc. 2003- 2007)
- Colin Nakata (MSC. 2003- 2007)
- Laura Davis (MSc 2007 – 2011)
- Ali Sabra (PhD 2005 – 2013)
- Ian Young (MSc 2009 – 2013) (co-supervised)
- Christian Naguit (MSc 2009 – 2013) (co-supervised)
- Ibrahim Abou Elsaad (PhD 2011- present)
- Jianfei Shao (MSc 2014 – present) (co-supervised)
- Haoran Chen (MSc 2014 – present) (co-supervised)

- **Postdoctoral fellow**

- Maha Afifi (January 2005- March 2006)

- **Technicians**

- Karen Kivinen ( summer 2004)
- Carl Szczerski (summer 2009, co-supervised)

- **Research Assistants**

- Sarah Halwas (March – May 2009, co-supervised)
- Sarah Kunkel (September-December 2008)
- Lacey Smith (January- April 2011, co-supervised)

## **Funding**

Start-up funds	University of Manitoba	1999	\$35,000
Gas chromatograph	NSERC - Equipment Grant	2000	\$17,000
Pressure chamber	URGP – U. of Manitoba	2000	\$ 4,000
Environ. Science and Diversity Lab (co-applicant with 2 others)	CFI – New Opportunities	2000	\$314,000 (33%)
Revegetation on CT substrates	Syncrude Canada Ltd.	2000	\$20,000
Summer Research Assistant	Manitoba Government	2000 - 2003	\$3,600

	(Career Start and Summer Placement)		
Mine tailings revegetation	Manitoba, Industry, Economic Development and Mines	2000-2009	\$2,500/year
Salt tolerance of red-osier dogwood	NSERC- Discovery Grant	2000 - 2004 2004 - 2005 2005 - 2012	\$88,000 \$24,000 \$144,000
Effects of petroleum coke on plants	Synchrude Canada Ltd	2004-2007	\$81,800
Supracentrifuge (PI with 2 others)	NSERC – equipment Faculty of Sciences	2005 2005	\$75,837 \$7,500
Evaluating the success of Manitoba Mine tailings revegetation efforts (co-PI)	Manitoba Science, Technology, Energy and Mine (Mine Branch) Geological Survey (in kind) Manitoba Conservation (in kind)	2009-2012	\$192,810 (50%)  \$15,000 \$10,000
Defence against herbivores in salinity stressed plants (co-applicant)	University of Winnipeg Internal Research Grant	2012-2013	\$7,425 (50%)
Crosstalk between salinity and herbivory	URGP- University of Manitoba	2012-2013	\$7,497
Endowment Funds to support teaching	University of Manitoba	2005-2014	\$80,732
Salinity tolerance of nitrogen-fixing woody species: implications for oil sands reclamation (Main Applicant with 2 others)	Total E&P Canada Ltd. Teck Resource Ltd.	2014-2015	\$42,000
Physiological responses of trees for managed relocation in Manitoba	Manitoba Hydro	2014-2017	\$30,000

## Teaching experience

1999-present BIOL 3452 (former BOTN 3010), Environmental Plant Physiology, University of Manitoba

2002-present	BIOL 3400 (former, BIOL 3450, BOTN 2020), Plant Physiology, University of Manitoba
1999-2011	BIOL 4430 (Former BOTN 4120), Advanced Plant Stress Physiology, University of Manitoba
2000-2008	BOTN 7480, Plant Stress Physiology, University of Manitoba
2009-present	BIOL 7600, Special Topics in Biological Sciences, University of Manitoba
1999-2001	039.451 Plant Metabolism, University of Manitoba (1/3 of the course)
1999-2001	001.402, Forest Botany, University of Manitoba (1/3 of the course)
1996	Forestry 321, Tree structure and function, University of Alberta

## Service activity

- **University/ Faculty Committees**
  - Faculty of Science LASH (Local Area Health and Safety) Committee (2013 – present)- Co-Chair
  - Evaluation Committee for the Manitoba Horticulturists Graduate Scholarship (2011)
  - Faculty Search Committees (2003, 2004, 2007, 2008, 2010, 2013): Departments of Statistics (4), Zoology (2) and Chemistry (1)
  - Faculty-based Promotion committee (2005-2009)
  - Faculty of Sciences, Research Committee (2000-2007)
  - Ecology Program Committee (2000-2002)
  - Faculty of Sciences, Executive Committee (2001-2002)
  - Headship Search Committee (Physics and Botany, Faculty of Sciences)
  - Headship Search Committee (Plant Sciences, Faculty of Agriculture and Food Sciences)
- **Departmental Committees**
  - Safety Group (2003- present)- Chair and WHMIS coordinator
  - Greenhouse Committee (2000-present) – Chair (2003-2009)
  - Honours thesis committee (2012- present)
  - Adjunct Professor Committee (2009 - present)
  - Botany-Zoology Joint Seminar Committee (2003-2004) – co-Chair
  - Undergraduate Curriculum Committee (2008)
  - Physiology Teaching Committee (2008- present)
  - Search Committees (2000, 2001, 2002, 2006, 2010, 2013, 2015): Botany (4) and Biological Sciences (4)
  - Search Committees (2012): CRC Tier II (1)



- Graduate Student Committee (2006)
- Tenure Committee (2005)
- Promotion Committees (2006, 2007 and 2008)
- **Other administrative duties at the University of Manitoba**
  - Acting Head of the Department of Botany during the week of July 3<sup>rd</sup> to July 7<sup>th</sup> 2006
- **Student Advisory Committees**
  - Department of Botany/ Biological Sciences: 16MSc and 3 PhD students
  - Department of Entomology: 2 MSc students
  - Department of Plant Sciences: 8 MSc and 1 PhD students
  - Department of Soil Sciences: 2 MSc student
  - Department of Biosystem Engineering: 1 PhD
  - University of Winnipeg, Dept of Biology: 1 MSc student
- **Reviewers**
  - Granting agencies (NSERC)
  - Conference Abstracts (American Society for Mining Reclamation)
  - Journals (Physiologia Plantarum, Acta Physiologiae Plantarum, Can. J. Forest Research, Can. J. Bot, Botany, J. Environmental Quality, Plant and Soil, Plant Science, Tropical Agric., Scientia Horticulturae, African J. of agricultural research, J. of the American society of Horticultural Sciences, Acta Agricultura Scandinavia, Forest Science, Trees, Tree Physiology)
  - Judge for oral and poster presentations at the Canadian Society of Plant Physiologists and Canadian Land Reclamation Association Conferences
- **Associate Editor**
  - Acta Physiologiae Plantarum, Springer (since 2009 - 112 manuscripts)
  - Plants (open access journal) – Special Issue on interactions between biotic and abiotic stresses 2014
- **Memberships in Professional Societies**
  - Canadian Society of Plant Biologists (Meeting Site Committee)
  - Scandinavian Society of Plant Physiologists
  - Canadian Land Reclamation Association (Member of the Board of Directors, Award committee) – 2013/2015 Co-chair of the organizing committee for the 2015 annual conference in Winnipeg – Joint meeting with the Manitoba Soil Science Society
  - Canadian Botanical Association
  - American Society of Mining Reclamation
  - Federation of European Society of Plant Biology
  - Manitoba Plant Biologist Association
  - Society for Experimental Biology

- **Translation English/French for colleagues**
  - Conference abstracts, course outlines, publications, travel documents
  
- **Judge for student oral and poster presentations at Conferences**
  - Canadian Society of Plant Physiologists (2009)
  - Canadian Land Reclamation Association (2009- 2011)
  
- **Chairing PhD and MSc defenses in the Department of Botany**
  - 2005-2006
  
- **Service to public**
  - Provide information on the selection of plants for specific projects to:
    - Companies (Syncrude Canada Ltd, AMEC, Aquila Conservation and Environment Consulting)
    - College students and school teachers
    - An Italian artist to complete an art project
  - Answer questions from the public related to plant damage/stress

## James D. Roth

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Canada  
Tel: 204-272-1677 | FAX: 204-474-7604  
E-mail: [jim.roth@umanitoba.ca](mailto:jim.roth@umanitoba.ca)

### Professional Positions

2015 - present Associate Professor, University of Manitoba, Winnipeg, MB, Canada  
2009 - 2015 Assistant Professor, University of Manitoba, Winnipeg, MB, Canada  
2000 - 2009 Research Assistant Professor, University of Central Florida, Orlando, FL, USA  
1999 - 2000 Postdoctoral Fellow and Instructor, University of Idaho, Moscow, ID, USA  
1999 Adjunct Professor, Lewis-Clark State College, Lewiston, ID, USA  
1995 - 1996 Fulbright Scholar, University of Saskatchewan, Saskatoon, SK, Canada  
1991 - 1998 Graduate Assistant, University of Minnesota, St. Paul, MN, USA

### Education

PhD, Ecology, University of Minnesota, 1998

*Dissertation*: "The role of marine resources in arctic fox population dynamics; insights from stable isotopes" (advisor PA Abrams)

BS, Biology (Systematics and Ecology), University of Kansas, 1991 (Highest Distinction and Departmental Honors)

*Honors thesis*: "Habitat selection of birds in a fragmented landscape" (advisor RD Holt)

BA, Mathematics, University of Kansas, 1991

### PUBLICATIONS AND PRESENTATIONS

#### Peer-reviewed Publications (\*student author)

Ceriani\* SA, Roth JD, Tucker AD, Evans DR, Addison DS, Sasso CR, Ehrhart LM, Weishampel JF.

2015. [Carry-over effects and foraging ground dynamics of a major loggerhead breeding aggregation](#). *Marine Biology in press*. DOI 10.1007/s00227-015-2721-x

Friesen\* OC, Roth JD, Graham LC. 2015. [Sex-biased parasitism in the monogamous arctic fox driven by diet](#). *Journal of Mammalogy* 96:417-424.

Trana\* MR, Roth JD, Tomy G, Anderson WG, Ferguson S. 2015. [Influence of sample degradation and tissue depth on blubber cortisol in beluga whales](#). *Journal of Experimental Marine Biology and Ecology* 462:8-13.

Ewacha\* MVA, Roth JD, Brook RK. 2014. [Vegetation structure and composition determine snowshoe hare activity at arctic tree line](#). *Canadian Journal of Zoology* 92(9):789-794.

Ceriani\* SA, Roth JD, Sasso CR, McClellan CM, James M, Haas HL, Smolowitz RJ, Evans DR, Addison DS, Bagley DA, Ehrhart LM, Weishampel JF. 2014. [Modeling and mapping isotopic patterns in the Northwest Atlantic derived from loggerhead sea turtles](#). *Ecosphere* 5(9):122.

Ceriani\* SA, Roth JD, Ehrhart LM, Quintana-Ascencio PF, Weishampel JF. 2014. [Developing a common currency for stable isotope analyses of nesting marine turtles](#). *Marine Biology* 161:2257-2268.

- Makenbach\* SA, Waterman JM, Roth JD. 2013. [Predator detection and dilution as benefits of associations between yellow mongooses and Cape ground squirrels](#). Behavioral Ecology and Sociobiology 67:1187-1194.
- Shura\* SK, Roth JD. 2013. [Impacts on declining moose populations in southeastern Manitoba](#). Proceedings of Manitoba's Undergraduate Science and Engineering Research 1:20-26.
- Thornton D, Wirsing AJ, Roth JD, Murray DM. 2013. [Habitat quality and population density drive occupancy dynamics of snowshoe hare in variegated landscapes](#). Ecography 36:610-621.
- Ceriani\* SA, Roth JD, Evans D, Weishampel JF, Ehrhart LM. 2012. [Inferring foraging areas of nesting loggerhead turtles using satellite telemetry and stable isotopes](#). PLoS One 7(9): e45335.
- Thornton D, Wirsing AJ, Roth JD, Murray DM. 2012. [Complex effects of site preparation and harvest on snowshoe hare abundance across a patchy forest landscape](#). Forest Ecology and Management 280:132-139.
- Anderson\* CJR, da Vitoria Lobo N, Roth JD, Waterman JM. 2010. [A computer-aided photo-identification system based on image pattern recognition with an application to polar bears using whisker spot patterns](#). Journal of Mammalogy 91:1350-1359.
- Hillegass\* MA, Waterman JM, Roth JD. 2010. [Parasite removal increases reproductive success in a social African ground squirrel](#). Behavioral Ecology 21:696-700.
- Witteveen\* BH, Worthy GAJ, Roth JD. 2009. [Tracing migratory movements of breeding North Pacific humpback whales using stable isotope analysis](#). Marine Ecology Progress Series 393:173-183.
- Witteveen\* BH, Worthy GAJ, Wynne KA, Roth JD. 2009. [Population structure of North Pacific humpback whales on their feeding grounds as shown by stable carbon and nitrogen isotope ratios](#). Marine Ecology Progress Series 379:299-310.
- Suazo\* AA, Fauth JE, Roth JD, Parkinson CL, Stout IJ. 2009. [Responses of small rodents to habitat restoration and management for the endangered Florida Scrub-Jay](#). Biological Conservation 142:2322-2328.
- Barton\* BT, Roth JD. 2008. Implications of intraguild predation for sea turtle nest protection. Biological Conservation 141:2139-2145.
- Roth JD, Murray DL, Steury TD. 2008. [Spatial dynamics of sympatric canids: modeling the impact of coyotes on red wolf recovery](#). Ecological Modelling 214:391-403.
- Hillegass\* MA, Waterman JM, Roth JD. 2008. [The influence of sex and sociality on parasite loads in an African ground squirrel](#). Behavioral Ecology 19:1006-1011.
- Murray DL, Steury TD, Roth JD. 2008. [Assessment of Canada lynx research and conservation needs in the contiguous United States: another kick at the cat](#). Journal of Wildlife Management 72:1463-1472.
- Roth JD, Marshall JD, Murray DL, Nickerson DM, Steury TD. 2007. [Geographical gradients in diet affect population dynamics of Canada lynx](#). Ecology 88:2736-2743.
- Anderson\* CJR, Roth JD, Waterman JM. 2007. [Can whisker spot patterns be used to identify individual polar bears?](#) Journal of Zoology 273:333-339.
- Barton\* BT, Roth JD. 2007. [Raccoon removal on sea turtle nesting beaches](#). Journal of Wildlife Management 71:1234-1237.
- Hannan\* LB, Roth JD, Ehrhart LM, Weishampel JF. 2007. [Dune vegetation fertilization by nesting sea turtles](#). Ecology 88:1053-1058.
- Waterman JM, Roth JD. 2007. [Interspecific associations of Cape ground squirrels with two mongoose species: benefit or cost?](#) Behavioral Ecology and Sociobiology 61:1675-1683.
- Degner\* JF, Stout IJ, Roth JD, Parkinson CL. 2007. [Population genetics and conservation of the](#)

- [threatened southeastern beach mouse \(\*Peromyscus polionotus niveiventris\*\): subspecies and evolutionary units](#). Conservation Genetics 8:1441-1452.
- Dalén L, Fuglei E, Hersteinsson P, Kapel C, Roth JD, Samelius G, Tannerfeldt M, Angerbjörn A. 2005. [Population history and genetic structure of a circumpolar species: the arctic fox](#). Biological Journal of the Linnean Society 84:79-89.
- Wirsing\* AJ, Roth JD, Murray DM. 2005. [Can prey use dietary cues to distinguish predators? A test involving three terrestrial amphibians](#). Herpetologica 61:104-110.
- Murray DM, Roth JD, Wirsing\* AJ. 2004. [Predation risk avoidance by terrestrial amphibians: the role of prey experience and vulnerability to native and exotic predators](#). Ethology 110:635-647.
- Roth JD. 2003. [Variability in marine resources affects arctic fox population dynamics](#). Journal of Animal Ecology 72:668-676.
- Roth JD. 2002. [Temporal variability in the diet of arctic foxes as reflected in stable-carbon isotopes; the importance of sea ice](#). Oecologia 133:70-77.
- Murray DM, Roth JD, Ellsworth\* E, Wirsing\* AJ, Steury\* TD. 2002. [Estimating southern snowshoe hare populations using fecal pellet counts](#). Canadian Journal of Zoology 80:771-781.
- Roth JD, Hobson KA. 2000. [Stable-carbon and nitrogen isotopic fractionation between diet and tissue of captive red fox: implications for dietary reconstruction](#). Canadian Journal of Zoology 78:848-852.
- Fenton MB, Waterman JM, Roth JD, Lopez E, Fienberg SE. 1998. [Tooth breakage and diet: a comparison of bats and carnivorans](#). Journal of Zoology, London 246:83-88.
- Gutzwiller KJ, Marcum HA, Harvey HB, Roth JD, Anderson SH. 1998. Bird tolerance to human intrusion in Wyoming montane forests. The Condor 100:519-527.
- Abrams PA, Holt RD, Roth JD. 1998. [Apparent competition or apparent mutualism? Shared predation when populations cycle](#). Ecology 79:201-212.
- Abrams PA, Namba T, Mimura M, Roth JD. 1997. The relationship between productivity and population densities in cycling predator-prey systems. Evolutionary Ecology 11:371-373.
- Starfield AM, Roth JD, Ralls K. 1995. ["Mobbing" in Hawaiian monk seals: the value of simulation modeling in the absence of apparently crucial data](#). Conservation Biology 9:166-174.
- Abrams PA, Roth JD. 1994. [The effects of enrichment on three-species food chains with nonlinear functional responses](#). Ecology 75:1118-1130.
- Abrams PA, Roth J. 1994. [The responses of unstable food chains to enrichment](#). Evolutionary Ecology 8:150-171.

#### **Submitted Manuscripts** (\*student author)

- Szumski\* CM, Roth JD, Gau RJ, Murray DL. *Submitted*. Demographic differences in diet breadth of Canada lynx during a fluctuation in prey availability. Oecologia.
- Friesen\* OC, Roth JD. Alternative prey use affects helminth parasite infections in gray wolves. Oecologia.
- Gharajehdaghpour\* T, Roth JD, Fafard PM, Markham JH. *Submitted*. Arctic foxes as ecosystem engineers: increased soil nutrients lead to increased plant productivity on fox dens. Scientific Reports.
- Trana\* MR, Roth JD, Tomy G, Anderson WG, Ferguson S. *Submitted*. Increased blubber cortisol in ice-entrapped beluga whales. Polar Biology.
- Ewacha\* MVA, Kaapehi C, Waterman JM, Roth JD. *Submitted*. Cape ground squirrels as ecosystem engineers: modifying habitat for plants, small mammals, and beetles in the Namib Desert. African Journal of Ecology.

- Gordon\* MJ, Roth JD, Tursi RM, Hughes PT, Hoffman EA. *Submitted*. Identifying feeding patterns in an endangered rabbit: stable isotope analysis of diet selectivity. BMC Research Notes.
- McDonald\* RS, Roth JD, Anderson WG. *Submitted*. Prey cortisol affects the usefulness of fecal glucocorticoid metabolite concentration to indicate stress in a carnivore. *Oecologia*.

**Published Abstracts** (\*student author)

- Roth JD, Wiesel I, Drea CM. 2005. Variation in seal consumption by brown hyenas in the Namib Desert estimated using stable isotopes. *Integrative and Comparative Biology* 45:1065-1065.
- Barton\* BT, Roth JD. 2005. Sea turtle nest predators: Implications for community ecology. *Integrative and Comparative Biology* 45:962-962.
- Anderson\* CJR, Waterman JM, Roth JD. 2005. Non-invasive identification of individual polar bears by whisker spot patterns. *Integrative and Comparative Biology* 45:1106-1106.
- Eckhardt\* GH, Waterman JM, Roth JD. 2002. The functional significance of play fighting in polar bears: are they asocial? *Integrative and Comparative Biology* 42:1224-1224.

**Invited Seminars**

- Churchill Northern Studies Centre, Churchill, MB, Canada, June 2013.
- University of Kansas, Department of Ecology & Evolutionary Biology, Lawrence, KS, USA, March 2012.
- University of Manitoba, Department of Entomology, Winnipeg, MB, Canada, March 2012.
- Université du Québec à Rimouski, Centre d'études Nordiques, Rimouski, QC, Canada, May 2011.
- University of Winnipeg, Department of Biology, Winnipeg, MB, Canada, November 2009.
- University of Manitoba, Department of Biological Sciences, Winnipeg, MB, Canada, November 2008.
- Florida Institute of Technology, Department of Biological Sciences, Melbourne, FL, USA, January 2008.
- University of Central Florida, Department of Biology, Orlando, FL, USA, January 2008.
- University of Nevada, Department of Natural Resources & Environmental Science, Reno, NV, USA, November 2007.
- University of Florida, Department of Zoology, Gainesville, FL, USA, January 2007.
- University of Central Florida, Department of Biology, Orlando, FL, USA, September 2000.
- California State University, Department of Biological Sciences, Hayward, CA, USA, March 2000.
- University of Idaho, Department of Fish & Wildlife Resources, Moscow, ID, USA, February 1999.
- Lewis-Clark State College, Division of Natural Sciences, Lewiston, ID, USA, February 1999.
- York University, Department of Biology, Toronto, ON, Canada, April 1998.

**Presentations at Professional Meetings** (\*student presenter)

- Choy\* ES, Loseto LL, Roth JD. 2015. Investigating the energetic consequences of prey shifts to Beaufort Sea beluga whales. Arctic Science Summit Week, Toyama, Japan.
- Ewacha\* M, Roth JD, Anderson WG, Brannen D, Dupont D. 2015. Human disturbance affects the stress response of boreal woodland caribou and wolves in eastern Manitoba. Prairie University Biological Symposium, Winnipeg, MB, Canada.
- Mocker\* DM, Roth JD. 2015. Hungry like the wolf: diet reconstruction of wolves following a rapid decline in Manitoba moose populations. Prairie University Biological Symposium, Winnipeg, MB, Canada.
- Gharajehdaghpour\* T, Roth JD, Markham J. 2015. Ecosystem engineering by arctic foxes: Effects on soil nutrient dynamics and benefits to herbivores. Prairie University Biological Symposium, Winnipeg, MB, Canada.

- Choy\* ES, Loseto LL, Roth JD. 2014. Examining the diet and diving physiology of Beaufort Sea beluga whales. Arctic Change 2014 Conference, Ottawa, ON, Canada.
- Choy\* ES, Loseto LL, Roth JD. 2014. Identifying the diet and physical condition of the Beaufort Sea belugas using fatty acid signatures. Arctic in Rapid Transition Workshop, Plouzane, France.
- Mocker\* DM, Roth JD. 2014. Implications of wolf predation on moose: diet reconstruction of wolves in an area where moose have declined. Parks and Protected Areas Research Forum of Manitoba, Winnipeg, MB, Canada.
- Ewacha\* M, Roth JD, Anderson WG, Brannen D, Dupont D. 2014. Stress response of caribou to industrial activity in eastern Manitoba. Parks and Protected Areas Research Forum of Manitoba, Winnipeg, MB, Canada.
- Gharajehdaghpour\* T, Roth JD, Markham J. 2014. Arctic foxes as ecosystem engineers: Estimating the benefits of fox dens to plants and herbivores. Parks and Protected Areas Research Forum of Manitoba, Winnipeg, MB, Canada.
- Fafard\* P, Roth JD, Markham J. 2014. Do arctic foxes act as ecosystem engineers in the Canadian subarctic? Parks and Protected Areas Research Forum of Manitoba, Winnipeg, MB, Canada.
- Eby\* A, Friesen OC, Roth JD. 2014. Temporal comparisons of diet overlap and diet variability between arctic foxes and red foxes in the subarctic. Parks and Protected Areas Research Forum of Manitoba, Winnipeg, MB, Canada.
- Nagy\* AM, Roth JD, Sallows TA. 2014. Effects of elk management on wolf diets in Riding Mountain National Park. Parks and Protected Areas Research Forum of Manitoba, Winnipeg, MB, Canada.
- Roth JD, McDonald RM, Friesen OC. 2014. Stress and parasites related to diet in arctic fox. Wapusk National Park Research & Monitoring Symposium, Winnipeg, MB, Canada.
- Roth JD, Friesen OC, McDonald RM. 2013. Variability in stress, parasites, and diet in arctic fox. International Conference in Arctic Fox Biology, Westfjords of Iceland.
- Choy\* ES, Loseto LL, Roth JD. 2013. Identifying the diet and physical condition of the Beaufort Sea belugas using fatty acid signatures. ArcticNet Annual Scientific Meeting, Halifax, NS, Canada.
- Coulson\* AV, Roth JD, Brook RK. 2013. Does diet overlap contribute to the spread of chronic wasting disease? Ecological Society of America Annual Meeting, Minneapolis, MN, USA.
- Szumski\* CM, Roth JD, Gau RJ, Murray DL. 2013. Dietary niche expansion and recruitment of a specialist carnivore through a flux in preferred prey availability. Ecological Society of America Annual Meeting, Minneapolis, MN, USA.
- Ewacha\* M, Roth JD, Brook RK. 2013. Vegetative structure and composition determine snowshoe hare activity at tree line. Ecological Society of America Annual Meeting, Minneapolis, MN, USA.
- Friesen\* OC, Roth JD. 2013. Intraspecific variation in diet and behavior affects parasite loads in arctic fox. Ecological Society of America Annual Meeting, Minneapolis, MN, USA.
- Mocker\* DM, Friesen OC, Roth JD. 2013. Mapping wolf diet and parasites across Manitoba, Canada. Ecological Society of America Annual Meeting, Minneapolis, MN, USA.
- Szumski\* CM, Roth JD, Murray DL, Gau RJ. 2013. Demographic variability of lynx diet in a single northern population over time. Prairie University Biological Symposium, Winnipeg, MB, Canada.
- Ewacha\* M, Waterman JM, Roth JD. 2013. The Cape ground squirrel as an ecosystem engineer: creating habitat for small mammal, invertebrate, and plant communities. Prairie University Biological Symposium, Winnipeg, MB, Canada.
- Friesen\* OC, Roth JD. 2013. Age and sex differences in the helminth community of the arctic fox. Prairie University Biological Symposium, Winnipeg, MB, Canada.
- McDonald\* RM, Roth JD, Anderson WG. 2013. Cortisol production in arctic foxes related to food

- availability. Prairie University Biological Symposium, Winnipeg, MB, Canada.
- Trana\* MR, Ferguson S, Roth JD, Anderson GW, Tomy GT, Fisk AT. 2013. Increased cortisol concentrations in beluga whale blubber over time. Prairie University Biological Symposium, Winnipeg, MB, Canada.
- Coulson\* AV, Roth JD, Brook RK. 2013. Diet overlap between elk and white-tailed deer. Prairie University Biological Symposium, Winnipeg, MB, Canada.
- Ceriani\* SA, Roth JD, Weishampel JF, Evans D, Ehrhart LM. 2013. Rotten luck: using non-viable loggerhead eggs to infer feeding grounds along Florida's east coast. 33<sup>rd</sup> Annual Symposium on Sea Turtle Biology and Conservation, Baltimore, MD, USA.
- Trana\* MR, Ferguson S, Roth JD, Anderson GW, Tomy GT, Fisk AT. 2013. Increased cortisol concentrations in beluga whales from the Canadian Arctic. Manitoba Chapter of The Wildlife Society, Riding Mountain National Park, MB, Canada
- Friesen\* OC, Roth JD. 2013. Parasite infections in sympatric arctic and red foxes: implications of dietary overlap, behaviour, and climate change. Parks and Protected Areas Research Forum of Manitoba, Winnipeg, MB, Canada.
- McDonald\* RM, Roth JD, Anderson WG. 2013. Stored food resources do not always mitigate the environmental challenges facing arctic foxes. Parks and Protected Areas Research Forum of Manitoba, Winnipeg, MB, Canada.
- Trana\* MR, Ferguson S, Roth JD, Anderson GW, Tomy GT, Fisk AT. 2012. Temporal and special trends of cortisol in beluga whales from the Canadian Arctic. ArcticNet Annual Scientific Meeting, Vancouver, BC, Canada.
- Choy\* ES, Loseto LL, Roth JD. 2012. The offshore diet of the Beaufort Sea beluga population and the energetic effects of climate change. ArcticNet Annual Scientific Meeting, Vancouver, BC, Canada.
- Choy\* ES, Loseto LL, Roth JD. 2012. The offshore diet of the Beaufort Sea beluga population and the energetic effects of climate change. Arctic in Rapid Transition, Sopot, Poland.
- Friesen\* OC, Coulson AV, Roth JD. 2012. Spatial and temporal variation in gray wolf diets in regions of moose declines in southern Manitoba. International Wolf and Carnivore Conference, Thompson, MB, Canada.
- Friesen\* OC, Roth JD. 2012. Relationship between diet and endoparasites in gray wolves of eastern Manitoba. International Wolf and Carnivore Conference, Thompson, MB, Canada.
- Ceriani\* SA, Roth JD, Weishampel JF, Evans DR, Haas HL, Smolowitz RJ, Addison DS, Bagley DA, Ehrhart LM. 2012. Satellite telemetry and stable isotopes: building isoscapes for loggerhead sea turtles in the Northwest Atlantic Ocean. International Conference on Applications of Stable Isotope Techniques to Ecological Studies, Brest, France.
- Moayeri\* M, Baydack R, Roth J. 2012. Annual wolf diet in northern Manitoba and the potential impacts upon woodland caribou. The Wildlife Society Annual Conference, Portland, OR, USA.
- Friesen\* OC, Roth JD. 2012. Parasite diversity and intensity in sympatric arctic and red fox: implications of Arctic climate change. Ecological Society of America Annual Meeting, Portland, OR, USA.
- Makenbach\* SA, Waterman JM, Roth JD. 2012. Let's stay together: enhanced predator avoidance in interspecific association between yellow mongooses and Cape ground squirrels. Animal Behavior Society Annual Meeting, Albuquerque, NM, USA.
- Ceriani\* SA, Roth JD, Weishampel JF, Evans D, Haas HL, Smolowitz RJ, Addison DS, Bagley DA, Ehrhart LM. 2012. Development of isoscapes for sub-adult and adult Northwest Atlantic-dwelling loggerheads. Southeast Regional Sea Turtle Meeting, Jekyll Island, GA, USA.



- Chapman\* JM, Debets CD, Makenbach SA, Roth JD, Brook RK. 2012. High and dry: hummock tundra use by small mammals in Wapusk National Park. Parks and Protected Areas Research Forum of Manitoba, Winnipeg, MB, Canada.
- Ceriani\* SA, Roth JD, Evans D, Ehrhart LM. 2011. Satellite telemetry and stable isotopes: a tool to investigate migratory connectivity in loggerhead turtles. 4<sup>th</sup> Mediterranean Conference on Marine Turtles, Naples, Italy.
- Roth JD, Murray DL. 2011. Understanding large-scale connectivity and sustainability of Canada lynx populations. Fur Institute of Canada Annual Meeting, Winnipeg, MB, Canada.
- Trana\* MR, Ferguson S, Roth JD, Tomy G. 2011. Temporal patterns in beluga whale diet. Society for Marine Mammalogy Conference, Tampa, FL, USA.
- Trana\* MR, Roth JD, Ferguson S, Tomy G. 2011. Assessing chronic stress in beluga whale stocks with changes in predation risk and diet. Canadian Section of The Wildlife Society Annual Meeting, Thunder Bay, ON, Canada.
- Ceriani\* SA, Roth JD, Evans D & Ehrhart LM. 2011. Satellite tracking confirms the use of stable isotopes to infer foraging grounds of loggerhead turtles (*Caretta caretta*) nesting on Florida's east coast. 31<sup>st</sup> Annual Symposium on Sea Turtle Biology and Conservation, San Diego, CA, USA.
- McDonald\* RM, Roth JD. 2011. The stress response of arctic foxes to fluctuations in food availability. Canadian Society for Ecology & Evolution Annual Meeting, Banff, AB, Canada.
- Friesen\* O, Roth JD. 2011. Ecology of parasites in arctic fox: implications of climate change. Canadian Society for Ecology & Evolution Annual Meeting, Banff, AB, Canada.
- Trana\* MR, Roth JD, Ferguson S. 2011. Comparing chronic stress in beluga whale stocks of the Canadian arctic. Canadian Society for Ecology & Evolution Annual Meeting, Banff, AB, Canada.
- McDonald\* RM, Roth JD. 2011. The impact of summer food subsidies on Arctic food web dynamics. Prairie University Biological Symposium, Saskatoon, SK, Canada.
- Friesen\* O, Roth JD. 2011. Ecology of parasites in arctic (*Vulpes lagopus*) and red fox (*Vulpes vulpes*): parasite community and diet reconstruction from fecal samples. Prairie University Biological Symposium, Saskatoon, SK, Canada.
- Trana\* MR, Roth JD, Ferguson S. 2011. Effects of stress hormones on beluga whale (*Delphinapterus leucas*) populations of the Canadian arctic. Prairie University Biological Symposium, Saskatoon, SK, Canada.
- Roth JD. 2011. Spatial subsidies and indirect effects in subarctic food webs: do seals affect lemmings? Churchill Northern Studies Centre and Parks Canada Science Symposium, Winnipeg, MB, Canada.
- Roth JD, Brown JR, Barton, BT. 2010. Facilitated predation between intraguild predators: implications for marine turtle nests. Ecological Society of America Annual Meeting, Pittsburgh, PA, USA.
- Ceriani\* SA, Roth JD, Ehrhart LM. 2010. Foraging ecology of nesting loggerhead turtles (*C. caretta*): a preliminary study using stable isotope analysis. Benthic Ecology Meeting, Wilmington, NC, USA.
- Gordon\* MJ, Roth JD, Hoffman EA. 2009. Measuring variation in the diet of the Lower Keys marsh rabbit. Southeastern Ecology & Evolution Conference, Gainesville, FL, USA.
- Korosy\* MG, Roth JD, Noss RF. 2008. Winter diets of ground-foraging sparrows in Florida dry prairie. American Ornithologists Union Annual Meeting, Portland, OR, USA.
- Kaapehi\* CM, Roth JD, Waterman JM, Bird TL. 2008. Cape ground squirrels (*Xerus inauris*) influence on invertebrate biodiversity. International Entomology Conference, Durban, South Africa.
- Roth JD, Murray DL, Steury TD. 2007. Spatial dynamics of sympatric canids: modeling the impact of coyotes on red wolf recovery. Society for Conservation Biology Annual Meeting, Port Elizabeth,

South Africa.

- Waterman JM, Roth JD, Kaapehi, C. 2007. The impact of Cape ground squirrels on desert communities in Namibia. Society for Conservation Biology Annual Meeting, Port Elizabeth, South Africa.
- Brown\* JR, Barton BT, Roth JD. 2007. Raccoons (*Procyon lotor*), ghost crabs (*Ocypode quadrata*) and marine turtle egg survival: the nuances of intraguild predation. Southeastern Ecology & Evolution Conference, Orlando, FL, USA.
- Hillegass\* M, Waterman JM, Roth JD. 2007. Cape ground squirrels (*Xerus inauris*) and their parasites: is sociality a benefit? Southeastern Ecology & Evolution Conference, Orlando, FL, USA.
- Anderson\* CJR, da Vitoria Lobo N, Roth JD, Waterman JM. 2007. Facial profiling of polar bears: an automated approach. Southeastern Ecology & Evolution Conference, Orlando, FL.
- Roth JD, Wiesel I. 2006. Brown hyenas as nutrient transport vectors in the Namib desert: implications for biodiversity. Ecological Society of America Annual Meeting, Memphis, TN, USA.
- Keserauskis\* MM, Roth JD, Stout IJ. 2006. Dietary overlap among small mammals in coastal habitats in central Florida. Ecological Society of America Annual Meeting, Memphis, TN, USA.
- Anderson\* CJ, Waterman JM, Roth JD. 2006. High complexity of whisker spot patterns of polar bears permits noninvasive individual identification. Ecological Society of America Annual Meeting, Memphis, TN, USA.
- Waterman JM, Hillegass M, Roth JD. 2006. Parasites impact reproductive success in a social African ground squirrel. Animal Behavior Society Annual Meeting, Snowbird, UT, USA.
- Stout IJ, DeLong A, Suazo A, Keserauskis M, Degner J, Gillespie K, Quintana-Ascencio P, Roth JD, Parkinson CL. 2006. Population dynamics, habitat use, and trophic relations of the southeastern beach mouse in a complex coastal setting. Society for Conservation Biology Annual Meeting, San Jose, CA, USA.
- Anderson\* CJ, Waterman JM, Roth JD. 2006. Photo-identification of individual polar bears by whisker spot pattern variation. Southeastern Ecology & Evolution Conference, Tuscaloosa, AB, USA.
- Roth JD, Wiesel I, Drea CM. 2006. Variation in seal consumption by brown hyenas in the Namib desert estimated using stable isotopes. Society for Integrative and Comparative Biology Annual Meeting, Orlando, FL, USA.
- Barton\* BT, Roth JD. 2006. Sea turtle nest predators: implications for community ecology. Society for Integrative and Comparative Biology Annual Meeting, Orlando, FL, USA.
- Anderson\* CJ, Waterman JM, Roth JD. 2006. Non-invasive identification of individual polar bears by whisker spot patterns. Society for Integrative and Comparative Biology Annual Meeting, Orlando, FL, USA.
- Keserauskis\* MM, Stout IJ, Roth JD. 2005. The difference in dietary composition of *Peromyscus polionotus niveiventris* between two habitat types. Ecological Society of America Annual Meeting, Montreal, QC, Canada.
- Suazo\* A, Stout IJ, Fauth J, Roth JD. 2005. Populations of threatened southeastern beach mouse (*Peromyscus polionotus niveiventris*) in a managed landscape. Ecological Society of America Annual Meeting, Montreal, QC, Canada.
- DeLong\* AT, Suazo AA, Keserauskis MM, Degner JF, Quintana-Ascencio P, Roth JD, Parkinson CL, Stout IJ. 2005. Multiple approaches to understanding the dynamics of a small mammal in habitats shaped by fire, salinity and hurricanes. Ecological Society of America Annual Meeting, Montreal, QC, Canada.
- Keserauskis\* MM, Stout IJ, Roth JD. 2005. Life on the dunes: What does *Peromyscus polionotus niveiventris* eat? Florida Academy of Sciences, Tampa, FL, USA.

- Barton\* BT, Roth JD. 2005. Cascading effects of predator removal on sea turtle nesting beach communities. Southeastern Ecology & Evolution Conference, Athens, GA, USA.
- Keserauskis\* MM, Stout IJ, Roth JD. 2005. *Peromyscus polionotus niveiventris*= diet: the plant component. Southeastern Ecology & Evolution Conference, Athens, GA, USA.
- Barton\* BT, Roth JD. 2005. The effects of intraguild predation on community structure and sea turtle conservation. 4<sup>th</sup> Biennial Mosquito Lagoon Conference, Cocoa Beach, FL, USA.
- Degner\* J, Stout IJ, Roth JD, Parkinson CL. 2005. Population genetics of the southeastern beach mouse at Cape Canaveral Air Force Station. 4<sup>th</sup> Biennial Mosquito Lagoon Conference, Cocoa Beach, FL, USA.
- Eckhardt\* G, Waterman JM, Roth JD. 2004. Effects of vehicle approaches on polar bear behavior in Churchill, Manitoba. Florida Academy of Sciences, Orlando, FL, USA.
- Plog\* LB, Weishampel JF, Roth JD. 2004. Sea turtle nutrient inputs to dune vegetation: a stable isotope analysis. Florida Academy of Sciences, Orlando, FL, USA.
- Barton\* B, Roth JD. 2004. Population demographic consequences of raccoon removals on sea turtle nesting beaches. Florida Academy of Sciences, Orlando, FL, USA.
- Laible\* J, Waterman JM, Roth JD, Eckhardt G. 2004. Body size estimation in polar bears. Florida Academy of Sciences, Orlando, FL, USA.
- Eckhardt\* GH, Waterman JM, Roth JD. 2004. The effects of tourist vehicles on the behavior of polar bears near Churchill, Manitoba. Southeastern Ecology & Evolution Conference, Atlanta, GA, USA.
- Eckhardt\* GH, Waterman JM, Roth JD. 2004. The effects of ecotourism on the polar bears of Churchill, Manitoba. International Polar Bear Husbandry Conference, San Diego, CA, USA.
- Plog\* LB, Weishampel JF, Roth JD, Ehrhart LM. 2003. Nutrient flow from sea turtle nests to dune vegetation. Ecological Society of America Annual Meeting, Savannah, GA, USA.
- Eckhardt\* GH, Waterman JM, Roth JD. 2003. The functional significance of male-male interaction in polar bears: does size matter? Florida Academy of Sciences, Orlando, FL, USA.
- Plog\* LB, Weishampel JF, Roth JD, Ehrhart LM. 2003. Sea turtle nesting nutrient inputs to dune vegetation: a stable isotope analysis. 23<sup>rd</sup> Annual Symposium on Sea Turtle Biology and Conservation, Kuala Lumpur, Malaysia.
- Eckhardt\* GH, Waterman JM, Roth JD. 2003. The functional significance of play fighting in polar bears: are they asocial? Society for Integrative and Comparative Biology Annual Meeting, Toronto, ON, USA.
- Roth JD. 2001. Indirect effects between ecosystems: does seal carrion affect terrestrial prey of arctic foxes? International Theriological Congress, Sun City, South Africa.
- Roth JD, Abrams PA. 1999. The effect of spatial subsidies on predator-prey cycles. Ecological Society of America Annual Meeting, Spokane, WA, USA.
- Roth JD, Hobson KA. 1999. Stable-carbon and nitrogen isotopic fractionation between diet and tissue of captive red fox: implications for dietary reconstruction. American Society of Mammalogists Annual Meeting, Seattle, WA, USA.
- Roth JD. 1998. The significance of marine subsidies to a cyclic population of arctic foxes; insights from stable carbon isotopes. Ecological Society of America Annual Meeting, Baltimore, MD, USA.
- Waterman JM, Roth JD. 1998. Mobbing in Cape ground squirrels; response to snakes near the burrow site. Animal Behavior Society Annual Meeting, Carbondale, IL, USA.
- Roth JD. 1998. The importance of marine food sources to a cyclic population of arctic foxes. International Conference on Applications of Stable Isotope Techniques to Ecological Studies, Saskatoon, SK,

Canada.

Roth JD. 1997. Annual variation in marine food intake and its effect on a cycling population of arctic foxes (*Alopex lagopus*). American Society of Mammalogists Annual Meeting, Stillwater, OK, USA.

Roth JD. 1996. Scavenging in arctic foxes (*Alopex lagopus*) revealed by stable-carbon isotope analysis. American Society of Mammalogists Annual Meeting, Grand Forks, ND, USA.

## **FUNDING** (PIs other than me in **bold**)

### **Research Grants**

Arctic Bay killer whale tagging, biopsy, and monitoring. 2015-16. World Wildlife Fund Canada. \$20,000

Estimating marine inputs to a detritus-based food web in the Namib Desert. 2015-16. University of Manitoba University Research Grants Program. \$7,500

Eastern Canadian Arctic killer whale tagging, biopsy, and monitoring. 2013-2016. Aboriginal Affairs and Northern Development Canada, Nunavut General Monitoring Plan. \$122,100

Dietary reconstruction of Manitoba wolves: Implication for moose declines. 2012-2015. Manitoba Conservation. \$50,000

Indirect effects in arctic food webs. 2012-2015. University of Manitoba Field Work Support Program. \$27,880.

Wolf diet reconstruction: implication for moose declines in Manitoba. 2012. University of Manitoba University Research Grants Program. \$7,500

Indirect effects of predator interactions and alternative prey in food webs. 2011-2017. Natural Sciences and Engineering Research Council of Canada, Discovery Grant. \$130,000

Stable isotope sample preparation and acquisition for applications in ecology and conservation. 2011-2012. Canada Foundation for Innovation. \$203,000

Development of models predicting large-scale connectivity and sustainability of Canada lynx populations (with **D Murray**, P Wilson, J Bowman). 2011-2014. Natural Sciences and Engineering Research Council of Canada, Strategic Project Grant. \$560,750

Integrating resource selection, movement and group size models to predict and communicate chronic wasting disease risk for elk with co-occurring white-tailed deer (with **R Brook**, T Bollinger, P Paquet, D Clark, P McLoughlin, P Farnese). 2011-2012. PrioNet Canada. \$300,000

Monitoring arctic fox populations in Wapusk National Park through den surveys. 2011-2015. Parks Canada. \$27,000

Determining stable carbon and nitrogen isotope discrimination and turnover rates in captive sub-adult and adult loggerhead turtles (*Caretta caretta*) (with **L Ehrhart**, S Ceriani). 2011. Florida Sea Turtle Grants Program. \$11,489

Discovering new migratory pathways and the relationship between feeding ecology and reproductive output in loggerhead turtles nesting at the Archie Carr National Wildlife Refuge (with **L Ehrhart**, S Ceriani). 2011. Florida Sea Turtle Grants Program. \$29,895

Comparing chronic stress among Canadian beluga whale populations (with **S Ferguson**). 2011-2012. Kenneth M. Molson Foundation. \$40,000

Spatial subsidies and indirect effects in subarctic food webs. 2010-2011. Natural Sciences and Engineering Research Council of Canada, Discovery Grant. \$25,000

Variability in isotopic signatures of ringed seals in western Hudson Bay in relation to climate change. 2010. University of Manitoba University Research Grants Program. \$7,500

- Stable isotope analysis of Lower Keys marsh rabbits (with E Hoffman). 2008-2009. U.S. Fish & Wildlife Service. \$1,400
- Polar bear research (with **J Waterman**). 2003-2009. The Cotswold Foundation. \$90,000
- Measuring sea turtle nest predator distribution and abundance at Canaveral National Seashore. 2007-2008. National Park Service. \$24,000
- Effects of natural and human-influenced environmental variation on raccoons, ghost crabs, and marine turtle egg predation at Canaveral National Seashore (with J Brown). 2007-2008. Boardman Foundation. \$5,000
- A range-wide evaluation of the impact of hurricane activity in 2004 on the status of the southeastern beach mouse (with **IJ Stout**, CL Parkinson). 2005-2008. U.S. Fish & Wildlife Service. \$163,741
- The distribution and abundance of the southeastern beach mouse (*Peromyscus polionotus niveiventris*) on the Cape Canaveral air force station (with **IJ Stout**, CL Parkinson). 2003-2006. Patrick Air Force Base. \$379,803
- Non-invasive identification of polar bears (with **J Waterman**). 2006. Polar Bears International. \$2560
- Effect of ecotourism on the behavior, use of space and energetics of polar bears near Churchill, Manitoba (with **J Waterman**). 2003-2006. Polar Bears International. \$16,800
- The social complexities of an asocial species: play in adult polar bears, *Ursus maritimus* (with **J Waterman**). 2001-2006. Earthwatch Institute, Center for Field Research. \$286,635
- Acquisition of an IRMS for applications in anthropology, ecology and conservation biology (with T Dupras, J Waterman, A Chase, D Chase, G Worthy). 2001-2004. National Science Foundation Major Research Instrumentation Program; University of Central Florida Presidential Initiative to fund Major Research Equipment. \$241,180
- Measuring allochthonous inputs and their effects on Namib Desert food webs. 2003. National Science Foundation Planning Grant. \$4,265
- Stable-isotope changes between diet and tissue of captive rodents: implications for dietary reconstruction in wildlife (with J Waterman). 2001-2002. University of Central Florida In-house Research Grant. \$7,500
- Dietary reconstruction for southern lynx: Implications for conservation and population recovery (with D Murray). 2000. Idaho Department of Fish and Game Non-game Wildlife Program. \$4,000
- The role of marine resources in arctic fox population dynamics; insights from stable isotopes. 1994-1997. Sigma Xi Grants-in-Aid of Research; Canadian Studies Graduate Fellowship; American Museum of Natural History Theodore Roosevelt Memorial Fund; American Society of Mammalogists Grant-in-Aid of Research; Churchill Northern Studies Centre Northern Research Grant; University of Minnesota (Dayton and Wilkie Natural History Fellowships, Ecology Summer Fellowship, Doctoral Dissertation Special Grant, Doctoral Dissertation Fellowship Special Grant, Grant for Research Abroad). \$21,289

### **Grants for Teaching and Service**

- Polar bears and permafrost at the edge of the Arctic: student-led climate change field research in the Greater Wapusk Ecosystem (with R Brook, J Waterman). 2014-2017. Natural Sciences and Engineering Research Council of Canada, PromoScience Program. \$133,500
- Arctic field ecology in the Greater Wapusk Ecosystem. 2014-2015. University of Manitoba Field Work Support Program. \$11,570.

### **TEACHING**

**Courses - Primary Instructor**

University of Manitoba (2010-present)

*Arctic Field Ecology* (2 summers)

*Boreal Ecology* (5 semesters)

*Methods of Data Collection & Analysis in Ecology* (4 semesters)

University of Idaho (1999-2000)

*Fish & Wildlife Ecology, Management, & Conservation* (2 semesters)

*Wildlife Ecology I* (Lecture and Lab)

Lewis-Clark State College (1999)

*Introduction to Natural Sciences*

**Courses - Teaching Assistant**

Ontario Federation of Field Courses (1998)

*Ecology & Behaviour of Small Mammals*

University of Minnesota (1992-1995)

*Introductory Biology, Zoology, Evolution, Ecology, Animal Behavior, Decision Analysis and Modeling for Conservation Biology, Genetic Variation in Human Populations*

**Graduate Students Advised** (Committee chair: 2 PhD, 14 MSc)

Christa Szumski, PhD. (*in progress*) Diet specialization and dietary niche expansion of Canada lynx.

University of Manitoba (co-advised with D Murray).

Emily Choy, PhD. (*in progress*) Diet variation of Beaufort Sea beluga whales and the potential effects of climate change. University of Manitoba (co-advised with L Loseto).

Jackie Verstege, MSc. (*in progress*) Snow conditions on fox dens providing a winter refuge for lemmings. University of Manitoba.

Kyle Ritchie, MSc. (*in progress*) Population genetics of ringed seals in Hudson Bay. University of Manitoba (co-advised with S Petersen).

Michelle Ewacha, MSc. (*in progress*) Effects of industrial activity on stress and diet of caribou, moose, and wolves in Manitoba. University of Manitoba.

Tazarve Gharajehdaghypour, MSc. (*in progress*) Arctic foxes as ecosystem engineers: estimating the benefits of fox dens to plants and herbivores. University of Manitoba.

Laura Murray, MSc. (*in progress*) Effects of nanosilver on fish bioenergetics. University of Manitoba (co-advised with M Rennie).

Danielle Mocker, MSc. 2015. Diet reconstruction of wolves following a decline in Manitoba moose populations. University of Manitoba.

Andrew Coulson, MSc. 2014. Agricultural feeding affects isotopic niche breadth in elk and white-tailed deer. University of Manitoba.

Marci Trana, MSc. 2014. Variation in blubber cortisol as a measure of stress in beluga whales of the Canadian Arctic. University of Manitoba.

Ryan McDonald, MSc. 2013. Impact of prey availability and diet on stress in arctic foxes. University of Manitoba.

Olwyn Friesen, MSc. 2013. Ecology of parasites in northern Canids: implications of arctic climate change. University of Manitoba.

Justin Brown, MS. 2009. Factors affecting marine turtle egg predation by raccoons and ghost crabs on

Canaveral National Seashore. University of Central Florida (co-advised with J Waterman).

Carlos Anderson, MS. 2007. Individual identification of polar bears by whisker spot patterns. University of Central Florida (co-advised with J Waterman).

Brandon Barton, MS. 2005. Cascading effects of predator removal on the ecology of sea turtle nesting beaches. University of Central Florida.

Laura Plog, MS. 2004. Sea turtle nutrient input to dune vegetation: a stable isotope analysis. University of Central Florida (co-advised with J Weishampel).

### **Graduate Student Advisory Committees (10 PhD, 28 MSc)**

*PhD*: Paloma Carvalho (*in progress*), Kristin Westdal (*in progress*), Mohanad Zraik (*in progress*), Chris Deduke (2015), Cortney Watt (2014), Simona Ceriani (2014), Marianne Korosy (2013), Mary Beth Manjerovic (2010), Briana Witteveen (2008), Ingrid Wiesel (2006)

*MSc*: Randi Anderson (*in progress*), Jennifer Doering (*in progress*), Darcy McNicholl (*in progress*), Kathy Murray (*in progress*), Kevin Crook (2015), Emily Maxner (2014), Alexandra Grossi (2013), Nadine Price (2013), Michelle Moayeri (2013), Andrew Olynyk (2013), Brent Young (2013), Daigo Kamada (2012), Matthew Gordon (2010), Tamara Marshall (2010), Kathryn Simmons (2009), Melissa Hillegass (2007), Megan Keserauskis (2007), Christy Alves (2007), Alex Suazo (2006), Heather Skowron (2006), Gillian Eckhardt (2005), Kelly Brock (2005), Laura Craig (2005), Krisann Kosel (2005), Keith Clanton (2004), Kim Hefty (2003), Barbara Fields (2003), Charles Cowden (2002)

## **SERVICE**

### **Awards**

University of Manitoba Annual Outreach Award, November 2014

### **Professional Activities**

*Subject Editor*: Oikos, a Journal of Ecology

*Board Member*: Churchill Northern Studies Centre Board of Directors

*Journal Reviewer*: American Midland Naturalist, Behavioral Ecology, Biological Journal of the Linnean Society, Canadian Journal of Zoology, Current Zoology, Ecology, Journal of Animal Ecology, Journal of Mammalogy, Journal of Zoology, Mammalian Species, Mathematical Biosciences, Marine Biology, Naturwissenschaften, Northwest Science, PLoS One, Polar Biology, Polar Research, Scientia Agricola, Wildlife Society Bulletin

*Grant Reviewer*: Delta Waterfowl Foundation, U.S. Environmental Protection Agency, U.S. National Science Foundation, National Research Foundation of South Africa, Research Council of Norway, Swedish Research Council Formas

*Protocol Reviewer*: Assiniboine Park Zoo Research and Ethics Review Committee, University of Manitoba Research Ethics and Compliance Office

*Society Member*: American Society of Mammalogists, Ecological Society of America, Sigma Xi, Society for Conservation Biology, The Wildlife Society

*Departmental Service*: Ecology and Environmental Biology theme chair, Committee on Adjunct Professors (chair), Graduate Studies Committee, Seminars Committee, Barrett-Hamilton Lecture Committee (faculty advisor)

**Public Recognition of Research** (popular news articles featuring my research)

*Arctic foxes suffer while reds thrive in northern Canada* by Michelle Warwicker, BBC Nature, January 4, 2013. <http://www.bbc.co.uk/nature/20892310>

*Scientists solicit photos of polar bears in wild* by Jennifer Viegas, MSNBC News, November 17, 2008. <http://www.msnbc.msn.com/id/27773811>

*NASA Tool Helps Track Whale Sharks, Polar Bears* by John Roach, National Geographic News, August 25, 2008. [http://news.nationalgeographic.com/news/2008/08/080825-whale-sharks-missions\\_2.html](http://news.nationalgeographic.com/news/2008/08/080825-whale-sharks-missions_2.html)

*Student's research finds raccoons getting bad rap* by Patrick Peterson, Florida Today, March 19, 2006.

*Crab, raccoon play tag team against turtle* by Elizabeth Pennisi, Science, January 20, 2006. <http://www.sciencemag.org/content/311/5759/331.2>

*Seasons of the Snow Fox* by John Eliot and Norbert Rosing, National Geographic, October 2004. <http://ngm.nationalgeographic.com/ngm/0410/feature4/>

*Lawrence native working to determine why polar bears play* by Terry Rombeck, Lawrence Journal World, February 2, 2004. [http://www2.ljworld.com/news/2004/feb/02/lawrence\\_native\\_working/](http://www2.ljworld.com/news/2004/feb/02/lawrence_native_working/)

*Built for the Arctic: A Species' Splendid Adaptations* by Natalie Angier, The New York Times, January 27, 2004. <http://www.nytimes.com/2004/01/27/science/built-for-the-arctic-a-species-splendid-adaptations.html>

*Surf and turf* by Stephan Reeb, Natural History vol. 111, December 2002. <http://www.highbeam.com/doc/1P3-272482111.html>



## Dana Frances Schroeder

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### Education

- Ph. D. August, 1998      University of Calgary, Calgary, AB.  
Biochemistry & Molecular Biology, Faculty of Medicine
- B. Sc. May, 1991      Simon Fraser University, Burnaby, B.C.  
Biochemistry major, Co-op Education program

### Employment

- July 2011  
-present      Associate Professor  
University of Manitoba, Biological Sciences Dept, Winnipeg, MB  
DDB1 Complexes in *Arabidopsis* Visible and UV Light Response
- October 2002  
-June 2011      Assistant Professor  
University of Manitoba, Botany/Biological Sciences Dept, Winnipeg, MB  
DDB1 Complexes in *Arabidopsis* Visible and UV Light Response
- November 1998  
-September 2002      Postdoctoral Fellow      Supervisor: J. Chory  
The Salk Institute, Plant Biology Laboratory, La Jolla, CA  
Regulation of *Arabidopsis* light-response by DET1
- September 1992  
-November 1998      Doctoral Student      Supervisor: J.D. McGhee  
University of Calgary, Biochemistry & Molecular Biology Dept, Calgary, AB  
Regulation of *ges-1* expression in the *Caenorhabditis elegans* digestive tract
- May-December, 1991  
May-August, 1990      Lab Assistant      Supervisor: B.P. Kennedy  
Mol Biology Dept, Merck Frosst Centre for Therapeutic Research, Kirkland, PQ  
Characterization of promoter of 5-lipoxygenase activating protein gene
- May-August, 1989      Summer Student      Supervisor: A. Mulchandani  
National Research Council of Canada, Biotech Research Institute, Montreal, PQ  
Extension of a nucleotide degradation biosensor for seafood freshness
- May-August, 1988      Summer Student      Supervisor: K.K. Kartha  
National Research Council of Canada, Plant Biotech Institute, Saskatoon, Sask  
Tissue culture of haploid wheat; development of electrophoretic techniques for  
analysis of somaclonal variants
- January-April, 1988  
Ont      Co-op Student      Supervisor: M. Cygler  
National Research Council of Canada, Division Biological Sciences, Ottawa,  
Refinement of x-ray crystal structure of antibody HED10 Fab fragment
- May-August, 1987      Summer Student      Supervisor: J.H. Borden  
Simon Fraser University, Biological Sciences Dept, Burnaby, BC

Investigation of adventitious root promotion by the willow, *Salix scouleriana*

**Funding & Awards**

*Grants*

2014-2018	Schroeder DF (Principal Investigator) Elongin C complexes in <i>Arabidopsis</i> development and DNA repair. NSERC (Discovery) \$130,000
2013	Schroeder DF (Principal Investigator) Investigation of the role of RAE1-DDB1 complexes in <i>Arabidopsis</i> heat tolerance. University of Manitoba Research Grants Program \$7440
2013	Schroeder DF (Principal Investigator) University of Manitoba Department of Biological Sciences Bridge funding \$5000
2008-2012	Schroeder DF (Principal Investigator) DDB1 Complexes in <i>Arabidopsis</i> Visible and UV Light Response. NSERC (Discovery) \$170,900
2007-2010	Schroeder DF (Principal Investigator) Dissection of Plant Light Response. Canadian Foundation for Innovation (Infrastructure Operating Fund) \$25,188
2005	Valdimarsson G, DeKievit T, Huebner E, Schroeder D (co-investigator), Stasolla C, Whyard S. 3-D fluorescence imaging system. NSERC (Research Tools & Instruments) \$149,112
2005	Renault S, Piercey-Normore M, Schroeder D (co-investigator) Supraspeed Centrifuge. NSERC (Research Tools & Instruments) \$75,837
2004	Schroeder DF (Principal Investigator) Dissection of Plant Light Response. Canadian Foundation for Innovation (New Opportunities Fund) \$83,959
2004	Schroeder DF (Principal Investigator) Dissection of Plant Light Response. Manitoba Innovation Fund (New Opportunities Fund) \$81,258
2003-2005, 2007	Schroeder DF (Principal Investigator) Light Regulation of <i>Arabidopsis</i> Transcription Via Chromatin Remodelling. NSERC (Discovery) \$152,000
2002	Schroeder DF (Principal Investigator) University of Manitoba (Start-up) \$50,000

*Student Funding*

2013-2014	Graduate Enhancement of Tri-Council Stipends (\$3267)
2012-2013	Graduate Enhancement of Tri-Council Stipends (\$3062)
2012	Manitoba Mentorship (\$409)
2011	Canada Summer Jobs (\$998)
2010	Manitoba Career Focus (\$1080)
2009	Manitoba Career Focus (\$1440)
2003	Human Resource Development Canada Summer Career Placement (\$1190)

*Fellowships/Scholarships*

2000-2001	Human Frontier Science Program Long-Term Fellowship
1993-1998	Medical Research Council of Canada Studentship
1992-1997	Alberta Heritage Foundation for Medical Research Studentship

## *Awards*

2010	Sanofi-Aventis Biotalent Challenge Mentor Award
1998	University of Calgary Dept Biochemistry & Mol Biology Top Doctoral Graduate
1987-1991	Simon Fraser University Top Biochemistry Student

## **Training of Highly Qualified Personnel**

### *Graduate students*

2010-present	Triparna Lahari	Ph. D. student
2010-present	Dilukshi Fernando	M. Sc. -> Ph. D. student
2009-2011	Ashwin Ganpudi	M. Sc. student
2006-2013	Kevin Baron	Ph. D. student (Co-supervised with C. Stasolla, PI Sci)
2005-2008	Yu Zhang	M. Sc. student
2005-2008	Wesam Al Khateeb	Ph. D. student

### *Undergraduate students*

2015	Carolynne Brewer	Volunteer
2014	Albert Yeung	Summer student
2014	Angela Yuen	Volunteer
2013-2015	Margaret Stromecki	Volunteer
2013-2015	Kelsie Doering	Volunteer
2013-2014	Adam Carter	Genetics Honours
2013	Maria Krylova	Summer student
2012-2013	Camille Glidden	Volunteer
2012-2013	Charlene Ibbetson	Volunteer, Genetics Honours, Summer student
2012	Chinwe Nkwonta	Volunteer
2011-2013	Tim Liao	Summer student, Undergraduate asst, Genetics Honours
2010-2012	Esther Kim	Genetics Honours, Summer student, Undergraduate asst
2009-2011	Emerald Fonseca	Undergraduate asst, Summer student, Genetics Honours
2009-2010	Trinh Pham	Genetics Honours
2009-2010	Thao Nguyen	Genetics Honours
2008-2010	Valentina Ly	Genetics Honours, Co-op student, Undergraduate asst
2007-2008	Avril Hatherell	Undergraduate assistant, Co-op student
2006-2007	Lana Rosenfield	Undergraduate assistant
2006	David Collister	Summer student, Undergraduate assistant
2005	Chris Kuusselka	Summer student
2004-2005	Yufei Sun	Undergraduate assistant
2004	Xi Wang	Undergraduate assistant
2003-2005	Christine Yurkowski	Volunteer, Undergraduate assistant
2003-2005	Medhi Sefidgar	Summer student, Undergraduate assistant

### *Technicians*

2010-2011	Valentina Ly
2008	Mala Vijayakumar

### *Science fair students*

2010 Mariana Munoz-Gomez, Solana Johannson  
 2009 Ji Qi, Dominic Chung  
 2008 Sueng-Ju Lee, Mingzhu Wang  
 2005-2006 Mirna Guirgis, Zexi Wang  
*Graduate Thesis Committees* ( <sup>R</sup> = Replacement member )

2014-present	Shuang Wang	M.Sc.	Plant Science
2013-2014	Ainsley Chan	M.Sc.	Bio Science
2012-present	Vijaya Chitnis	Ph.D.	Plant Science
2012-present	Ibrahim Elsaad	Ph.D.	Bio Science
2011-2013	Braulio Soto Cerda	Ph.D.	Plant Science
2011-present	Jennifer Tanner	M.Sc. .->Ph.D.	Microbiology
2010-present	Shuanglong Huang	Ph.D.	Plant Science
2010-2011	Jodi Larkin	M.Sc.	Plant Science
2010-2012	Roger Watts	M.Sc.	Plant Science
2010 <sup>R</sup> -2010	Santosh Kumar	Ph.D.	Plant Science
2009 <sup>R</sup> -2011	Aditi Singh	M.Sc.	Zoology/Bio Science
2009-present	Nasir Javid	M.Sc.->Ph.D.	Plant Science
2009-2012	Kirandeep Doel	M.Sc.	Plant Science
2008-2009	Meghan Rose	M.Sc.	Plant Science
2008-2009	Zhen Yao	M.Sc.	Plant Science
2006-2013	Ali Sabra	Ph.D.	Botany/Bio Science
2006-2010	Mohamed Elhiti	Ph.D.	Plant Science
2006-2010	Tarek Bader	Ph.D.	Zoology/Bio Science
2004-2009	Brad Pickering	M.Sc.->Ph.D.	Microbiology
2004-2007	Mark Belmonte	Ph.D.	Plant Science
2004-2007	Zining Wang	Ph.D.	Plant Science
2004-2007	Mukhlesur Rahman	Ph.D.	Plant Science
2004-2008	Colin Hiebert	Ph.D.	Botany/Bio Science
2004-2006	Megan Schwabiuk	M.Sc.	Biochem Med Gen
2003-2007	Saber Golkari	Ph.D.	Botany

## Publications

### *Refereed publications*

Ly V, Collister DT, Fonseca E, Liao TS, Schroeder DF (2015) Light and COP1 regulate level of overexpressed DET1 protein. *Plant Science* 231: 114–123.

Baron KB, Schroeder DF, Stasolla C (2014) GEM-Related 5 (GER5), an ABA and stress-responsive GRAM domain protein regulating seed development and inflorescence architecture. *Plant Science* 223:153-66.

Al Khateeb W, Baher E, Lahham J, Schroeder D, Hussein E (2013) Regeneration and assessment of genetic fidelity of the endangered tree *Moringa peregrina* (Forsk.) Fiori using Inter Simple Sequence Repeat (ISSR). *Physiology and Molecular Biology of Plants* 19:157-164.

Ganpudi AL, Schroeder DF (2013) Genetic interactions of *Arabidopsis thaliana* Damaged DNA Binding Protein 1B (*DDB1B*) with *DDB1A*, *DET1* and *COP1*. *G3: Genes, Genomes, Genetics* 3: 493-503.

Ly V, Hatherell A, Kim E, Chan A, Belmonte MF, Schroeder DF (2013) Interactions between *Arabidopsis* DNA repair genes *UVH6*, *DDB1A*, and *DDB2* during abiotic stress tolerance and floral development. *Plant Science* 213: 88-97.

Kim E, Ly V, Hatherell A, Schroeder DF (2012) Genetic interactions between *Arabidopsis DET1* and *UVH6* during development and abiotic stress response. *G3: Genes, Genomes, Genetics* 2:913-20.

Baron KB, Schroeder DF, Stasolla C (2012) Transcriptional response of abscisic acid (ABA) metabolism and transport to cold and heat stress applied at the reproductive stage of development in *Arabidopsis thaliana*. *Plant Science* 188-189:48-59.

Rahman M, Li G, Schroeder D, McVetty PBE (2010) Inheritance of seed coat color genes of *Brassica napus* (L.) and tagging the genes using SRAP, SCAR and SNP molecular markers. *Molecular Breeding* 26: 439-453.

Zhang Y, Schroeder DF (2010) Effect of overexpression of *Arabidopsis Damaged DNA Binding protein 1A* on *De-etiolated 1* genetics and biochemistry. *Planta* 231: 337-48.

Al Khateeb WM, Schroeder DF (2009) Overexpression of *Arabidopsis Damaged DNA Binding protein 1A* (DDB1A) enhances UV tolerance. *Plant Molecular Biology* 70: 371-383.

Gussakovskyy EE, Shahak Y, Schroeder DF (2007) Color of illumination during growth affects light harvesting structure in pea plant leaves. *J. Photochem. Photobiol. B: Biology* 86: 121-130.

Al Khateeb WM, Schroeder DF (2007) *DDB2*, *DDB1A* and *DET1* exhibit complex interactions during *Arabidopsis* development. *Genetics* 176: 231-242.

Belmonte MF, Tahir M, Schroeder D, Stasolla C (2007) *HBK3*, a class I KNOX homeobox gene, controls the developmental pathway of spruce (*Picea abies*) somatic embryos. *J. Exp. Bot.* 58: 2851-2861.

Schroeder DF, Gahrtz M, Maxwell BB, Cook RK, Kan JM, Alonso JM, Ecker JR, Chory J (2002) *De-etiolated 1* (*DET1*) and *Damaged DNA Binding protein 1* (*DDB1*) interact to regulate *Arabidopsis* photomorphogenesis. *Current Biology* 12, 1462-1472.

Schroeder DF, McGhee JD (1998) Anterior-posterior patterning within the *Caenorhabditis elegans* endoderm. *Development* 125, 2877-2887.

Fukushige T, Schroeder DF, Allen FL, Goszczynski B, McGhee JD (1996) Modulation of gene expression in the embryonic digestive tract of *C. elegans*. *Dev. Biol.* 178, 276-288.

Stroeher VL, Kennedy BP, Millen KJ, Schroeder DF, Hawkins MG, Goszczynski B, McGhee JD (1994) DNA-protein interactions in the *Caenorhabditis elegans* embryo: Oocyte and embryonic factors that bind to the promoter of the gut-specific *ges-1* gene. *Dev. Biol.* 163, 367-380.

#### *Invited Review*

Ganpudi AL, Schroeder DF (2011) UV damaged DNA repair & tolerance in plants. In: *Selected Topics in DNA Repair*, CC Chen, Ed., Intech, Croatia

#### *Commentary*

Schroeder DF (2001) The Canadian Diaspora, Part 1: A Long Way From Home. *Science's Nextwave* [http://sciencecareers.sciencemag.org/career\\_magazine/previous\\_issues/articles/2001\\_09\\_28/noDOI.8527636686794883345](http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2001_09_28/noDOI.8527636686794883345)

#### *Conference presentations (since 2000)*

Fernando VCD, Schroeder DF (2014) Investigation of genetic interactions between *DET1* and genes involved in ABA signal transduction in *Arabidopsis thaliana*. 25th International Conference on Arabidopsis Research, Vancouver, BC abstract 446

Lahari T, Schroeder DF (2014) Role of predicted RAD4 interacting proteins in *Arabidopsis* UV damaged DNA repair. 25th International Conference on Arabidopsis Research, Vancouver, BC abstract 263

Fernando VCD, Schroeder DF (2013) Role of *DE-ETIOLATED 1 (DET1)* in regulation of seed germination in *Arabidopsis thaliana*. Prairie University Biology Symposium 2013, Winnipeg, MB (talk)

Lahari T, Schroeder DF (2013) Role of RAD7 homologues in *Arabidopsis thaliana* UV-damaged DNA repair. Prairie University Biology Symposium 2013, Winnipeg, MB (talk)

Fernando VCD, Schroeder DF (2013) Role of *DE-ETIOLATED 1 (DET1)* in regulation of seed germination in response to ABA-mediated stress conditions in *Arabidopsis thaliana*. ASPB Plant Biology 2013, Providence, RI abstract P01024

Lahari T, Schroeder DF (2013) Role of predicted RAD4 interacting proteins in *Arabidopsis thaliana* UV damaged DNA repair. ASPB Plant Biology 2013, Providence, RI abstract P01030

Fernando VCD, Schroeder DF (2012) Investigation of genetic interactions between *DET1* and genes involved in ABA signal transduction in *Arabidopsis thaliana*. Plant Biology 2012, Austin, TX, abstract P17002 .

Lahari T, Schroeder DF (2012) Role of *Arabidopsis RAD4/XPC* in UV-damaged DNA repair. CSPP/SCBV Annual Meeting. Edmonton, AB, abstract P05.

Ganpudi AL, Alam MZ, Schroeder DF (2011) *Damaged DNA Binding protein 1b (DDB1b) – DDB1a* interactions during *Arabidopsis* development and abiotic stress response. 22<sup>nd</sup> International Conference on Arabidopsis Research. Madison, WI, abstract 118

Fernando VCD, Schroeder DF (2011) The basis of ABA phenotypes in *Arabidopsis det1* mutants. Plant Canada, Halifax, NS, abstract CSPP-S24

Ly V, Schroeder D (2010) Environmental regulation and genetic interaction affect *Arabidopsis* floral organ number. University of Manitoba Undergraduate Poster Competition, Winnipeg, MB.

Fonseca E, Schroeder D (2010) Light regulation of DET1 localization and abundance. University of Manitoba Undergraduate Poster Competition, Winnipeg, MB.

Ganpudi AL, Alam MZ, Schroeder DF (2010) The Role of *Arabidopsis Damaged DNA Binding protein 1b (DDB1b)* and genetic interactions with *DDB1a* and *De-etiolated 1*. Plant Biology 2010, Montreal, PQ, abstract P04048.

Baron KN, Schroeder DF, Stasolla C (2010) Functional characterization of GEM1 and GEM-Related (GER) genes during sexual reproduction of *Arabidopsis thaliana*: assessing the role of GRAM-domain proteins in abscisic acid (ABA) metabolism and signaling. Plant Biology 2010, Montreal, PQ, abstract P10029.

Ly V, Schroeder D (2009) Genetic interactions between *Arabidopsis xpd* and *det1* reveal novel phenotypes. University of Manitoba Undergraduate Poster Competition, Winnipeg, MB.

Al Khateeb WM, Schroeder DF (2009) *DDB1A-DDB2* interaction in *Arabidopsis* DNA damage repair. Canadian Society of Plant Physiologists Annual Meeting, Vancouver, BC, abstract P45.

Al Khateeb W, Schroeder DF (2008) Overexpression of *Arabidopsis* Damaged DNA Binding protein 1A (DDB1A) enhances DNA repair. Salk Institute Plant Biology Laboratory 25<sup>th</sup> Anniversary Symposium, San Diego, CA.

Zhang Y, Schroeder DF (2008) Effect of overexpression of *Arabidopsis* DDB1A on *DET1* genetics and biochemistry. CSPP-SCPV 2008, 50th Anniversary Conference of The Canadian Society of Plant Physiologists, Ottawa, ON.

Al Khateeb W, Schroeder DF (2008) Overexpression of *Arabidopsis* Damaged DNA Binding protein 1A (DDB1A) enhances DNA repair. 19<sup>th</sup> International Conference on *Arabidopsis* Research, Montreal, PQ, abstract 7048.

Al Khateeb W, Schroeder DF (2008) An *Arabidopsis* homologue of human Damaged DNA Binding protein 1 plays an important role in damaged DNA repair. 42<sup>nd</sup> Prairie Universities Biological Symposium, Winnipeg, MB, (talk).

Belmonte MF, Tahir M, Schroeder D, Stasolla C (2007) *HBK3*, a class I *KNOX* homeobox gene, controls the developmental pathway of spruce (*Picea abies*) somatic embryos. Seed Symposium 2007. Translational Seed Biology: From Model Systems to Crop Improvement. University of California, Davis, CA.

Al Khateeb W, Schroeder DF (2007) Overexpression of Damaged DNA Binding protein 1A (DDB1A) enhances *Arabidopsis* DNA repair. Plant Canada 2007, Saskatoon, SK, abstract E1-1 (talk).

Zhang Y, Schroeder DF (2007) Effect of *DDB1A* Overexpression on *DET1* Genetics and Biochemistry. 18<sup>th</sup> International Conference on *Arabidopsis* Research, Beijing, China, abstract P-638.

Collister D, Schroeder DF (2006) Interactions between *COP1*, *DET1* and *DDB1A* during light signalling in *Arabidopsis thaliana*. U of Manitoba NSERC Undergraduate Poster Competition, Winnipeg, MB.

Al Khateeb W, Schroeder DF (2006) Interactions between *De-etiolated 1* (*DET1*) and Damaged DNA Binding proteins (*DDB1A* and *DDB2*) in *Arabidopsis* light signalling. XV<sup>th</sup> Federation of European Plant Biology Societies Congress, Lyon, France, abstract RAS01-005.

Al Khateeb W, Sefidgar M, Schroeder DF (2005) The Role of *DET1* and Damaged DNA Binding Proteins (*DDB1* and *DDB2*) in *Arabidopsis* DNA Repair and Light Signaling. Manitoba Association of Plant Biologists Fall Meeting, Winnipeg, MB.

Al Khateeb W, Sefidgar M, Schroeder DF (2005) The Role of *DET1* and Damaged DNA Binding Proteins (*DDB1* and *DDB2*) in *Arabidopsis* DNA Repair and Light Signaling. Plant Canada 2005, Edmonton, AB, abstract 103.

Schroeder DF (2004) Roles of *DET1* & *DDB1* in Plant Development. Society for Developmental Biology 63<sup>rd</sup> Annual Meeting, Calgary, AB, abstract 92.

Schroeder DF (2004) Roles of *DET1* & *DDB1* in *Arabidopsis* Development. Canadian Botanical Association 40<sup>th</sup> Annual Meeting, Winnipeg, MB (talk).

Schroeder DF, Chory J (2003) *DET1* & *DDB1* Interact to Regulate Photomorphogenesis. 14<sup>th</sup> International Conference on *Arabidopsis* Research, Madison, WI, abstract 451.

Schroeder DF, Gahrtz M, Chory J (2001) *DET1*, a regulator of *Arabidopsis* photomorphogenesis. Human Frontier Science Program Awardee Annual Meeting, Turin, Italy, abstract 102.

Schroeder DF, Gahrtz M, Chory J (2001) DET1, a regulator of *Arabidopsis* photomorphogenesis. 12th International Conference on Arabidopsis Research, Madison, WI, abstract 413.

Schroeder DF, Gahrtz M, Cook RK, Chory J (2000) DET1 structure/function analysis. 11th International Conference on *Arabidopsis* Research, Madison, WI, abstract 450.

#### *Invited Lectures*

Schroeder DF (2012) DDB1 Complexes in *Arabidopsis* Visible and UV Light Response. Duke University Plant Biology Forum, Durham, NC

Schroeder DF (2010) Genetics of Plant Light Response. Manitoba Association of Plant Biologists Annual Meeting Invited Speaker.

Schroeder DF (2007) Regulation of Plant Visible and UV Light Response. University of Manitoba Department of Plant Science Invited Seminar.

Schroeder DF (2003) DET1 & DDB1, Nuclear Regulators of Plant Light Response. University of Manitoba Department of Plant Science Invited Seminar.

Schroeder DF (2003) DET1 & DDB1, Nuclear Regulators of Plant Light Response. University of Manitoba Department of Zoology Invited Seminar.

Schroeder DF, Chory J (2002) DET1 and DDB1, nuclear regulators of *Arabidopsis* light response. San Diego Center for Molecular Agriculture Monthly Meeting, San Diego, CA

#### *Science Fair presentations*

Munoz-Gomez M, Johannson S, Schroeder DF (2010) Effectiveness of SPF in moisturizing products. Sanofi-Aventis Biotalent Challenge, Winnipeg, MB

Munoz-Gomez M, Johannson S, Schroeder DF (2010) Effectiveness of SPF in moisturizing products. Manitoba Schools Science Symposium, Winnipeg, MB (Bronze medal in Health Sciences Senior division)

Qi J, Chung D, Schroeder DF (2009) Investigating roles of an antifreeze protein in *Arabidopsis thaliana*. Sanofi-Aventis Biotalent Challenge, Winnipeg, MB

Lee SJ, Wang M, Schroeder DF (2008) Analysis of De-etiolated 1 RNA through ripening. Sanofi-Aventis Biotalent Challenge, Winnipeg, MB (5<sup>th</sup> place (\$200) in Intermediate Gr. 9/10 division)

## **Teaching**

### *Undergraduate*

Fall 2013/14	BIOL 3100	guest presentation
2010-2013	BIOL 4100	Honours thesis committee
Fall 2005/07/09/11/13	BIOL 4500/BOTN 4180 -	Molecular Genetics of Plant Development
Fall 2003-present	BIOL 2500/BOTN 2460 -	Genetics 1 (except for 2008 Research leave)
Winter 2003-present	BIOL 3500/BOTN 3460 -	Genetics 2 (except for 2007 Maternity leave, 2012 Research leave, 2014 Medical leave)

### *Graduate*



Fall 2014	BIOL 7100	panel member
Winter 2013	BIOL 7220	guest presentation
Fall 2006, Winter 06/10	BIOL 7410/BOTN 7410 -	Molecular Development of Plants
Fall 2005/09/11/13	BIOL/BOTN 7470 -	Plant Molecular Development
Winter 2005	BOTN 7410	Molecular Mechanisms of Seed Development
Winter 2004	BOTN 7410	<i>Arabidopsis</i> Transformation
Fall 2003	BOTN 7410	Plant Gene Expression

## Service

### *Committees- University of Manitoba*

2014-present	Plant Physiologist Search Committee
2013	Plant Growth Technician search committee
2012, 2014	Biological Sciences Tenure Committee
2012-2013	Plant Secondary Compounds search committee
2011	Developmental Biologist search committee
2010-2013	Biological Sciences Honours thesis committee
2008-2009	Plant Cell Biologist Search Committee
2006-2007	Zoology Physiologist (2 positions) Search Committee
2006	Botany Curriculum Committee
2005-2006	CRC Tier 2 Chair in Genomics Search Committee
2004-present	Botany/Biological Sciences Greenhouse Committee
2004	Genetics Instructor Search Committee
2003-2009	Faculty of Science Executive Committee
2003-2007,09-present	Genetics Committee
2003-2006	Botany/Zoology Seminar Committee

### *Reviews*

2014	Plant Cell article
2014	Plant Molecular Biology article
2014	Journal of Integrative Agriculture article
2013, 2014	Plant Science article (2)
2013	Human Frontier Science Program Career Development Award
2012	Mechanisms of Development article
2011, 2012	Hartwell et al. Genetics textbook review
2010	Trends in Plant Science article
2010, 2011	Plant Physiology articles (3)
2008	provided input on new NSERC GSC structure
2007, 2009, 2010	Plant Journal articles (3)
2006	US-Israel Binational Agricultural Research and Development Fund proposal
2005	Wiley & Sons textbook chapter
2004, 2006, 2007	NSERC Strategic grants (3)

### *Memberships*

Manitoba Association of Plant Biologists  
Canadian Society of Plant Physiologists  
American Society of Plant Biologists  
Genetics Society of America



# CURRICULUM VITAE

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**KEVIN GLEN-EDWARD SCOTT, PH.D.**

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circa 2014

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**NAME:** KEVIN GLEN-EDWARD SCOTT, PH.D.

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Department of Biological Sciences  
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**EDUCATION & TRAINING:**

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**Post Doctoral Fellowship**

*July 2002 – July 2004*

Internal Medicine  
Digestive Health Center of Excellence  
University of Virginia Health System  
Mentor: Dr. Peter B. Ernst, DVM. Ph.D.

**Doctor of Philosophy**

*January 1998 – April 2002*

Biological Sciences (Zoology)  
Mucosal Immunopathology  
University of Calgary, Department of Biological Sciences  
Supervisor: Dr. André G. Buret, Ph.D.  
Dissertation: Role of T Cells in the Pathogenesis of Small Intestinal Injury and Malfunction

**Bachelor of Science, Honours**

*September 1993 – April 1997*

Biological Sciences (Zoology)  
University of Calgary, Department of Biological Sciences  
Supervisor: Dr. Doug Morck, DVM. Ph.D.  
Honours Thesis: Infectious Bovine Keratoconjunctivitis: A Clinical Model for Infection

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**SOCIETY & ORGANIZATION MEMBERSHIPS:**

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Canadian Society of Zoologists (CSZ)  
Member since 2008

Teachers Without Borders  
Member since 2007

American Gastroenterology Association (AGA)  
Member from 2004 – 2006

Canadian Association of Gastroenterologists (CAG)  
Member from 2001 – 2006

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**POSITIONS HELD:**

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**Senior Instructor**

University of Manitoba  
Faculty of Science, Department of Biological Sciences

*July 2006 – Present*

Sessional Instructor

University of Calgary  
Faculty of Science, Department of Biological Sciences

*August 2005 – July 2006*

Assistant Professor

Okanagan University College  
Faculty of Science, Department of Biology

*August 2004 – August 2005*

Post Doctoral Fellowship

University of Virginia, Digestive Health Centre of Excellence  
Mentor: Dr. Peter Ernst  
Field of Study: Lymphocyte and intestinal epithelial cell interactions in models of intestinal inflammation.

*July 2002 – July 2004*

Full Time Graduate Student

University of Calgary, Department of Biological Sciences  
Mentor: Dr. André Buret  
Field of Study: Role of T-cells in the pathogenesis of small intestinal injury and malfunction.

*January 1998 – April 2002*

Summer Student Researcher

University of Calgary, Department of Biological Sciences  
Mentor: Dr. Doug Morck

Field of Study: Immunohistochemistry and staining of ocular sections attained from a study involving Infectious Bovine Keratoconjunctivitis in calves.

*April 1997 – August 1997*

Weekend Animal Care Provider

University of Calgary, Life and Environmental Science Animal Resource Centre  
Supervisor: Dr. Doug Morck

Duties: Provide animal husbandry for all laboratory animals at the University of Calgary including feeding, watering and monitoring of new births.

*September 1996 – August 1997*

Summer Student Researcher

University of Calgary, Department of Biological Sciences  
Mentor: Dr. Doug Morck

Field of Study: The effects of chemotherapeutic treatments against *Pasteurella multocida* isolated from cat mouths.

*April 1996 – August 1996*

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**TEACHING EXPERIENCE:**

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**Undergraduate Courses:**

**University of Manitoba**

		<b>Lecture</b>	<b>Lab</b>
BIOL 2390 –	Introductory Ecology		
BIOL 1030 –	Biology II: Biological Diversity, Function & Interactions		
BIOL 1030 –	Biology II: Biological Diversity, Function & Interactions (Video)		
PHYS 1030 –	Fundamentals of Medical Physiology		
BIOL 2420 –	Human Physiology II		
BIOL 3472 –	Environmental Physiology of Animals 2 Lab Instructor		
BIOL 3470 –	Environmental Physiology of Animals 1 Lab Instructor		
ZOOL 3460 –	Introductory Parasitology		
BIOL 1020 –	Biology I: Principles & Themes		

**University of Calgary**

BIOL 231 –	Introduction to Cellular Biology		
BIOL 233 –	Introduction to Organismic Biology of Plant and Animals		
ZOOL 463 –	Animal Physiology II – Gastrointestinal physiology		
BIOL 231 –	Introduction to Cellular Biology		

**Okanagan University College**

BIOL 133 –	Human Anatomy & Physiology II		
BIOL 131 –	Human Anatomy & Physiology I		
BIOL 418 –	Parasitology		
BIOL 133 –	Human Anatomy & Physiology II		
BIOL 448 –	Directed Studies		
BIOL 112 –	Ecology & Evolution for non-majors		
BIOL 318 –	Immunology		

**LABORATORY INSTRUCTOR / TA POSITIONS**

**Head Laboratory Instructor – University of Calgary**

BIOL 233 – Introduction to Biology II	<i>2 times</i>
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**Laboratory Instructor – University of Calgary**

ZOOL 483 – Principles of Parasitism	<i>3 times</i>
ZOOL 361 – Introduction to Human Physiology I	<i>1 time</i>
BIOL 233 – Introduction to Biology II	<i>1 time</i>
BIOL 231 – Introduction to Biology I	<i>3 times</i>

**Guest Lecturer – University of Calgary**

BIOL 231 Introduction to Biology I	1 lec-hrs	<i>Spring 2000</i>
Topic: Basic Immunology and Host Defense Systems		
BIOL 231, Introduction to Biology I	1 lec-hrs	<i>Spring 1999</i>
Topic: Basic virology		
ZOOL 483, Principles of Parasitism	1 lec-hrs	<i>Fall 1999</i>
Topic: T Lymphocytes in Immunoparasitology		

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## MAJOR CONCEPTS TAUGHT IN THE ABOVE CLASSES

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### Concept (Level)

Basic Biochemistry (1)	Animal Behaviour (1, 2)
Cell Structure (1)	Endocrinology (1)
Photosynthesis (1)	Eukaryotic Microbes (1)
Cellular Respiration (1)	Plant Reproduction & Development (1)
Fermentation (1)	Plant Form & Function (1)
Food Microbiology (1)	Meeting Plant Tissue Needs (1)
Cell Division (1)	Plant Growth Regulators (1)
Molecular Genetics (1)	Immunology (1, 2, 3)
Chromosomal Genetics (1)	Digestive System (2, 3)
Mendelian Genetics (1, 2)	Environmental Factors in Ecology (1, 2)
Population Genetics (1)	Energetics & Nutrient Cycles (1, 2)
Evolution & Speciation (1, 2)	Organismal Ecology (1, 2)
Biodiversity (1, 2)	Population Ecology (1, 2)
Animal Reproduction & Development (1)	Community Ecology (1, 2)
Animal Form & Function (1)	Conservation Ecology (1, 2)
Meeting Animal Tissue Needs (1)	Human Anatomy & Physiology (1)
Coordinated Motion (1)	Bacteriology (1)
	Virology (1)

## SERVICE

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### **Integrative Biology Theme Group (Chair)**

*September 2009 – Present*

Department of Biological Sciences, University of Manitoba

Roles: The development and promotion of the Integrative Biology Theme, the promotion of the Co-op programme in the Biological Sciences

### **Undergraduate Curriculum Committee**

*September 2009 – Present*

Department of Biological Sciences, University of Manitoba

Roles: Deal with all issues pertaining to the undergraduate programme in the department. These include (but are not limited to) new course proposals, deletion of old courses, course changes, items dealing with the themes, etc.

### **UMFA Board of Representatives**

*September 2009 – 2014*

University of Manitoba Faculty Association

Roles: Represent the UMFA membership in the department relaying their concerns to the Faculty Association and reporting on issues back to the membership.

### **Duff Roblin Fire Support Team**

*March 2009 – June 2009*

University of Manitoba Faculty Association

Roles: Rescue important samples, inventory computers for data salvage, inventory freezers, relocate frozen samples

### **Environmental & Integrative Physiology Theme Group**

*September 2006 – Present*

Department of Biological Sciences, University of Manitoba

Roles: The development and promotion of the Environmental & Integrative Physiology Theme.

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**Scholarships and Awards Committee**

*September 2006 – 2011*

Department of Biological Sciences, University of Manitoba

Roles: Assess and rank applications for both Graduate and Undergraduate awards including NSERC, UMGF, USRA, Major Barrett-Hamilton, etc.

**Honours/Majors Program and Undergraduate Studies Working Group** *January 2008 – July 2008*

Department of Biological Sciences, University of Manitoba

Roles: Initial work on the development of the undergraduate programme of the newly formed department, major contribution was the numbering system used for all BIOL courses.

Thompson Nelson Education Limited

*September 2007 – August 2008*

*Biology the Dynamic Science* 1<sup>st</sup> Canadian Edition

Editorial Advisory Board

Canadian Biology Olympiad

*June 2007*

Laboratory Coordinator

University of Manitoba Liaison

**TEACHING PROPOSALS FUNDED:**

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**Science Endowment Fund**

University of Manitoba

*Physiology Teaching Lab* (BIOL 3460/3462)

Awarded: *January 2010*

\$10,000

Purchase of:

Wescor Vapour Pressure Osmometer

**Science Endowment Fund**

University of Manitoba

*Physiology Teaching Lab* (ZOOL 3530/3540)

Awarded: *January 2008*

\$180,000

Purchase of:

3 PowerLab A/D Converters

Microplate Reader

14 Impedence converters

2 FoxBox O<sub>2</sub>/CO<sub>2</sub> Field Analyzers

7 Peristaltic pumps

General Lab Equipment

**Science Endowment Fund**

University of Manitoba

*Physiology Teaching Lab* (ZOOL 3530/3540)

Awarded: *January 2007*

\$24,000

Purchase of:

4 PowerLab A/D Converters

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**RESEARCH GRANTS:**

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**CAG / Axcan Pharma / CIHR Post-Doctoral Fellowship**

Canadian Association of Gastroenterology

Axcan Pharma Inc.

Canadian Institute of Health Research

Awarded: *July 2002 – June 2004*

\$137,766

**CCFC Chair in Intestinal Disease Research Scholarship**

Crohn's Colitis Foundation of Canada

Awarded: *May 2001 – April 2002*

\$15,000

**AWARDS & SCHOLARSHIPS:**

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**University 1 Teaching Award – Biology 1030**

University of Manitoba University 1 Programme

Nominated: *April 2007*

**Student's Union Teaching Excellence Award – Biology 231**

University of Calgary Student's Union

Nominated: *April 2006*

**Student's Union Teaching Excellence Award – Biology 233**

University of Calgary Student's Union

Nominated: *April 2006*

**American Physiological Society – Inflammatory Bowel Disease Travel Award**

American Physiological Society

Awarded: *August 2004*

US\$1000

**John Kendall Doctoral Thesis Award**

University of Calgary, Faculty of Science

Awarded: *May 2003*

\$500

**Canadian Graduate Student Microbiologist of the Year Award (Cangene Gold Award)**

**First Runner-Up**

Canadian Society of Microbiologists

Cangene

Awarded: *May 2003*

**MIRG Young Investigator Prize**

Banff Inflammation Workshop

Mucosal Inflammation Research Group, University of Calgary

Awarded: *January 2003*

\$300

*January 2001*

\$300

**Governor General's Gold Medal Thesis Award Nominee**

Nominee for the Department of Biological Sciences

University of Calgary, Faculty of Graduate Studies

Nominated: *October 2002*

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**T.W.M. Cameron Best Zoology Ph.D. Thesis of the Year Award Nominee**

Nominee for the University of Calgary

Canadian Society of Zoologists

Nominated: *August 2002*

**MIRG Travel Grant**

Mucosal Inflammation Research Group, University of Calgary

Awarded: *September 2001*

\$700

**Canadian Hunter Award for Excellence in Teaching**

University of Calgary, Faculty of Science

Awarded: *May 2000*

\$500

**Department of Biological Sciences TA Award of Excellence**

University of Calgary, Department of Biological Sciences

Awarded: *May 2000*

**University of Calgary Travel Grant**

University of Calgary

Awarded: *April 2000*

\$700

**Graduate Teaching Fellowship**

University of Calgary, Faculty of Science

Awarded: *May 2001 – June 2001*

\$3,000

**Graduate Teaching Assistantships**

University of Calgary, Department of Biological Sciences

Awarded: *September 2001 – December 2001*

\$2,150

*January 2001 – April 2001*

\$6,200

*September 2000 – December 2000*

\$2,100

*January 2000 – May 2000*

\$5,600

*September 1999 – December 1999*

\$5,600

*January 1999 – April 1999*

\$5,200

*January 1998 – April 1998*

\$5,200

**Graduate Research Scholarships**

University of Calgary, Department of Biological Sciences

Awarded: *January 2002 – April 2002*

\$3,995

*May 1999 – August 1999*

\$3,995

**Graduate Tuition Fee Scholarships**

University of Calgary, Department of Biological Sciences

Awarded: *May 2000*

\$500

*January 1998*

\$500

**Ronald G. Greene 1995 Distinguished Alumni Bursary**

University of Calgary Alumni Association

Awarded: *September 1996 – April 1997*

\$1,500

**Alberta Heritage Fund for Medical Research Summer Studentship**

Alberta Heritage Fund for Medical Research

Awarded: *May 1996 – August 1996*

\$5,200

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University of Calgary Undergraduate Merit Award

University of Calgary

Awarded: September 1995 – April 1996

\$500

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**PUBLICATIONS:**

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**BOOK CHAPTERS:**

1. A.G. Buret, **K.G-E. Scott**, A.C.K. Chin. 2001. Giardiasis: Pathophysiology and Pathogenesis IN *Giardia: The Cosmopolitan Parasite*. P.M. Wallis, M.E. Olson, B. Olson (eds.) CAB International, Oxon, UK.

**PUBLISHED REFEREED MANUSCRIPTS:**

- Scott, KG-E. and D. Weihrauch. 2010. Ammonia excretion across the gill epithelium of the marine crab *Cancer magister*: A novel teaching lab for Animal Physiology courses. *Advances in Physiology Education* (in preperation)
1. Olson T.S., B.K. Reuter, **K.G-E. Scott**, M.A. Morris, X. Wang, L.N. Hancock, T.L. Burcin, S.M. Cohn, P.B. Ernst, F. Cominelli, J.B. Meddings, K.F. Ley, and T.T. Pizarro. 2006. The primary defect in experimental ileitis originates from a nonhematopoietic source. *Journal of Experimental Medicine* **203(3)**:541-552.
  2. O'Hara A.M., R.C. Mifflin, K.A. Ryan, **K.G-E. Scott**, M. Naganuma, A. Casola, T. Izumi, S. Mitra, P.B. Ernst, and S.E. Crowe. 2006. Interleukin-8 induction by *Helicobacter pylori* in gastric epithelial cells is dependent on apurinic/aprimidinic endonuclease-1/redox factor-1. *Journal of Immunology* **177(11)**:7990-7999.
  3. Walker R.L., A.G. Buret, C.L. Jackson, **K.G. Scott**, R. Bajwa, and H.R. Habibi. 2004. Effects of growth hormone on leucine absorption, intestinal morphology, and ultrastructure of the goldfish intestine. *Canadian Journal of Physiology and Pharmacology* **82**:951-959
  4. **Scott K.G-E.**, L.C.H. Yu, and A.G. Buret. 2004. The role of CD8<sup>+</sup> and CD4<sup>+</sup> T lymphocytes in jejunal mucosal injury during murine giardiasis. *Infection and Immunity* **72(6)**:3536-3542.
  5. Buret A.G., A.C. Chin and **K.G-E. Scott**. 2003. Infection of human and bovine epithelial cells with *Cryptosporidium andersoni* induces apoptosis and disrupts tight-junctional ZO-1: effects of epidermal growth factor. *International Journal for Parasitology* **33(12)**:1363-1371.
  6. Denning T.L., H. Qi, R. König, **K.G. Scott**, M. Naganuma and P.B. Ernst. 2003. CD4<sup>+</sup> Th cells resembling regulatory T cells that inhibit chronic colitis differentiate in the absence of interactions between CD4 and class II MHC. *Journal of Immunology* **171(5)**:2279-2286.
  7. McDonnell, P.A. **K.G-E. Scott**, D.A. Teoh, M.E. Olson, J.A. Upcroft, P. Upcroft and A. Buret. 2003. *Giardia duodenalis* trophozoites isolated from a parrot (*Cacatua galerita*) colonize the small intestinal tracts of domestic kittens and lambs. *Veterinary Parasitology* **111(1)**:31-46.
  8. **Scott K.G-E.**, D.R. Kirk, J.B. Meddings, S.P. Less-Miller and A.G. Buret. 2002. Intestinal infection with *Giardia* spp. reduces epithelial barrier function in a myosin light chain kinase-dependent fashion. *Gastroenterology* **123(4)**:1179-1190.
-



9. Buret A.G., K. Mitchell, D.G. Muench, **K.G-E. Scott**. 2002. *Giardia lamblia* disrupts tight junctional ZO-1 and increases permeability in non-transformed human small intestinal epithelial monolayers: effects of epidermal growth factor. *Parasitology* **125(Pt 1)**:11-19.
10. Chin, A.C., D.A. Teoh, **K.G-E. Scott**, J.B. Meddings, W.K. MacNaughton and A.G. Buret. 2002. Strain-dependent induction of enterocyte apoptosis by *Giardia lamblia* disrupts epithelial barrier function in a caspase-3-dependent manner. *Infection and Immunity* **70(7)**:3673-3680.
11. **Scott K.G-E.**, M.R. Logan, G.M. Klammer, D.A. Teoh and A.G. Buret. 2000. Effects of *Giardia muris* infection on jejunal architecture, brush border ultrastructure, disaccharidases and interleukin-6: The role of T lymphocytes. *Infection and Immunity* **68(6)**:3412-3418.

**PUBLISHED REFEREED ABSTRACTS/PUBLISHED PROCEEDINGS:**

1. B.K. Reuter, **K.G. Scott**, J.B. Meddings, F. Cominelli, P.B. Ernst, and T.T. Pizarro. 2005. The SAMP1/YitFc mouse displays spontaneous gastric inflammation and represents a viable model to study Crohn's gastritis. *Gastroenterology* **128(4 Suppl 2)**:P-168  
Digestive Disease Week, Chicago, Illinois. Poster Presentation.
  2. M. Naganuma, B.K. Reuter, **K.G. Scott**, T.S. Olson, G. Bamias, J. Rivera-Nieves, T.T. Pizarro, K.F. Ley, F. Cominelli, and P.B. Ernst. 2005. B Cells from SAMP1/YitFc mice express increased levels of GITR ligand and impair the tolerance induced by regulatory T cells. *Gastroenterology* **128(4 Suppl 2)**:P-36  
Digestive Disease Week, Chicago, Illinois. Oral Presentation.
  3. **K.G-E. Scott**, B.K. Reuter, L.N. Hancock, J.B. Meddings, S.M. Cohn, F. Cominelli, P.B. Ernst, and T.T. Pizarro. 2004. Small intestinal barrier dysfunction precedes inflammation in the SAMP1/YitFc model of spontaneous Crohn's-like ileitis  
APS Inflammatory Bowel Diseases Translational Research Conference, Snowmass Village, Colorado. Poster & Oral Presentations
  4. **K.G-E. Scott**, B.K. Reuter, L.N. Hancock, S.M. Cohn, J.B. Meddings, F. Cominelli, P.B. Ernst, and T.T. Pizarro. 2004. Epithelial structural changes and barrier dysfunction precede active and chronic inflammation in the SAMP1/YitFc model of spontaneous Crohn's-like ileitis  
Digestive Disease Week, New Orleans, Louisiana. Poster Presentation.
  5. B.K. Reuter, **K.G-E. Scott**, M.I. Staples, M. Dahman, T.T. Pizarro, P.B. Ernst and F. Cominelli. 2004. The SAMP1/YitFc Murine Model of Crohn's Disease-Like Ileitis: A Consequence of Dysfunctional Regulatory Cells?  
Digestive Disease Week, New Orleans, Louisiana. Poster Presentation.
  6. M. Naganuma, **K.G-E. Scott**, P.B. Ernst. 2004. The Vitamin D3 and Dexamethasone Induced Regulatory T Cell Does Not Correlate to the Expression of Foxp3.  
Digestive Disease Week, New Orleans, Louisiana. Poster Presentation.
  7. M. Naganuma, **K.G-E. Scott**, T.L. Denning, H.F. Ismail, T. Kanai, M. Watanabe, S.H. Feldman, P.B. Ernst. 2004. Prevention of Colitis by Regulatory T Cells (T reg) Generated Using Mutated Class II MHC Molecules.  
Digestive Disease Week, New Orleans, Louisiana. Oral Presentation.
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8. A.M. O'Hara, R.C. Mifflin, K.A. Ryan, **K.G-E. Scott**, M. Naganuma, P.B. Ernst, S.E. Crowe. 2004. Silencing of Apurinic/Apyrimidinic Endonuclease-1/Redox Factor-1 by RNA Interference Inhibits Helicobacter pylori-Induced Transcription Factor Activation and Interleukin-8 Secretion in Human Gastric Epithelial Cells.  
Digestive Disease Week, New Orleans, Louisiana. Oral Presentation.
  9. **K.G-E. Scott**, L.C.H. Yu, A.C. Chin, A.G. Buret. 2003. *Giardia* Induces CD8<sup>+</sup> T Cell-Dependent Jejunal Brush Border Injury and Decreases TGF- $\beta$  Production from Epithelial Cells. *Canadian Journal of Gastroenterology* **17(Suppl A):59A**.  
Canadian Digestive Disease Week, Banff, Alberta. Poster Presentation.
  10. **K.G-E. Scott**, J.B. Meddings, S.P. Lees-Miller and A.G. Buret. 2002. MLCK-Dependent Loss of Small Intestinal Barrier Function Leads to CD8<sup>+</sup> T-cell Mediated Epithelial Injury and Malfunction.  
Experimental Biology 2002, FASEB, New Orleans, Louisiana. Poster Presentation.
  11. **K.G-E. Scott**, D.R. Kirk, J.B. Meddings, A.G. Buret. 2001. T-Cell Independent Loss of Intestinal Epithelial Barrier Leads to T-Cell Activation and T-Cell Dependent Microvillous Brush Border Injury and Malfunction in Giardiasis. *Inflammation Research* **50(Suppl 3):S162**.  
5<sup>th</sup> World Congress of Inflammation, International Association of Inflammation Societies, Edinburgh, Scotland. Oral Presentation.
  12. A.C. Chin, K.D. Mitchell, D.A. Teoh, **K.G-E. Scott**, J.B. Meddings, W.K. MacNaughton and A.G. Buret. 2001. Induction of Enterocyte Apoptosis by *Giardia* Causes Epithelial Barrier Dysfunction in Human Duodenal Monolayers. *Inflammation Research* **50(Suppl 3):S178**.  
5<sup>th</sup> World Congress of Inflammation, International Association of Inflammation Societies, Edinburgh, Scotland. Oral Presentation.
  11. **K.G-E. Scott**, D.R. Kirk, J.B. Meddings and A.G. Buret. 2001. T-Lymphocyte-Derived and Parasite-Derived Pathogenic Mechanisms in Murine Giardiasis. *Canadian Journal of Gastroenterology* **15(Suppl A):35A**.  
Canadian Digestive Disease Week, Banff, Alberta. Poster Presentation.
  12. Chin, A.C., K.D. Mitchell, D.A. Teoh, **K.G.-E. Scott**, W.K. MacNaughton, A.G. Buret. 2001. *Giardia lamblia*-induced epithelial barrier dysfunction is due to increased enterocyte apoptosis. *Canadian Journal of Gastroenterology* **15(Suppl A):64A**.  
Canadian Digestive Disease Week, Banff, Alberta. Poster Presentation.
  13. **K.G-E Scott**, D.R. Kirk, A.M. Rix, J.B. Meddings, A.G. Buret. 2000. Small Intestinal Permeability and Microvillar Alterations in Murine Giardiasis: The Role of T Cells. *Gastroenterology* **118:4(Suppl. 2, Part 1):A684-3758**.  
Digestive Disease Week, San Diego, California. Oral Presentation.
  14. Chin, A.C., K.D. Mitchell, D.A. Teoh, **K.G.-E. Scott**, A.G. Buret. 2000. Epithelial Barrier Dysfunction Is Associated with Induction of Enterocyte Apoptosis in Human Duodenal Epithelial Monolayers Exposed to *Giardia lamblia*. *Gastroenterology* **118:4(Suppl. 2, Part 1):A692-3789**.  
Digestive Disease Week, San Diego, California. Oral Presentation.
-



**REFEREED ABSTRACTS (NOT PUBLISHED):**

1. **K.G-E. Scott**, T.L. Denning, H. Takaishi, R. Konig, P.B. Ernst. 2003. Enterocyte Killing by T-Lymphocytes is Mediated Through Fas-FasL Interactions Between SEB-Activated Effector but not Regulatory T-Cells.  
Banff Inflammation Workshop. Poster Presentation.
  2. **K.G-E. Scott** and A.G. Buret. 2002. The Roles of CD4<sup>+</sup> and CD8<sup>+</sup> T Lymphocytes in Epithelial Injury and Malfunction.  
CSZ 2002, Canadian Society of Zoologists, Lethbridge, AB.
  3. **K.G-E. Scott** and A.G. Buret. 2002. The Role of T Lymphocytes in Epithelial Malfunction and Injury.  
Kananaskis Inflammation Workshop, MIRG, Kananaskis, AB. Oral Presentation.
  4. R.L. Walker, C.L. Jackson, **K.G-E. Scott**, R. Bajwa, A.G. Buret and H.R. Habibi. August 2001. Effect of Growth Hormone on Leucine Absorption and Morphological Characteristics of the Goldfish Intestine.  
XXXIV<sup>th</sup> International Congress of Physiological Sciences International Union of Physiological Sciences, Christchurch, New Zealand. Poster Presentation.
  5. **K.G-E. Scott**, D.R. Kirk, J.B. Meddings, and A.G. Buret. February 2001. The role of CD4<sup>+</sup> and CD8<sup>+</sup> T lymphocytes in small intestinal permeability and microvillar alterations during *Giardia muris* infection in mice.  
Banff Inflammation Workshop. Poster Presentation.
  6. A.C.K. Chin, K.D. Mitchell, D.A. Teoh, **K.G-E. Scott**, W.K. MacNaughton, and A.G. Buret. February 2001. *Giardia lamblia*-induced enterocyte apoptosis is associated with altered epithelial barrier function.  
Banff Inflammation Workshop. Poster Presentation.
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## **CURRICULUM VITAE**

Michael Peter Shaw

**Address:** 294 Kingsway, Winnipeg

### **Education:**

- (1) B.Sc. (Ecology), University of Calgary. 1984-1989.
- (2) M.Sc. (Botany), University of Manitoba.  
Thesis Title: The Spatial-temporal dynamics of drained beaver pond meadows in Riding Mountain National Park, Manitoba. 1990-1993.

### **Experience:**

#### **(1) Employment**

Senior Instructor, Department of Biological Sciences, 2005 - present

Instructor II in the Biology Program at the University of Manitoba (1998- 2005)

Instructor I in the Biology Program at the University of Manitoba (1993- 1998)

Instructor I, Department of Botany, University of Manitoba, Winnipeg Manitoba. (1994)

Teaching Assistant, Biology Program, University of Manitoba, Winnipeg Manitoba. (1990-1993)

Teaching Assistant, Department of Botany, University of Manitoba, Winnipeg Manitoba. (1990-1993)

Teaching Assistant, Department of Zoology University of Manitoba, Winnipeg Manitoba. (1990-1992)

Environmental Technician, Alberta Environment, Government of Alberta. (1989-1990)

#### **(2) Primary Teaching At University of Manitoba:**

BIOL 1010 -Biology: Biological Diversity and Interaction (By distance education and traditional lectures 20 + times)

BIOL 1000 -Biology: Foundations of Life Interaction (By distance education, blended learning and traditional lectures 20 + times)

BIOL 1020 -Biology 1: Principles and Themes – Laboratories (20+ times)

BIOL 1020 -Biology 1: Principles and Themes – Lectures (By video lectures and traditional lectures 20 + times)  
BIOL 1030 -Biology 1: Principles and Themes – Laboratories (20+ times)  
BIOL 1030 -Biology 2: Biological Diversity, Function and Interactions – Lectures (By traditional lectures 10 + times)  
BIOL 1340 -State of the Earth's Environment (By traditional lectures 20 + times)

**(3) Teaching Materials Developed:**

BIOL 1000 Distance Education Course Manual and Website (2003, 2008, 2014). The course manual leads students through an accompanying text book and study guide.

BIOL 1010 Distance Education Course Manual and Website(2003, 2008, 2014). The course manual leads students through an accompanying text book and study guide.

BIOL 1020 Laboratory Manual(1993-2014). The lab manual leads students through the 8 labs. I have edited the entire manual and added several new labs.

BIOL 1030 Laboratory Manual (1993-2014). The lab manual leads students through the 10 labs. I have edited the entire manual and added several new labs.

BIOL 1020 and BIOL 1030 End of Lab Video Reviews . Video reviews using computer captured images of actual lab material. The reviews provide a short synopsis of the laboratories using questions similar to those that a student can expect on exams. Students in all lab sections receive a consistent end of lab summary which is not always possible utilizing a staff of 45 demonstrators in 60 lab sections.

BIOL 1020 and Biol 1030 Web Lab Reviews

The lab tutorials, utilizing the Web lead the students through a review of 18 laboratories and provide access to the relevant labeled images from a computer image bank. This system allows the students to review the laboratory when they want and as often as they desire.

A sample of the Universities, collages and high schools currently using, with permission, some portion of the lab reviews:

Footscray City College, Australia  
Grand Rapids Community College  
Hinds Community College  
Illinois State University  
Leiden University, The Netherlands  
Michigan State University  
New England Institute of Technical and Further Education  
Northeastern University



Purdue University  
University of Missouri  
Virginia Polytechnic Institute and State University  
Waroona District High School, Australia  
William Paterson University

Digitised Images for the First Year Biology Labs Most of the 1000+ images (diagrams and art work) for the lab are now in digital form. These has allowed for clear images in the manual as well as more effective labeling of structures for students.

Biology Web Glossary The glossary, provides definitions of all (700+) terms from the BIOL 1020 and Biol 1030 Labs. The terms in the glossary are also linked to appropriate labeled colour images.

Biology 71.123 Distance Education Course Manual (1996). The manual was written by four authors including myself. I provided editorial oversight.

#### **(4) Publications**

Shaw, M. 1998. Development of Web-Based Laboratory Supplements: Challenges and Opportunities. Vol. 6. No. 4 University Teaching Services Newsletter, The University of Manitoba.

#### **(5) Conferences and presentations**

Shaw, M. 2013 Working Effectively with Professors Faculty of Science, Teaching Assistant Workshop, Sept.

Shaw, M. 2009 Working Effectively with Professors Faculty of Science, Teaching Assistant Workshop, Sept.

Shaw, M, 2009. Keynote presentation, "Puzzling Questions" BC Association for Community Living Annual Conference. June 6, 2009 Victoria BC

Shaw, M 2009, "Acting Ethically", Ontario Association for Community Living Annual Conference. June 4, 2009 Kingston, Ontario.

Shaw, M 2009, "Inclusive Education at the post-Secondary level in Western Canada". World Down Syndrome Congress, August 18, 2009, Dublin, Ireland.

Shaw, M. 2008 "Prenatal Testing and the Genetic Revolution" International Conference Plenary, 2008 Global Forum For Inclusion, November 18, Ottawa, Canada

Shaw, M. 2008, "Down Syndrome – The Way Forward" Keynote Address, May 18, Canadian Down Syndrome Annual Conference. Ottawa, Ontario.

Shaw, M. 2008, "The Power of Language – An examination of the role of language in the provision of fair and balanced information" Breakout session, May 18, Canadian Down Syndrome Annual Conference. Ottawa, Ontario.

Shaw, M. 2007 "Working Effectively as a TA in Science Labs" Sept 6, UTS-Faculty of Science TA Workshop. University Of Manitoba, Winnipeg, MB

Shaw, M. 2007, "Down Syndrome – The Next 20 Years in Canada" Keynote Address, May 19, Canadian Down Syndrome Annual Conference. Calgary Hyatt, Calgary Alberta.

Shaw, M. 2007, Welcome Address, National Down Syndrome Awareness Week Kick Off. November 1, National Gallery of Canada, Ottawa, MB.

Shaw, M. 2006 " Value-Neutral Language" August 23, Down Syndrome Medical Interest Group Annual Meeting. Vancouver Conference center, Vancouver BC.

Shaw, M. 2006 " Inclusive Education at the Post-Secondary Level – The Manitoba Experience" August 25, 8th World Down Syndrome Congress. Vancouver Conference center, Vancouver BC.

Shaw, M. 2006 " Down Syndrome: Not a Medical Condition" Sept 28, Canadian Association of Genetic Councillor's Annual Meeting. Delta Winnipeg Hotel, Winnipeg MB.

Shaw, M. 2004 *Inclusion of Individuals with Developmental Disabilities in a Post-Secondary Setting Workshop* World Down Syndrome Congress, Singapore.

Shaw, M. 2001 *Working Effectively with Professors* Faculty of Science, Teaching Assistant Workshop, Sept.

Shaw, M. 1998 Moderator and coordinator for "*Working Effectively with Professors*" Faculty of Science, Teaching Assistant Workshop, Sept.

Shaw, M. 1997 *Using a WWW Site as both a Review Tool and as an in Class Supplement* Nov. 20 University Teaching Services Lunch Hour Discussion Group. University of Manitoba.

Shaw M. 1997 *Responsibilities and Obligation of Teaching Assistants*. University Teaching Services Workshop for Teaching Assistants, Sept.

Shaw M. 1996 *Providing a laboratory review over the World Wide Web for first year biology students*. Traveling the Information Highway: Biology Teaching and Research on the World Wide Web - A Teaching Symposium, American Institute

of Biological Sciences Meetings August 4-8, Seattle Washington.

Shaw M. 1996 *Responsibilities and Obligation of Teaching Assistants*. University Teaching Services Workshop for Teaching Assistants, Sept.

Shaw M. 1995 *Dissection of the common grass frog Rana pipiens*. Science Alive in 95 Conference, The Science Teachers' Association of Manitoba, Oct. 19 - 20, Winnipeg Manitoba.

Shaw M. 1995 *Responsibilities and Obligation of Teaching Assistants*. University Teaching Services Workshop for Teaching Assistants, Oct.

Shaw M. 1995 *Dissection of the Grass Frog*, Workshop for students and staff of St. Mary's School, St. Mary's, Manitoba, Sept.

**(6) University Service activities:**

Chair, Department of Biological Sciences Recruitment and Retention Committee.. (2009 to present)

Elected Departmental Member, Promotion committee, Dr. Gary Anderson - 2014

Elected Departmental Member, Promotion committee, Dr. Mark Belmonte - 2014

Elected Departmental Member, Promotion committee, Dr. James Roth -2014

Member, Department of Biological Sciences Instructor Hiring Committee, 2013

Member, Department of Biological Science Awards Committee, (2012-present)

Elected Departmental Member, Promotion committee, Dr. Dirk Weihrauch - 2012

Elected Departmental Member, Promotion committee, Dr. Anne Worley - 2012

Elected Departmental Member, Promotion committee, Dr. Sylvie Renault -2012

Member, UMFA Collective Agreement Committee, (January 2006 to present)

Member, UMFA Executive Committee, (September 2011 to present)

Member, Science Ad Hoc Discipline Committee, 2006 - 2007

Presenter, Peguis First Nation Science Symposium, February, 2006

Presenter, Peguis First Nation Science Symposium, Dissection of the Common Grass Frog, February, 07

Member, Department of Biological Sciences Ecology Theme group Committee, (2010 – present)

Member, Department of Biological Sciences Integrative Biology Theme group Committee, (2010 – present)

Member, Vice-Provost (Academic Affairs) Learning Technologies Advisory Group, March 06 to March 2009

Staffed the Biology Program booth and interacted with prospective students at University of Manitoba “Evening of Excellence” (Oct 2001 - 2014).

Acting Coordinator, Biology Program, August 2004.

Microbiology Instructor Hiring Committee Member (Continuing position) - 2003.

Steering committee member, Campus Life Manitoba 2003- present.

Acting Coordinator, Biology Program, August 2003.

Microbiology Instructor Hiring Committee Member (Term position) - 2002.

Biology Program and Dept. of Botany representative on the Faculty of Science, Standing Committee on Information System, 2002 - present.

Disability Services Faculty Mentor, 2002 - present.

University Teaching Services Faculty Mentor for Ms. Kristina Hunter, Environmental Science Program 2002 -2003.

Disability Services Faculty Access Committee Member, 2001-present.

Biology representative on the Science and Technology Library Users Group 2000 - 2005.

UMFA representative on the Patent and Copyright Bylaw and Intellectual property review committee. 2000-2001.

UMFA Board of Representatives member for the constituency of Microbiology, Botany and Pharmacy. 1998- 2001.

**(7) Outreach Service activities:**

Co-Chair, Program Committee, 9th World Down Syndrome Congress, Vancouver 2006 (May 2004 – July 2006).

Organized tours of life science area (Microbiology, Zoology and Botany) for students from West Kildonan High School (March / 2003).

Member of Canadian Down Syndrome Society 2002 National Conference organizing committee ( 2000-2002).

Organized tour of life science area (Microbiology, Zoology and Botany) for advanced stream biology students from Kelvin High School (February / 2001).

Tour of life science area (Microbiology, Zoology and Botany) for advanced stream biology students from Kelvin High School (March / 1999).

Vice President, Friends of the Field Station (Delta Marsh) (March/1998 to March/1999).

Tour of life science area (Microbiology, Zoology and Botany) for biology students from Whitemouth High School (Oct. 1998).

Tour of life science area (Microbiology, Zoology and Botany) for advanced stream biology students from Kelvin High School (February / 1997).

Past- President, Friends of the Field Station (Delta Marsh) March/1996 to March/1997.

President, Friends of the Field Station (Delta Marsh) March/1994 to March/1996.

Tour of life science area (Microbiology, Zoology and Botany) for biology students from Sourris High School (April 1996).

Tour of life science area (Microbiology, Zoology and Botany) for advanced stream biology students from Kelvin High School (Feb / 1996).

Tour of life science area (Microbiology, Zoology and Botany) for advanced stream biology students from Kelvin High School (February / 1995).

Tour of life science area (Microbiology, Zoology and Botany) for advanced stream biology students from Kelvin High School (Jan / 1994).

**(8) Associations and other professional activities:**

Chair, Board of Directors, Canadian Down Syndrome Society (May 2005 to May 2010).

Treasurer, Canadian Down Syndrome Society (May 2003 to May 2005).

Member, Board of Directors, Canadian Down Syndrome Society (May 2002 to May 2012).

Faculty affiliate (ecology). The Biology Place web site, Peregrine Publishers. (<http://www.biology.com>) 1999 - 2000

University of Manitoba World Wide Web (WWW) committee (1995-2000).

National Association of Biological Teachers 1993-1998

Association for Biology Laboratory Education 1993-1998

**(9) Lectures given in the following courses at the University of Manitoba**

Department of Botany

Botany 236 Plants in the Prairie Landscape (1993),  
Botany 237 Principles of Ecology (field course)(1991- 2),  
Botany 354 Community Ecology, (1992)  
Botany 468 Conservation Strategies, (1993)  
Botany 356 Environmental Conservation Issues (1994)

Department of Zoology

Zoology 477 Quantitative and Theoretical Ecology, (1992).

**(10) Teaching Assistant/ Demonstrator positions in the following courses at the University of Manitoba (1990-1993):**

Department of Botany

Botany 230 The Biology of Seed Plants, (1990)  
Botany 236 Plants in the Prairie Landscape, (1991-3)  
Botany 237 Principles of Ecology (field course) (1991-2),  
Botany 237 Principles of Ecology, (1991)  
Botany 354 Community Ecology, (1992)  
Botany 355 Environmental Conservation Issues, (1992)  
Botany 465 Analysis of Biological Communities, (1992-3)  
Botany 734 Landscape Architectural Field Ecology, (1991)

Department of Zoology

Zoology 237 Principles of Ecology, (1992)  
Zoology 477 Quantitative & Theoretical Ecology, (1990-2)

Introductory Biology

Biology 125 Introductory Biology (1990-3)



# **Joy Stacey, MSc., PhD (Biology)**

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W471 Duff Roblin · (204)474-6380 · joy.stacey@umanitoba.ca

## EDUCATION

2003- 2009 Memorial University of Newfoundland PhD(Biology)

**The role of vanadium in the physiology of ascidians**

Comprehensive Examination “Uptake mechanisms and significance of accumulation/sequestering by marine invertebrates of elements which occur in naturally low or trace levels in seawater”

**Passed with distinction**

2000-2003 Memorial University of Newfoundland MSc., (Biology)

**The impact of mussel (*Mytilus* sp.) farming on the zooplankton communities of Notre Dame Bay, Newfoundland**

1994-1999 Memorial University of Newfoundland BSc.(Hons.)Biology major, English minor

**The localization of iron and vanadium in *Strongylocentrotus droebachiensis*, *Cucumaria frondosa*, *Halocynthia pyriformis* and *Ciona intestinalis***

## EMPLOYMENT/TEACHING EXPERIENCE

2015-2016 University of Manitoba, Department of Biological Science

Course development- Developed “Biology and Society”, a 4<sup>th</sup> year course offered as a special topics course, to be converted into a regular course for Winter 2017 (tentative)

2008-present University of Manitoba, Department of Biological Sciences

**Instructor II**, teaching lectures for Biology 1020, Biology 1010, Biology 2200/ Biology 2210 (sabbatical fill ins , Laboratory sections of Biology 2200 and Biology 2210)

1999-2008 Memorial University Department of Biology

**Teaching assistant or laboratory instructor** for more than 25 sections in total, including

B1001/1002 -Principles of Biology (laboratory instructor, 2 terms)

B2040/2041- Modern Biology and Human Society

B2900 - Principles of Evolution and Systematics

B2060 - Principles of Cell Biology

B2122 - Biology of Invertebrates

B2210 - Biology of Vertebrates

B2900 - Population and Evolutionary Ecology

B4040 - Mycology

B4605/7220 - Quantitative Methods in Biology

1999 Newfoundland Cold Ocean Aquarium Association/Ocean Sciences Centre

**Public education co-coordinator** and guide: developed and presented marine educational tours the general public and students and managed day to day operations



## PROFESSIONAL DEVELOPMENT

University of Manitoba Learning and Development Services Workshops 2008-present

ANGEL workshop

Copyright: why you should care

Online Course Deliveries: challenges and rewards

Guidelines to constructing and deconstruction of multiple choice for exams

Practical aspects of using stories in teaching

Performance elements of instruction 3: Instructor expressiveness: gesture and non-verbal behaviours in successful instruction

Performance elements of instruction 4: effective use of humor in teaching

Developing effective online communications to promote critical thinking

Developing your teaching dossier

The art of questioning!

Peerwise

How do we know it's working?

Constructive course alignment

Rubric design: to rubric or not?

### Conferences

2008-present

Canadian Society of Zoologists Annual Meeting, May 2009, Scarborough, ON, Canada

Experimental Biology Meeting, April 2010, Anaheim, CA, USA

Canadian Society of Zoologists Annual Meeting, May 2011, Ottawa, ON, Canada

Experimental Biology Meeting, April 2012, San Diego, CA, USA

Canadian Society of Zoologists Annual Meeting, May 2012, Sackville, NB, Canada

Canadian Society of Zoologists Annual Meeting, May 2013, Guelph, ON, Canada

Canadian Society of Zoologists Annual Meeting, May 2014, Montreal, ON, Canada

American Association for the Advancement of Science Annual Meeting, February, 2015, San Diego CA, USA

Canadian Society of Zoologists Annual Meeting, May 2015, Calgary, AB, Canada

## COMMITTEE MEMBERSHIP

### Department

Undergraduate Curriculum Committee

Retention and Promotion Committee (2009- 2014)

Museum and collections committee

Safety group

Hiring committees for two technical positions (First year biology lab technician, 2011; Equipment technician 2011)

Faculty of Science Indigenous Achievement Committee

### Faculty hiring committees

Microbiology (1 position, 2012)

Computer Science (5 positions, 2011/12, 2013/2014, 2015/2016 )

### University

LMS review committee (2011)

## PUBLICATIONS

J.R. Treberg, Stacey, J.E. and W. R. Driedzic 2012  
Comparative Biochemistry and Physiology, Part B. 161: 323-330. Vanadium accumulation in ascidian coelomic cells is associated with enhanced pentose phosphate capacity but not overall anaerobic metabolism.

Stacey, J.E. and W.R. Driedzic. 2010  
Journal of Experimental Marine Biology and Ecology 386: 11-18. Seasonal variability in, and impact of food availability on, iron and vanadium content of *Ciona intestinalis* tissues (Tunicata, Ascidiacea )"

Hall, J.R., Short, C.E., Petersen, L.H., Stacey, J.E., Gamperl, A.K. and Driedzic, W.R. 2009  
Comparative Biochemistry and Physiology, Part D. 4: 128-138. Expression levels of genes associated with oxygen utilization, glucose transport and glucose phosphorylation in hypoxia exposed Atlantic cod (*Gadus morhua*)

Anderson, R.R., Rivkin, R.V., Deibel, D., Thompson, R.J., Edwards, T.J. Stacey, J.E. and J. R. Ryan 2008  
International Council for the Exploration of the Sea CM 2008/H08. Ecosystem interactions with mussel culture in Newfoundland coastal waters.

Stacey, J.E. 2007  
*In* Vanadium Biochemistry. M.A. Alves Ed. Research Signpost. ISBN 978-81-308-0184-1. Chapter10.  
Ecophysiology of vanadium accumulation by ascidians.

## CONFERENCE PRESENTATIONS

May 2011 Treberg, J.R., Stacey, J.E. and W.R. Driedzic  
Carbohydrate metabolism in coelomic cells from tunicates with different degrees of vanadium accumulation.  
Treberg J.R., Stacey J.E. and Driedzic W.R. Oral presentation by J. Treberg to the Canadian Society of Zoologists, Ottawa, ON, Canada,

May 2009 Stacey, J.E. and W.R. Driedzic  
Response of North Atlantic ascidians to elevated vanadium Oral presentation to the Canadian Society of Zoologists annual meeting, Toronto, ON, Canada

May 2007 Stacey, J.E. and W.R. Driedzic  
Ecophysiology of vanadium accumulation by North Atlantic ascidians (Tunicata, Ascidiacea). Oral presentation to the Canadian Society of Zoologists annual meeting, Montreal, QU, Canada

September 2006 Stacey, J.E. and W.R. Driedzic  
Seasonal vanadium and iron contents, and coelomic cell composition and G6PDH activity in North Atlantic ascidians. Poster presentation to the American Chemical Society annual meeting.  
**Winner** of best poster presentation by a young investigator, 5th International Symposium on the Chemistry and Biochemistry of Vanadium

May 2005 Stacey, J.E. and W.R. Driedzic  
Effect of seasonal and experimentally manipulated food availability on the blood vanadium and iron content of two ascidians : *Ciona intestinalis* and *Halocynthia pyriformis*. Oral presentation to the Canadian Society of Zoology annual meeting. Kingston, ON.

January 2004 Stacey, J.E. and D. Deibel  
The impact of mussel farming on zooplankton communities on Notre Dame Bay, Newfoundland. Oral presentation to the Canadian Conference for Fisheries Research annual meeting. St. John's, NL.

September 2002

Stacey, J. and D. Deibel

The impact of mussel farming on estuarine zooplankton communities. D. Poster presentation to the 2nd annual Aquanet Research Conference and Annual General Meeting. Moncton, NB

June 2002

Stacey, J. and D. Deibel

The role of zooplankton in sustainable shellfish aquaculture. Oral presentation to the American Society of Limnology and Oceanography Aquatic Sciences Summer Meeting. Victoria, B.C.

March 2002

O'Rourke, J.; Anderson, M.R.;

Barnes, M.; Deibel, D.; Rivkin, R.B.; Thompson, R.; Tian, R.; Stacey, J.; Matthews, P.; Whalen, B.; Ryan, J

Habitat implications of mussel farming in coastal Newfoundland, Canada. Oral presentation by M.R. Anderson to the annual Ocean Sciences Meeting, American Geophysical Union.

June 2001

Stacey, J and D.. Deibel

The role of zooplankton in sustainable shellfish aquaculture. Poster presentation to the 1st Annual Aquanet Research Conference and Annual General Meeting. Halifax, NS, 2001

## PROFESSIONAL SOCIETIES

- Canadian Society of Zoologist, member

## Curriculum Vitae – Jason (Jake) M. Stout

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(204) 474-8493

Department of Biological Sciences

University of Manitoba

Manitoba, MB R3T 2N2

Canada

### Education

**Ph.D.** Purdue University, West Lafayette, IN. Department of Biochemistry. October 2007

**M.Sc.** in Plant Agriculture. University of Guelph, Guelph, ON. September 2000.

**B.Sc.** in Environmental Biology. Minor in Plant Biotechnology. University of Guelph, Guelph, ON. April 1997.

### Positions

Assistant Professor. University of Manitoba. July 2014 – present.

Owner and Operator. Plant Analytics Canada. June 2013 – present.

Content Reviewer. Cactus Communications. July 2013 – present.

Partner and Chief Scientific Officer. Advantage Phytonatural Therapeutics. June 2013 – December 2013.

Postdoctoral fellow / Research Associate. National Research Council of Canada, Plant Biotechnology Institute. July 2008-May 2013.

Lab Technician. Department of Zoology. University of Guelph. September 2000-September 2001.

Summer Research Student. Pioneer Hi-Bred. Georgetown, ON. Summer 1996.

### Theses

Ph.D. thesis. 2007. Characterization of semi-dominant alleles of *REF4* and their impact on phenylpropanoid accumulation in *Arabidopsis*. Department of Biochemistry, Purdue University. Thesis advisor: Dr. Clint Chapple.

M.Sc. thesis. 2001. Expression of a pectin methylesterase and a thaumatin gene in relation to deep supercooling in *Vitis riparia* Michx. buds. Department of Plant Agriculture, University of Guelph. Thesis advisor: Dr. Bryan McKersie.

B.Sc. Honors thesis. 1996. Department of Environmental Biology. Paclobutrazol pre-treatment protects wheat seedlings from UV-induced DNA damage. Thesis advisor: Dr. Austin Fletcher.

## Grants and Awards

1. "Monoterpene indole alkaloid gene discovery and evolution in the Apocynaceae". NSERC Discovery Grant. \$145000.
2. Research Startup Funds. University of Manitoba. \$120000
3. NRC visiting scholar fellowship. 2008 to present.
4. Ronald C Moyer Scholarship. 1998.

## Teaching

### Full Courses

1. BIOL2520 Cell Biology. Winter 2015.
2. BIOL2380 Introduction to Toxicology. Winter 2015.

### Guest Lectures

1. 2015 June. BIOL2300 Principles of Ecology. University of Manitoba. 'Ecology of Natural Plant Products'.
2. 2014 November, BIOL7720 Critical Thinking in Biology. University of Manitoba. 'Biochemical Genomics: Using Next-Generation Sequencing to Elucidate Biochemical Pathways'.
3. 2014 September, BIOL3100. Short presentation on research conducted in my laboratory.
4. November 2012. BIOL316 Eukaryotic Molecular Genetics. University of Saskatchewan. 'Plant model and non-model systems.'
5. September 2012. Plant agriculture graduate student seminar series. University of Saskatchewan. 'Chemical genomics in *Cannabis sativa*.'
6. February 2012. Guest lecturer. BIOL316 Eukaryotic Molecular Genetics. University of Saskatchewan. 'Next generation sequencing approaches for understanding plant biochemistry.'
7. November 2010. Guest lecturer. Functional Genomics in Food and Bioproducts, graduate course. University of Saskatchewan. 'Next generation sequencing techniques and biochemical genomics.'

### Andragogy training

1. September to December 2014. Completed the following Centre for the Advancement of Teaching and Learning workshops: 'Desire2Learn Course Setup Introduction', 'Desire2Learn Content Indepth', 'Desire2Learn Quizzes Indepth', 'Desire2Learn Gradebook Indepth', and 'Short Scaffold Writing Assignments in STEM Fields'.
2. August 11<sup>th</sup> to 14<sup>th</sup> 2014. Completed the 'Summer Teaching Institute', a four day andragogy workshop offered by the Centre for the Advancement of Teaching and Learning, University of Manitoba.
3. September to November 2012. Completed 'Transforming Teaching', a higher learning andragogy course for postdoctoral fellows and new faculty. Gwenna Moss Centre for Teaching Effectiveness. University of Saskatchewan.

### Teaching Assistantships

1. Teaching assistant, Medical Biochemistry, Department of Biochemistry, Purdue University, 2004.
2. Teaching assistant, Biochemistry for Non-Majors, Department of Biochemistry, Purdue University, 2003.
3. Teaching assistant, Plant Agriculture, Department of Plant Agriculture, University of Guelph, 1998 to 2000.

## Supervision and Training

### Undergraduate Students

1. Jarret Best. May 2015 to present.
2. Matheus Augusto Patricio De Almeida. May 2015 to present.
3. Jacob (Jake) Cavers. Undergraduate research assistant. October 2014 – April 2015.

4. Drew Florence. Biology thesis student. Development of molecular markers to track the loss of heterozygous loci in selfed hemp plants. September 2011-April 2012. Drew won the agricultural department undergraduate student symposia “best presentation” award based upon this work.
5. Shawn Whitfield. NRC summer student. Investigations into potential interactions between DABB proteins and polyketide synthases in Arabidopsis. May 2011-August 2011.

## Service

### Department of Biological Sciences

1. Recruitment and Retention Committee. April 2015 to present.
2. Promotion and Tenure committee member for Dr. Mark Belmonte, Dr. Jim Roth, and Dr. Gary Anderson. October to November 2014.
3. Chemical inventory system deployment committee. October 2014.
4. MSc thesis committee member. Student: Jianfie Shao. Advisors: Sylvie Renault and John Markham. December 2014 to present.

### School of Science

1. MSc defence examiner. Department of Chemistry. Student: Ryan Macdonald. Advisor: Mazdak Khajepour. December 10<sup>th</sup> 2014.

### University of Manitoba

1. PhD defence chair. Department of Entomology. Student: Rassol Bahreini. Advisor: Dr. Robert Currie. November 13<sup>th</sup> 2014.
2. MSc external committee member. Faculty of Agriculture and Food Sciences. Department of Human Nutritional Sciences. Student: Jennifer Vancure. Advisor: Miyoung Suh. November 2014 to present.

### Professional

1. Manuscript review
  - a. 2014: BMC Plant Biology
  - b. 2009: Plant Cell and Environment
  - c. 2013: Genome Biology, DNA Research
2. Grant review
  - a. National Science Centre, Poland. Evaluated a graduate-level grant. October 2014.
3. Ad hoc
  - a. Student oral presentation evaluator, CSPB AGM, June 2012.

## Publications

1. Sawler J, **Stout JM**, Gardner KM, Hudson D, Vidmar J, Butler L, Page JE & Myles S. The genetic structure of cannabis. Accepted by PLoS One.
2. Purves R, Ambrose SJ, Clark SM, **Stout JM**, Page JE. (2015) Separation of isomeric short-chain acyl-CoAs in plant matrices using ultra-performance liquid chromatography coupled with tandem mass spectrometry. *Journal of Chromatography B*. 980(1):1-7 PMID 25553535  
Contribution: Preparation of CoA samples for analysis. Biological interpretation of data.

3. Xiao M, Zhang Y, Chen X, Lee E-J, Barber C, Chakrabarty R, Desgagne-Penix I, Kim Y-B, Liu E, MacNevin G, Masada-Atsumi S, Reed M, **Stout JM**, Zerbe P, Zhang Y, Bohlmann J, Covello PS, De Luca V, Page JE, Ro D-K, Martin VJJ, Facchini PJ, and Sensen CW. (2013) Transcriptome analysis based on next-generation sequencing of non-model plants producing specialized metabolites of biotechnological interest. *Journal of Biotechnology*. 166(3): 122-134. PMID 23602801.  
Contribution: Development of cDNA library preparation method for 454 sequencing. Analysis and biological interpretation of data. Writing of a portion of the manuscript.
4. Gagne SJ, **Stout JM**, Liu E, Boubakir Z, Clark SM and Page JE. (2012) Identification of olivetolic acid cyclase from *Cannabis sativa* reveals a unique catalytic route to plant polyketides. *Proceedings of the National Academy of Science*. 109(31): 12881-12886. PMID 22802619.  
Contribution: Conceptualization and initiation of project. Cloning of candidate genes. Expression of candidate genes in *E. coli*. Phylogenetics. Manuscript editing.
5. **Stout JM**, Boubakir Z, Ambrose S, Purves R, Page J. (2012) The hexanoyl-CoA precursor for cannabinoid biosynthesis is formed by an acyl-activating enzyme in trichomes of *Cannabis sativa*. *The Plant Journal*. 71(3): 353-65. PMID 22353623. Cover photograph and highlighted paper.  
Contribution: Candidate gene identification and cloning. Heterologous protein expression in *E. coli*. LCMS method development and analysis. Enzyme kinetics. Subcellular protein localization using confocal microscopy. Phylogenetics. Manuscript preparation and editing.
6. Bonazit D, Soltau WL, Blatchley MR, Powers BL, Hurlock AK, Seals LA, Weng JK, **Stout JM**, and Chapple C. (2012) REF4 and RFR1, subunits of the transcriptional coregulatory complex mediator, are required for phenylpropanoid homeostasis in Arabidopsis. *The Journal of Biological Chemistry*. 287: 5434-5445. PMID 22167189.  
Contribution: Isolation of homozygous T-DNA lines. Verification of gene disruption by qRT-PCR. Isolation of intragenic *REF4* suppressor mutants. Manuscript editing.
7. van Bakel H, **Stout JM**, Cote AG, Tallon C, Sharpe AG, Hughes TR, Page JE. (2011) The draft genome and transcriptome of *Cannabis sativa*. *Genome Biology*. 12:R102. Highly accessed manuscript. F1000 evaluated: <http://f1000.com/13395957>. PMID 22014239.  
Contribution: Nucleic acid extractions. Analysis of the assembled genome for genes of interest. Manuscript writing (portion of the results section).
8. Shilmiller AL, **Stout J**, Weng JK, Humphries J, Ruegger MO, Chapple C. (2009) Mutations in the *cinnamate 4-hydroxylase* gene impact metabolism, growth and development in Arabidopsis. *The Plant Journal*. 60: 771-782. PMID 19682296. Note: Schilmiller and **Stout** are co-first authors.  
Contribution: LCMS analysis and identification of novel metabolites. Lignin quantity and quality analysis. Electron microscopy sample preparation. Manuscript preparation.
9. **Stout J**, Romero-Severson E, Ruegger M, Chapple C. (2008) Semidominant mutations in *Reduced Epidermal Fluorescence 4* reduce phenylpropanoid content in Arabidopsis. *Genetics* 178: 2237-2251. PMID 18430946.  
Contribution: Map-based cloning of *REF4*. Genetics demonstrating the semi-dominance of mutant *REF4* alleles. RNAi-mediated transcript knockdown in mutant plants. EMS mutagenesis. Suppressor mutant screen. Metabolite analysis by HPLC. Lignin analysis. Manuscript preparation.
10. Weng JK, Lu X, **Stout J**, and C Chapple. (2008). Independent origins of syringyl lignin in vascular plants. *Proceedings of the National Academy of Science*. 105(22): 7887-92. PMID 18505841.  
Contribution: Initiation of project. Lignin quality analysis of a diverse range of plant species.

11. Sinlapadech T, **Stout J**, Ruegger MO, Deak M, Chapple C. (2007) The hyper-fluorescent trichome phenotype of the *brt1* mutant of Arabidopsis is the result of a defect in a sinapic acid:UDPG glucosyltransferase. *The Plant Journal* 49, 655-668. PMID 17217457.  
Contribution: Isolation and structural elucidation by GCMS of a novel fluorescent polyketide.
12. **Stout J**, Chapple C.(2004) The phenylpropanoid pathway in Arabidopsis: lessons learned from mutants in sinapate ester biosynthesis. In: *Recent Advances in Phytochemistry*. Volume 38. pp. 39-68. (Review)
13. Woram RA, McGowan C, **Stout J**, Gharbi K, Ferguson MM, Hoyheim B, Davidson EA, Davidson WS, Rexroad C, Danzmann RG. (2004) A genetic linkage map for Arctic char (*Salvelinus alpinus*): evidence for higher recombination rates and segregation distortion in hybrid versus pure strain mapping parents. *Genome* 47, 304-315. PMID 15060583.  
Contribution: Development of an "in house" AFLP marker system. AFLP marker scoring of two populations. Linkage analysis of markers.

### Invited lectures

1. Stout JM. Elucidation of the cannabinoid biosynthetic pathway in *Cannabis sativa* using biochemical genomics. Biology Department, University of Manitoba. March 20, 2013.
2. Stout JM, van Bakel H, Boubakir Z, Cote A, Ambrose S, Purves R, Hughes TR, Page JE. Biochemical genomics in *Cannabis sativa*. Biology Department, University of Regina. January 20, 2012
3. Stout JM, van Bakel H, Boubakir Z, Cote A, Ambrose S, Purves R, Hughes TR, Page JE. Biochemical genomics in *Cannabis sativa*. National Research Council of Canada, Plant Biotechnology Institute. November 9, 2011
4. Stout JM, Chapple C. Biofuels, Semidominance and Lignin: From Basic Research to Potential Applications. University of Saskatchewan, Biology Seminar Series, March 22, 2009
5. Stout JM, Chapple C. Semi-dominant mutations in *REF4* cause global reductions in phenylpropanoid metabolism in Arabidopsis. Leibniz Institute of Plant Biochemistry, Halle (Salle), Germany. February 2009
6. Stout JM, Chapple C. Semi-dominant mutations in *REF4* cause global reductions in phenylpropanoid metabolism in Arabidopsis. Plant Biology Symposia, Purdue University IN, August 2006

### Selected presentations (presenter's name is underlined)

1. Stout JM. How the cannabis genome can (eventually!) help the hemp industry. Canadian Hemp Trade Alliance conference, Winnipeg MB, November 17<sup>th</sup> 2014. (keynote address)
2. Stout JM, van Bakel H, Gagne S, Boubakir Z, Liu E, Ambrose S, Purves R, Hughes TR, Page JE. Genomic analysis of *C. sativa* reveals the recruitment of an acyl-activating enzyme for cannabinoid biosynthesis by a change in subcellular localization. Canadian Society of Plant Biology Annual General Meeting, Edmonton AB, June 25-27 2012. (contributed talk)
3. Stout JM, van Bakel H, Hughes TR, Page JE. The draft genome and transcriptome of *Cannabis sativa*. Second Annual Progress and Applications of Next Generation Sequencing Workshop. May 3-4, Saskatoon, SK. (contributed talk)
4. Stout JM, Boubakir Z, Ambrose S, Purves R, Page JE. The hexanoyl-CoA precursor for cannabinoid biosynthesis is formed by an acyl-activating enzyme in trichomes of *Cannabis sativa*. Canadian Plant Genomics Workshop 2011, Aug 22-25, 2011, Niagara Falls, ON (contributed talk)
5. Stout JM, Boubakir Z, Ambrose S, Purves R, Page JE. The hexanoyl-CoA precursor for cannabinoid biosynthesis is formed by an acyl-activating enzyme in trichomes of *Cannabis sativa*. Gordon Research Conference – Plant Metabolic Engineering, July 24-29, 2011, Waterville Valley, NH, USA (poster)
6. Page JE, van Bakel H, Cote A, Stout J, Hughes TR. The genome of *Cannabis sativa*. 21st Annual Symposium of the International Cannabinoid Research Society, July 5-9, 2011, St. Charles, IL, USA (contributed talk)
7. Purves RW, Stout JM, Ambrose SJ, Page, JE. Identification and quantification of short and mid-chain coenzyme-As in hemp (*Cannabis sativa*) using UPLC and tandem mass spectrometry. 59<sup>th</sup> ASMS Conference on Mass Spectrometry, June 5-9, 2011, Denver, Colorado (poster)



8. Stout JM and Page JE. Acyl-activating enzymes in *Cannabis sativa*: EST genomics identifies genes for carbon entry into cannabinoid metabolism. 2<sup>nd</sup> Banff Conference on Plant Metabolism, June 24-28, 2010, Banff, AB (poster)
9. Stout JM and Page JE. Acyl-activating enzymes in *Cannabis sativa*: Candidate genes for carbon entry into cannabinoid metabolism. Gordon Research Conference on Plant Metabolic Engineering. July 12-17, 2009, Waterville Valley, USA (poster)
10. Stout JM, Chapple C. Semi-dominant mutations in *REF4* cause global reductions in phenylpropanoid metabolism in Arabidopsis. Banff Conference on Plant Secondary Metabolism, August 2008 (poster)
11. Stout JM, Chapple C. Semi-dominant mutations in *REF4* cause global reductions in phenylpropanoid metabolism in Arabidopsis. Gordon Conference (Plant Molecular Biology), Plymouth NH, July 2006 (poster)
12. Stout JM, Schillmiller AL, Chapple C. Mapping and characterization of the Arabidopsis *ref3* mutant defective in C4H. Phytochemical Society of North America, Ottawa ON, July 2004 (poster)
13. Stout JM, Romero-Severson E, Chapple C. Phenotypic analysis and preliminary mapping of the Arabidopsis *ref4* mutant. Phytochemical Society of North America, Peoria IL, August 2003 (poster)
14. Stout JM, McKersie B. Expression of Genes Associated with Freezing Avoidance in *Vitis riparia*. International Society of Plant Molecular Biology, Quebec City PQ, June 2000 (poster)

### Intellectual property

1. Page JE, Stout JM. Cannabichromenic acid synthase from *Cannabis sativa*. US Provisional Patent (applied). 2014.
2. Page JE, Stout JM. Genes and proteins for alkanoyl-CoA synthesis. US patent. Canada patent. Various others. 2011
3. Chapple, C, Stout JM. Semi-dominant mutations to reduce phenylpropanoid metabolism in plants. US Provisional Patent Application. 2008.

### Consulting

April 2014. Expert Witness. "Regina v. Cole". Batchelor Stamm Law Corporation. Victoria, BC.  
 September 2012 to November 2012. Manus Biosynthesis Inc. Cambridge, MA. USA.

### Outreach

- Cannabinoids and cannabis. Interview for the Canadian University Press podcast. September 2010.
- 'Understanding Biotechnology: Dealing With the Issues'. Educational Poster. Royal Canadian Winter Fair. 1999.
- 'Plant Transformation'. Educational poster. Royal Canadian Winter Fair. 1998.
- GMO technology debate (principle organizer). University of Guelph. 1998.

### Professional memberships

- Canadian Society of Plant Biologists
- Canadian Consortium for Investigation of Cannabinoids

### Extracurricular activities

- PBI Staff Association. Acting member. 2008-2010.
- Founding member and Programming Director. Purdue Student Radio. 2005-2007.
- Senator. Purdue Graduate Student Senate. 2005-2006.

## *Curriculum Vitae: Jason R. Treberg*

### **Jason Robert Treberg**

Department of Biological Sciences (cross appointed to Human Nutritional Sciences)  
University of Manitoba  
Winnipeg, MB, R3T 2N2, Canada  
Phone: (204) 474-8122  
E-mail: Jason.Treberg@umanitoba.ca

Citizenship: Canadian

Date of birth: February 3, 1976.

### **Education:**

2006	Ph.D. (Biology)	Memorial University of Newfoundland
2002	M.Sc. (Biology)	Memorial University of Newfoundland
1999	B.Sc. (Marine Biology <i>Hons.</i> )	University of Guelph

### **Employment History:**

2011-present *Canadian Research Chair in Environmental Dynamics and Metabolism* (NSERC tier 2),  
University of Manitoba  
2011-present Assistant Professor, University of Manitoba  
2008-2011 Post-Doctoral Researcher, Buck Institute for Research on Aging  
(Supervisor: Dr. Martin D. Brand)  
2006-2008 Post-Doctoral Fellow, Memorial University of Newfoundland  
(Supervisor: Dr. John T. Brosnan)

### **Awards and Honours**

2011-2016 Canada Research Chair (NSERC tier 2)  
2008 American Physiological Society (Comparative and Evolutionary Physiology Section)  
Research Recognition Award  
2007, 2008 American Society for Biochemistry and Molecular Biology Postdoctoral Travel Award  
2006-2008 CIHR Post Doctoral Fellowship  
2006-2008 NSERC Post Doctoral Fellowship (*Declined*)  
2006 Best student oral presentation in, “Advances in Fish Biology” section,  
International Congress on the Biology of Fish  
2005 Award for Research Excellence, Graduate Students Union, Memorial  
University of Newfoundland  
2004-2006 Graduate Student Support (Fellowship), Memorial University of Newfoundland.  
2002-2004 Natural Sciences and Engineering Research Council of Canada,  
Postgraduate Scholarship B (\$21000/annum for 2 years: \$42 000 total).  
1999-2001 Graduate Student Support (Fellowship), School of Graduate Studies,  
Memorial University of Newfoundland.

### **Research Funding** (since 2011):

2013-2014 *Beaufort Regional Environmental Assessment* (BREA) student stipend support. \$36 000  
2013 *Testing model of human intestine nitrogen metabolism.* University of Manitoba  
Research Grants Programme. \$7 500  
2012-2017 *Temperature induced oxidative stress.* NSERC Discovery Grant. \$160 000

## *Curriculum Vitae: Jason R. Treberg*

- 2011-2016 Canada Research Chair in Environmental Dynamics and Metabolism (NSERC tier 2). \$500 000
- 2011 *Metabolic Research Laboratory*. Canada Foundation for Innovation (Leaders Opportunity Fund). \$124 462
- 2011 *Metabolic Research Laboratory*. Manitoba Research Innovation Fund. \$124 462

### **Teaching Experience (2011-present)**

#### **University of Manitoba Credit Courses**

- 2015-2016 BIOL4100 Chair of Biology Honours Thesis Committee
- 2015-2016 BIOL4460 (Comparative Animal Energetics)
- 2015-2016 BIOL1000 A03 (Biology: foundations of life)
- 2012-2015 BIOL4100 Biology Honours Thesis Committee
- 2013-2014 BIOL1000 A03 (Biology: foundations of life)
- 2012-2014 BIOL4460 (Comparative Animal Energetics)

#### **Post Doctoral Fellow Mentorship**

- 2014-present Dr. Daniel Munro. Project title: *Balance between mitochondrial ROS production and consumption: A role in determining species longevity?*

#### **Graduate Student Supervision**

(3 total, 3 current, 1 PhD, 1 MSc, 1 MSc co-supervised)

- 2015-present Lilian Wiens, MSc. student. Project title: *Thermal influences on mitochondrial reactive oxygen species metabolism in fishes*
- 2012-present Brittany Lynn, MSc student. Project title: *Energetics in Beaufort Sea Arctic Cod*. Co-supervised with Dr. Jim Reist, DFO, Freshwater Institute.
- 2012-present Nahid Tamanna, PhD student. Project title: *The consequences of methionine restriction on sulphur amino acid, glutathione metabolism and oxidative stress.*

#### **Senior Undergraduate Research Supervision** (student's awards), *project title in italics*

- 2015 Kathryn Kroeker (Faculty of Science USRA). Honours Project: *Role of transhydrogenase in mitochondrial bioenergetics*
- 2014 Kathryn Kroeker (NSERC USRA) *Mitochondrial inhibition by the membrane potential indicator dye safranin-O.*
- 2014 Sheena Banh. *Metabolic biochemistry and mitochondrial function.*
- 2014 Catherine Brandt. *Metabolic indicators of stress in plasma from populations of wild lake trout.*
- 2013 Emianka Sotiri (Faculty of Science USRA). *Comparative mitochondrial reactive oxygen species metabolism.*
- 2013 Pamela Zacharias. *Role of glutamate dehydrogenase in ammonia metabolism of small intestine.*
- 2012 Sheena Banh. *Mitochondrial Reactive Oxygen Species metabolism*
- 2012 Umesh Pandey. *Mitochondrial metabolism and glutathione levels.*

#### **Junior Undergraduate Researchers and Volunteers** *project title in italics*

- 2015 Kristen Braun. *Dietary influences on oxidative stress*
- 2014 Christine Lee (Undergraduate Volunteer). *Thermal sensitivity of mitochondrial glutathione reductase.*

## *Curriculum Vitae: Jason R. Treberg*

2012 Pamela Zacharias (Undergraduate volunteer). *Development of high-sensitivity resazurin based metabolite assays.*

### **Outreach**

2015 Faculty contributor to “How to be the Best” round table discussions with HQP at the annual meeting of the Canadian Society of Zoologists

2014 Faculty contributor to “Student Speed Networking Session” round table discussions with HQP at the annual meeting of the Canadian Nutrition Society

2013 Discussion lunch, organized by Post Doctoral Fellow association of the Canadian Society of Zoologists, to address questions from senior HQP on the transition between graduate research through to obtaining a first faculty position

### **External Examiner on Graduate Thesis**

2011 Jason C.L. Brown (Ph.D) *Thesis title: Mitochondrial metabolic suppression and reactive oxygen species production during hypometabolism in mammals. Supervisor: Dr. James F. Staples, Department of Biology, University of Western Ontario.*

### **Graduate Thesis Advisory Committees (University of Manitoba)**

<u>Student (Degree)</u>	<u>Years</u>	<u>Department</u>
Neil Mochnacz (PhD)	2014-present	Biological Sciences
Bailey Rankin (MSc)	2013-present	Biological Sciences
Michael Gaudry (MSc)	2013-present	Biological Sciences
Shuvo Sabbir (PhD)	2012-present	Microbiology
Alex Quijada-Rodriguez (MSc)	2013-2015	Biological Sciences.
Shuo Haung (MSc)	2012-2014	Biological Sciences
Duncan Barnett (MSc)	2011-2014	Biological Sciences

### **Undergraduate Thesis Examiner or Advisory Committee (University of Manitoba)**

<u>Student</u>	<u>Years</u>	<u>Department</u>
Kelsey Johnson	2015-2016	Biological Sciences
Amanda Van Loom	2015-2016	Biological Sciences
Alyssa Archibald	2014-2015	Biological Sciences
Kevin Bairos-Novak	2014-2015	Biological Sciences
Dana Kolwalsky	2014-2015	Biological Sciences
Arielle Nagy	2014-2015	Biological Sciences
Melanie Fetterly	2013-2014	Biological Sciences
Chelsea M. Lobson	2013-2014	Biological Sciences
Christa Woloschiniwsky	2013-2014	Biological Sciences
Samantha Fulton	2013-2014	Biological Sciences
Cameron Bauer	2012-2013	Biological Sciences
Michael J. Gaudry	2012-2013	Biological Sciences
Stephanie Hans	2012-2013	Biological Sciences
Katie Wild	2012-2013	Biological Sciences
Benjamin Carriere	2011-2012	Biological Sciences
Alex Quijada-Rodriguez	2011-2012	Biological Sciences

## *Curriculum Vitae: Jason R. Treberg*

### **Committee and Administrative Duties**

Honours Thesis Committee, Department of Biological Sciences (2012-present)

Chair 2015-2016

Graduate Studies Committee, Department of Human Nutritional Sciences (2014-2015)

Duff Roblin Animal Holding facility Local Animal Users Committee (LAUC) member for Biological Sciences (2014-present)

Fire warden (3<sup>rd</sup> floor Doff Roblin Building), Department of Biological Sciences (2013-present)

Promotion Committee, Faculty of Science (University of Manitoba). Department of Biological Sciences internal member on committees for three separate academic promotion applications (2012).

### **Peer Review**

Selected Journals: Journal of Biological Chemistry, Free Radical Biology and Medicine, American Journal of Physiology (*Regulatory, Integrative, and Comparative Physiology*; *Endocrinology and Metabolism*; and *Gastrointestinal and Liver Physiology* issues), Journal of Experimental Biology, Comparative Biochemistry and Physiology

Research Grants: NSERC Discovery Grant, National Science Foundation (NSF)

**Publications** 20 in last 5 years (2010-2015); Web of Science h-index = 14; i-10 index = 18

**Note**: HQP from my lab are underlined, HQP from colleague's labs that were trained by me for new techniques/infrastructure in my lab are *italicized*. My name in **bold** indicates that I am corresponding author.

**Peer-reviewed accepted or in press** (*in press* available on request)

33. Alex Quijada-Rodriguez, **Treberg J.R.**, and Dirk Weihrauch. Mechanism of ammonia excretion in the freshwater leech *Nepheleopsis obscura*: characterization of a primitive Rh protein and effects of high environmental ammonia. Accepted by *American Journal of Physiology: Integrative, Comparative and Evolutionary Physiology* (MS#R-00482-2014R1)
32. **Treberg J.R.**, Munro D., Banh S., Zacharias P., Sotiri E. Differentiating between apparent and actual rates of H<sub>2</sub>O<sub>2</sub> metabolism by isolated rat muscle mitochondria to test a simple model of mitochondria as regulators of H<sub>2</sub>O<sub>2</sub> concentration. *Redox Biology* 5:216-224 ([doi:10.1016/j.redox.2015.05.001](https://doi.org/10.1016/j.redox.2015.05.001))
31. \* Aida Adlimoghaddam, Mélanie Boeckstaens, Anna-Maria Marini, **Treberg J.R.**, Ann-Karen Brassinga, and Dirk Weihrauch. 2015. Ammonia excretion in the non-parasitic soil nematode *Caenorhabditis elegans*: Mechanism and evidence of ammonia transport capability of an invertebrate Rh-protein, CeRhr-1. *Journal of Experimental Biology* 218: 675-683.  
\* Featured by the editors in the, "Inside JEB" section; see, Knight K., 2015. Ammonia excretion: *C. elegans* style. *Journal of Experimental Biology*. 218: 647-648.
30. \* **Treberg J.R.**, Banh S., Pandey U., Weihrauch D. 2014. Intertissue differences for the role of glutamate dehydrogenase in metabolism. *Neurochemical Research* 39: 516-526.  
\*Invited paper, stemming from my invited talk at the 2<sup>nd</sup> Human Glutamate Dehydrogenase meeting in Heraklion (Greece). The paper is largely a synthesis of my previous work in the area but also included preliminary work by my trainees and a small pilot study that led to collaborative efforts between my and D. Weihrauch's groups on intestine.

## *Curriculum Vitae: Jason R. Treberg*

29. Hans S., Fehsenfeld S., **Treberg J.R.**, Weihrauch D. 2014. Acid-base regulation in the Dungeness crab (*Metacarcinus magister*). *Marine Biology* 161:1179-1193.
28. **Banh S., Treberg J.R.** 2013. The pH sensitivity of H<sub>2</sub>O<sub>2</sub> metabolism in skeletal muscle mitochondria. *FEBS Lett.* 587:1799-1804
27. Cruz M.J, Sourial M.M, **Treberg J.R.**, Adlimoghaddam A., Fehsenfeld S., Weihrauch D. 2013 Cutaneous nitrogen excretion in the African clawed frog *Xenopus laevis*: Effects of high environmental ammonia (HEA). *Aquatic Toxicology* 136-137:1-12.
26. Quinlan C.L., **Treberg J.R.**, Perevoshchikova I.V., Orr A.L., Brand M.D. 2012. Native rates of superoxide production from multiple sites in isolated mitochondria measured using endogenous reporters. *Free Radical Biology and Medicine* 53:1807-17.
25. Quinlan C.L., Orr A.L, Perevoshchikova I.V, **Treberg J.R.**, Ackrell B.A., Brand M.D. 2012. Mitochondrial complex II can generate reactive oxygen species at high rates in both the forward and reverse reactions. *Journal of Biological Chemistry* 287: 27255-27264.
24. **Treberg J.R.**, Stacey J.E., Driedzic W.R. 2012. Ascidian coelomic cell metabolism: comparison between vanadium accumulators and non-accumulators. *Comparative Biochemistry and Physiology – 161B*: 323-330.
23. Quinlan C.L., Gerencser A.A., **Treberg J.R.**, Brand M.D. 2011. The mechanism of superoxide production by the antimycin-A inhibited mitochondrial Q-cycle. *Journal of Biological Chemistry* 286: 31361-31372.
22. **Treberg J.R.**, Quinlan C.L., Brand M.D. 2011. Evidence for two sites of superoxide production by mitochondrial NADH-Q oxidoreductase (complex I). *Journal of Biological Chemistry* 286: 27103-27110.
21. **Treberg J.R.** and Brand M.D. 2011. A model of the proton translocation mechanism of complex I. *Journal of Biological Chemistry* 286: 17579-17584.
20. Quinlan C.L., **Treberg J.R.**, Brand M.D. 2011. Mechanisms of mitochondrial free radical production and their relationship to the aging process. In: Masoro, E. J. and Austad, S. N., (eds.), *Handbook of the Biology of Aging (7th Edition)*, Academic Press, London, Chapter 3, pp 47-61.
19. **Treberg J.R.**, Brosnan M.E., Brosnan J.T. 2010. The simultaneous determination of NAD(H) and NADP(H) utilization by glutamate dehydrogenase. *Molecular and Cellular Biochemistry* 344: 253-259.
18. **Treberg J.R.**, Quinlan C.L., Brand M.D. 2010. Hydrogen peroxide efflux from muscle mitochondria underestimates matrix superoxide production: a correction using glutathione depletion. *FEBS Journal* 277: 2766-2778.
17. **Treberg J.R.**, Clow K.A., Greene K.A., Brosnan M.E., Brosnan J.T. 2010. Systemic activation of glutamate dehydrogenase increases renal ammoniogenesis: implications for the

## *Curriculum Vitae: Jason R. Treberg*

hyperinsulinism/hyperammonemia syndrome. *American Journal of Physiology: Endocrinology and Metabolism* 298: E1219-1225.

16. Jastroch M, Divakaruni A.S, Mookerjee S., **Treberg J.R.**, Brand M.D. 2010. Mitochondrial proton and electron leaks. *Essays in Biochemistry* 47: 53-67.
15. Speers-Roesch B and **Treberg J.R.** 2010. The unusual energy metabolism of elasmobranch fishes. *Comparative Biochemistry and Physiology* 155A: 417-434.  
A review submitted (by invitation) to *Comparative Biochemistry and Physiology* in contribution to a special issue of CBP A, entitled "Biology of Elasmobranchs: from genes to ecophysiology and behaviour".
14. Clow K.A., **Treberg, J.R.**, Brosnan M.E. and Brosnan J.T. 2008. Elevated tissue betaine contents in developing rats are due to dietary betaine, not to synthesis. *Journal of Nutrition*. 139: 1641-1646.
13. **Treberg J.R.**, MacCormack T.J., Lewis J.M., Almeida-Val V.M.F, Val A., Driedzic W.R. 2007. Intracellular Glucose and Binding of HK and PFK to Particulate Fractions Increase under Hypoxia in Heart of the Amazonian Armoured Catfish (*Liposarcus pardalis*). *Physiological and Biochemical Zoology*. 80: 542-550.
12. **Treberg J.R.** and Driedzic W.R. 2007. The accumulation and synthesis of betaine in winter skate (*Leucoraja ocellata*). *Comparative Biochemistry and Physiology A* 147: 475-483.
11. **Treberg J.R.** and Driedzic W.R. 2006. Maintenance and accumulation of trimethylamine oxide by the winter skate (*Leucoraja ocellata*): reliance on low whole animal losses rather than endogenous synthesis. *American Journal of Physiology: Regulatory, Integrative and Comparative Physiology*. 291: 1790-1798.
10. **Treberg J.R.**, Crockett E.L. and Driedzic W.R. 2006. Activation of liver carnitine palmitoyltransferase-1 and mitochondrial acetoacetyl-CoA thiolase is associated with elevated ketone bodies in the elasmobranch *Squalus acanthias*. *Physiological and Biochemical Zoology*. 79: 899-908.
9. \* **Treberg J.R.**, Speers-Roesch B., Piermarini P.M., Ip Y.K., Ballantyne J.S. and Driedzic W.R. 2006. The accumulation of methylamine counteracting solutes in elasmobranchs with differing levels of urea: a comparison of marine and freshwater species. *Journal of Experimental Biology*. 209: 860-870.  
\* Featured by the editors in the, "Inside JEB" section; see, Phillips K., 2006. Elasmobranchs balance urea. *Journal of Experimental Biology*. 209: ii.
8. **Treberg J.R.**, Bystriansky J.S. and Driedzic W.R. 2005. Temperature effects on trimethylamine oxide accumulation and the relationship between plasma concentration and tissue levels in smelt (*Osmerus mordax*). *Journal of Experimental Zoology*. 303A: 283-293.
7. **Treberg J.R.**, Hall J.R. and Driedzic W.R. 2005. Enhanced protein synthetic capacity in Atlantic cod (*Gadus morhua*) is associated with temperature-induced compensatory growth. *American Journal of Physiology: Regulatory, Integrative and Comparative Physiology*. 288: R205-R211.

## *Curriculum Vitae: Jason R. Treberg*

6. MacCormack T.J., **Treberg J.R.**, Almeida-Val V.M., Val A.L. and Driedzic W.R. 2003. Mitochondrial K(ATP) channels and sarcoplasmic reticulum influence cardiac force development under anoxia in the Amazonian armoured catfish *Lipossarcus pardalis*. *Comparative Biochemistry and Physiology*. 134A:441-448.
5. Sulikowski J.A., **Treberg J.R.** and Howell W.H. 2003. Fluid regulation and physiological adjustments in the winter skate, *Leucoraja ocellata*, following exposure to reduced environmental salinities. *Environmental Biology of Fishes*. 66: 339-348.
4. **Treberg J.R.**, Martin R.A. and Driedzic W.R. 2003. Muscle enzyme activities in a deep-sea squaloid shark, *Centroscyllium fabricii*, compared with its shallow-living relative, *Squalus acanthias*. *Journal of Experimental Zoology*. 300A: 133-139.
3. **Treberg J.R.** and Driedzic W.R. 2002. Elevated levels of trimethylamine oxide in deep-sea fish: evidence for synthesis and intertissue physiological importance. *Journal of Experimental Zoology*. 293: 39-45.
2. **Treberg J.R.**, Lewis J.M. and Driedzic W.R. 2002. Comparison of liver enzymes in osmerid fishes: key differences between a glycerol accumulating species, rainbow smelt (*Osmerus mordax*), and a species that does not accumulate glycerol, capelin (*Mallotus villosus*). *Comparative Biochemistry and Physiology*. 132A: 433-438.
1. **Treberg J.R.**, Wilson C.E., Richards R.C., Ewart K.V. and Driedzic W.R. 2002. The freeze-avoidance response of smelt *Osmerus mordax*: initiation and subsequent suppression of glycerol, trimethylamine oxide and urea accumulation. *Journal of Experimental Biology*. 205: 1419-1427.

### **Invited publications (not peer reviewed):**

1. **Treberg J.R.**, Brosnan M.E, Watford M., Brosnan J.T. 2010. On the Reversibility of Glutamate Dehydrogenase and the Source of Hyperammonemia in the Hyperinsulinism/Hyperammonemia Syndrome. 2010 *Advances in Enzyme Regulation* 50: 34-43. Edited by G. Weber, C.E. Forrest Weber and L. Cocco; Elsevier.

### **Invited Perspective Article**

1. Treberg J.R. *More to selecting an osmolyte than just osmotic balance*. Contribution on the paper, "Living with water stress: Evolution of Osmolyte Systems" by Yancey *et al.* (1982, *Science*, 217: 1214-1222) for the *Journal of Experimental Biology's* 'Classics' section. Contribution invited by the News and Reviews Editor (JEXBIO/2015/128579 Classics 219.6: Treberg on Yancey, P.H. *et al.* *Science* 1982. Anticipated publication in issue 22 of Vol. 215).

### **Peer reviewed publications under review/revision (available on request):**

1. **Treberg J.R.** and Ben Speers-Roesch. Absence from the abyss: Does physiology constrain the distribution of chondrichthyan fishes in the deep-sea? Submitted to: *Journal of Experimental Biology* (JEXBIO/2011/065417)
2. Banh S., Wiens L., Sotiri E., **Treberg J.R.** Mitochondrial reactive oxygen species production by fish muscle mitochondria: Potential role in acute heat-induced oxidative stress. Submitted to:



## ***Curriculum Vitae: Jason R. Treberg***

*Comparative Biochemistry and Physiology A: Molecular and Integrative Physiology*  
(CBPB#24879R1)

3. Munro D., Banh S., Sotiri E., Tamanna N., **Treberg J.R.** Consumption of H<sub>2</sub>O<sub>2</sub> by Rat Skeletal Muscle Mitochondria Relies on GSH and Thioredoxin-Dependent Pathways. Submitted to: *Journal of Biological Chemistry* (JBC/2015/663914)

### **Invited Peer reviewed publications *under preparation*:**

1. **Treberg J.R.** The role of mitochondria in reactive oxygen species (ROS) regulation. *Commentary* for the *Journal of Experimental Biology* (JEXBIO/2015/132142)

### **Keynote, Departmental and Institutional Presentations** (all by invitation since 2011):

1. *Seeking balance in mitochondrial reactive oxygen species (ROS) metabolism.* Presented as part of the University of Manitoba Department of Pharmacology and Therapeutics Seminar Series, Winnipeg, MB. (January 9<sup>th</sup>, 2015)
2. *The role of mitochondria in reactive oxygen species (ROS) balance: Are they a major source of H<sub>2</sub>O<sub>2</sub> or net consumers?* Presented as part of the Mount Allison Department of Chemistry and Biochemistry Seminar Series, Sackville, NB. (October 22<sup>nd</sup>, 2014)
3. *Mitochondria: They do a lot of things but they don't make energy.* Presented as part of the University de Moncton Department of Biology Seminar Series, Moncton, NB. (October 20<sup>th</sup>, 2014)
4. *Adventures in mitochondrial metabolism: From fish to the nuances of electron transport complexes and back again.* Keynote presentation at the Atlantic Region Comparative Physiology Workshop. St. Andrew's, NB (Oct 18-19<sup>th</sup>, 2014).
5. *Mitochondrial metabolism: Oxidative phosphorylation and beyond.* Presented as part of the University of New Brunswick (Saint John) Department of Biology Seminar Series, Saint John, NB. (October 17<sup>th</sup>, 2014)
6. *Mitochondria do much more than just make ATP.* Presented as part of the University of New Brunswick (Fredericton) Department of Biology Seminar Series, Fredericton, NB. (October 16<sup>th</sup>, 2014)
7. *What controls mitochondrial ROS production?* Presented as part of the Institute of Cardiovascular Sciences, Visiting Scientist Seminar Series. St. Boniface Research Centre, Winnipeg, MB. (January 16<sup>th</sup>, 2013)
8. *Mitochondria: friend or foe in hydrogen peroxide metabolism?* Presented at the 1<sup>st</sup> Annual DREAM (Diabetes Research Envisioned and Accomplished in Manitoba) Symposium on Mitochondria in Health and Disease. The Manitoba Institute of Child Health, Winnipeg, MB (November 22<sup>nd</sup>, 2012)
9. *Glutamate dehydrogenase: reversibility and inter-organ differences in contribution to nitrogen metabolism.* Presented at the 2<sup>nd</sup> Human Glutamate Dehydrogenases Conference. Heraklion, Crete, Greece (June 10<sup>th</sup>, 2012)

## *Curriculum Vitae: Jason R. Treberg*

10. *Mitochondria: they do more than make ATP*. Presented as part of Human Nutritional Sciences Graduate Students seminar course. University of Manitoba, Winnipeg, MB. (January, 2012).

### **Conference Presentations** (30 since 2010), my trainees are underlined:

1. *Metabolism of H<sub>2</sub>O<sub>2</sub> by skeletal muscle mitochondria: consumption exceeds production* Munro D., Banh S., **Treberg J.R.** Presented at the 54<sup>th</sup> Annual Meeting of the Canadian Society of Zoologists, Calgary, AB, Canada, 2015
2. *Temperature influences on hydrogen peroxide metabolism by skeletal muscle mitochondria* **Treberg J.R.**, Banh S., Wiens L., Sotiri E., Zacharias P. Presented at the 54<sup>th</sup> Annual Meeting of the Canadian Society of Zoologists, Calgary, AB, Canada, 2015
3. *Effects of Dietary Methionine Restriction on Thiol Metabolism in Fischer 344 Rats* (Poster). Tamanna N., Banh S., Treberg J.R. Presented at the Prairie University Biology Symposium, Winnipeg MB, Feb 19-21<sup>th</sup>, 2015.
4. *Comparison of Two Mitochondrial Isolation Methods in Fish Striated Muscle*. (Poster) Wiens, L., Banh S., **Treberg J.R.** Presented at the Prairie University Biology Symposium, Winnipeg MB, Feb 19-21<sup>th</sup>, 2015.
5. *Sex-dependent Differences and Environmental Influences on Growth as Length of Arctic Cod (*Boreogadus saida*, Lepechin 1774) in the Canadian Beaufort Sea* (Poster). B.R. Lynn, W. Walkusz, **J.R. Treberg** and J.D. Reist. Presented at Arctic Change 2014. Ottawa ON, Canada Dec 8-12<sup>th</sup>, 2014.
6. *Highly Efficient Mitochondria Fuel Bluefin Tuna Red Muscle Within Distinct Temperature Ranges* (Poster). M. Jastroch, **J.R. Treberg**, M. Brand, and B. Block. Presented at the American Physiological Society's Intersociety meeting: Comparative approaches to grand challenges. San Diego, CA, USA Oct 5-8<sup>th</sup>, 2014
7. *Are polar seas particularly uninviting to Chondrichthyans?* **Treberg J.R.**, Atchison S., Reist J., Brandt C., Anderson W.G., Speers-Roesch B. Presented at the 11th International Congress on the Biology of Fishes, Aug 3-7, 2014, Heriot-Watt University, Edinburgh, Scotland, August 3-7, 2014
8. *The role of 1-alpha-hydroxycorticosterone in the endocrine stress response of elasmobranchs* Lambert F.N., **Treberg J.R.**, Evans A.N. Presented at the 11<sup>th</sup> International Congress on the Biology of Fishes, Aug 3-7, 2014, Heriot-Watt University, Edinburgh, Scotland, August 3-7, 2014
9. *Mitochondrial hydrogen peroxide consumption: an underappreciated component of the cellular ROS balance equation?* (Poster) **Treberg J.R.**, Banh S., Sotiri E., Zacharias, P. Presented at the European Bioenergetics Conference, Lisbon, Portugal, July 1-17, 2014.
10. *Low rate of ROS production and elevated levels of oxidative stress markers in the extraordinarily long-lived bivalve mollusc *Arctica islandica* - a conundrum for the oxidative stress theory of*

## *Curriculum Vitae: Jason R. Treberg*

aging (Poster) Munro, D., **Treberg J.R.**, Pichaud N., Blier, P.U. Presented at the European Bioenergetics Conference, Lisbon, Portugal, July 1-17, 2014.

11. *Characterization and suppression of mitochondrial production of superoxide and hydrogen peroxide under near-physiological conditions.* Brand M.D., Quinlan C.L., Goncalves R.L.S, Perevoshchikova I.V., **Treberg J.R.**, Hey-Mogensen M., Gerencser A.A., Orr A.L. Presented at the European Bioenergetics Conference, Lisbon, Portugal, July 1-17, 2014.
12. *Mitochondrial reactive oxygen species (ROS) metabolism: how do ectotherms compare to endotherms?* **Treberg J.R.**, Sotiri E., Banh S., Zacharias, P. Presented at 'Genomes to Biomes 2014', Montreal, QC, May 25-29, 2014.
13. *Relationships of Arctic Cod, Boreogadus saida (Lepechin 1774), body composition with their environment in the Canadian Beaufort Sea* (Poster) Brittany R. Lynn, Wojciech Walkusz, **Jason Treberg**, James Reist Presented at 'Genomes to Biomes 2014', Montreal, QC, May 25-29, 2014.
14. *Effects of dietary methionine restriction on thiol metabolism in rodents.* (Poster) Nahid Tamanna and **Jason Treberg**. Presented at the Canadian Student Health Research Forum, Winnipeg MB, (June 12<sup>th</sup>) 2014
15. *Pre-exposure of luminal ammonia promotes an active ammonia excretion and changes in gene-expression patterns in the intestinal human cell line Caco-2BBE: does ammonia modulate intestinal transport?* (Poster) **J.R. Treberg**, Pam Zacharias, Alex Quijada-Rodriguez, Frauke Fehrmann, Aida Adlimoghaddam, William L. Diehl-Jones, Dirk Weihrauch. Presented at the Canadian Nutrition Society annual meeting, St. John's NL, (June 5-7<sup>th</sup>) 2014
16. *The importance of the thioredoxin system in muscle mitochondrial reactive oxygen species metabolism* (Poster). **Jason R. Treberg**, Sheena Banh, Emianka Sotiri, Pamela Zacharias, Nahid Tamanna. Presented at Experimental Biology 2014, San Diego CA, USA (Apr 26-30<sup>th</sup>).
17. *Relationships between Arctic Cod, Boreogadus saida (Lepechin 1774), body composition and habitat parameters in the Canadian Beaufort Sea.* (Poster) B.R. Lynn, W. Walkusz, **J.R. Treberg**, J. Reist. Presented at the Prairie University Biological Symposium, University of Regina, Regina, SK, (February 20-22), 2014
18. *UCP1-mediated non-shivering thermogenesis does not underlie the evolution of cold-tolerance in multiple eutherian lineages.* K.L. Campbell, M.J. Gaudry, M. Jastroch, **J.R. Treberg**. Presented at the Society for Experimental Biology (SEB) Annual Meeting, Valencia, Spain (July 3-6), 2013
19. *Investigation of the pH-regulation and ammonia excretion mechanism in the soil nematode, Caenorhabditis elegans.* A. Adlimoghaddam, A.K. Brassinga, M. O'Donnell, **J.R. Treberg**, D. Weihrauch. Presented at the 52<sup>nd</sup> Annual Meeting of the Canadian Society of Zoologists, Guelph, ON, Canada, 2013
20. *Mechanism of ammonia transport in the integument of the freshwater ribbon leech Nephelopsis obscura.* A. Quijada-Rodriguez, **J.R. Treberg**, D. Weihrauch Presented at the 52<sup>nd</sup> Annual Meeting of the Canadian Society of Zoologists, Guelph, ON, Canada, 2013

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21. *Are skeletal muscle mitochondria net hydrogen peroxide producers or consumers?* **J.R. Treberg, S. Banh.** (Poster). Presented at the 52<sup>nd</sup> Annual Meeting of the Canadian Society of Zoologists, Guelph, ON, Canada, 2013
22. *Mitochondrial superoxide production under native conditions* Brand M.D., Quinlan C.L., Perevoshchikova, I.V., Orr A.L., Hey-Mogensen, M and **Treberg J.R.** Presented at the 17<sup>th</sup> European Bioenergetics Conference (Sept 15-20), 2012.
23. *The multifaceted metabolism of reactive oxygen species by mitochondria.* **Treberg J.R.** (Poster). Presented at Experimental Biology 2012, San Diego CA, USA
24. *Native rates and sites of mitochondrial ROS production.* Quinlan C.L., **Treberg J.R.**, Perevoshchikova I.V., Orr A.L. and Brand, M.D. Presented at the 10<sup>th</sup> International Conference on Brain Energy Metabolism, Asilomar Conference Grounds, Monterey, CA, USA, 2012.
25. *Sites of Mitochondrial ROS Production during Long-Chain Fatty Acid Oxidation.* (Poster) Perevoshchikova I.V., Quinlan C.L., Orr A.L., **Treberg J.R.** and Brand, M.D. Presented at the 18th Annual Meeting of the Society-for-Free-Radical-Biology-and-Medicine (SFRBM), Atlanta, GA, USA, 2011.
26. *Mitochondrial Complex II Generates Superoxide in the Forward and Reverse Directions.* (Poster) Quinlan C.L., Orr, A.L., **Treberg, J.R.**, Perevoshchikova, I.V., Brand M.D. Presented at the 18th Annual Meeting of the Society-for-Free-Radical-Biology-and-Medicine (SFRBM), Atlanta, GA, USA, 2011.
27. *Carbohydrate metabolism in coelomic cells from tunicates with different degrees of vanadium accumulation.* **Treberg J.R.**, Stacey J.E. and Driedzic W.R. Presented at the 50<sup>th</sup> Annual Meeting of the Canadian Society of Zoologists, Ottawa, ON, Canada, 2011.
28. *The temperature profiles for mitochondrial superoxide production and hydrogen peroxide consumption are different in Pacific bluefin tuna (*Thunnus orientalis*) muscle.* (Poster) **Treberg J.R.**, Jastroch M., Block B.A. and Brand M.D. Presented at the 50<sup>th</sup> Annual Meeting of the Canadian Society of Zoologists, Ottawa, ON, Canada, 2011.
29. *Mitochondrial reactive oxygen species (ROS) production: mechanisms, corrections and correlations.* **Treberg J.R.** and Brand M.D. Presented at the 49<sup>th</sup> Annual Meeting of the Canadian Society of Zoologists, Vancouver, BC, Canada, 2010.
30. *Superoxide formation at the Q-binding site of mitochondrial complex I does not arise from a semiquinone that has direct access to the bulk membrane QH<sub>2</sub>/Q pool.* (Poster) **Treberg J.R.**, Quinlan C.L., Brand M.D. Experimental Biology 2010, Anaheim CA, USA

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**Current Position:**

Professor, University of Manitoba, 2014 - present  
Associate Professor, University of Manitoba, 2009 - 2014  
Research Fellow, Mammal Research Institute, University of Pretoria 2007- present

**Previous Positions:**

Associate Professor, University of Central Florida, 2006 - 2009  
Assistant Professor, University of Central Florida, 2000 - 2006  
Assistant Professor, Lewis-Clark State College, 1998 - 2000  
Director, Nez Perce Biodiversity Institute, Lewis-Clark State College, 1998 - 2000  
Research Associate and Lecturer, York University, 1995 - 1998  
Postdoctoral fellow and Lecturer, University of Saskatchewan, 1994 - 1995

**Education:**

Ph.D. - Zoology, 1994. University of Minnesota  
M.Sc. - Zoology, 1985. University of Alberta  
B.Sc. (Honours) - Zoology, 1981. University of Guelph

**Research Interests:**

- Selective forces influencing the evolution of social systems and mating strategies
- Influence of sexual selection on morphology, behaviour, diseases & parasites
- Evolution of cooperative breeding
- Conservation in Canada, Africa and in the Arctic

**PUBLICATIONS AND PRESENTATIONS**

**Peer-reviewed publications** (\* denotes undergraduate or graduate student):

- Manjerovic\* MB, **Waterman JM**. 2015. 'Failure to launch': Is there a reproductive cost to males living at home? *Journal of Mammalogy*. 96(1): 144-150. DOI:10.1093/jmamma/gyu015.
- Yunik\* M, **Waterman JM**, Galloway TD. 2015. Seasonal changes in the infestation parameters of the sucking louse, *Linognathoides laeviusculus* (Phthiraptera: Anoplura: Linognathidae), infesting Richardson's ground squirrel (Rodentia: Sciuridae) in Manitoba. *The Canadian Entomologist*. *In Press*.
- Phillips\* MA, **Waterman JM**. 2014. Anti-snake behaviour in a facultative cooperative breeder, the Cape ground squirrel. *Behaviour*. 151: 1735-1758. doi:10.1163/1568539X-00003215

- Waterman JM**, Machlin\* GA, Enright C. 2014. Sex-biased parasitism in Richardson's ground squirrels (*Urocitellus richardsonii*) depends on the parasite examined. *Canadian Journal of Zoology*. 92: 73-79. dx.doi.org/10.1139/cjz-2013-0151
- Makenbach\* SA, **Waterman JM**, Roth JD. 2013. Predator detection and dilution as benefits of associations between yellow mongooses and Cape ground squirrels. *Behavioral Ecology & Sociobiology*. 67:1187-1194.
- Phillips\* MA, **Waterman JM**. 2013. Olfactory snake-predator discrimination in the Cape ground squirrel. *Ethology* 119: 278-285.
- Phillips\* MA, **Waterman JM**, Du Plessis P, Smit M, Bennett NC. 2012. Proteolytic venom resistance in a southern African ground squirrel. *Toxicon* 60: 760-763.
- Manjerovic\* MB, **Waterman JM**. 2012. Immunological sex differences in socially promiscuous African ground squirrels. *PLoS ONE*. 7(6): e38524. doi:10.1371/journal.pone.0038524
- Scantlebury M, Danek-Gontard M, Bateman PW, Bennett NC, Manjerovic\* MB, **Waterman JM**. 2012. Seasonal patterns of body temperature daily rhythms in group-living Cape ground squirrels *Xerus inauris*. *PLoS ONE* 7(4): e36053. doi:10.1371/journal.pone.0036053.
- Blowers\* TE, **Waterman JM**, Kuhar CW, Bettinger TL. 2012. Female Nile hippopotamus (*Hippopotamus amphibius*) space use in a naturalistic exhibit. *Zoo Biology*. 31:129-136.
- Edwards\* S, **Waterman JM**. 2011. Vigilance and grouping in a southern African ground squirrel (*Xerus inauris*). *African Journal of Ecology*. 49: 286-291.
- Pettitt\* BA, **Waterman JM**. 2011. Reproductive delay in the female Cape ground squirrel (*Xerus inauris*). *Journal of Mammalogy*. 92: 378-386.
- Eisenberg\* DA, Noss RF, **Waterman JM**, Main MB. 2011. Distribution and Habitat Use of the Big Cypress Fox Squirrel (*Sciurus niger avicennia*). *Southeastern Naturalist*. 10: 75-84.
- Joubert KE, Serfontein T, Scantlebury M, Manjerovic\* MB, Bateman PW, Bennett NC, **Waterman JM**. 2011. Determination of an optimal dose of medetomidine-ketamine-buprenorphine for anaesthesia in the Cape ground squirrel (*Xerus inauris*). *Journal of the South African Veterinary Association*. 82: 94-96.
- Anderson\* CR, da Vitoria Lobo N, Roth JD, **Waterman JM**. 2010. A computer-aided photo-identification system with an application to polar bears based on whisker spot patterns. *Journal of Mammalogy*. 91:1350-1359.
- Waterman JM**. 2010. The adaptive function of masturbation in a promiscuous African ground squirrel. *PLoS ONE*. 5: e13060 1-7.
- Hillegass\* MA, **Waterman JM**, Roth JD. 2010. Parasite removal increases reproductive success in a social African ground squirrel. *Behav. Ecol.* 21: 696-700.
- Nadelson LS, Walters L, **Waterman JM**. 2010. Course integrated undergraduate research experiences structured at different levels of inquiry. *J STEM Educ.* 11:27-44.
- Blowers\* TE, **Waterman JM**, Kuhar C, Bettinger T. 2010. Social behaviours of a group of female *Hippopotamus amphibius*. *Journal of Ethology*. 28:287-294.
- Abercrombie et al. 2009. Characterization of nine microsatellite loci in the Cape ground squirrel, *Xerus inauris*, and their cross-utility in other species. In: Permanent Genetic Resources added to Molecular Ecology Resources database 1 January 2009- 30 April 2009. *Molecular Ecology Resources* 9(5): 1375-1379.

- Unck\* C, **Waterman JM**, Verburgt L, Bateman PW. 2009. Quantity versus quality: How does level of predation threat affect Cape ground squirrel vigilance? *Animal Behaviour*. 78:625–632
- Pettitt\* BA, **Waterman JM**, Wheaton C. 2008. Assessing the effects of resource availability and parity on reproduction in female Cape ground squirrels: resources do not matter. *Journal of Zoology*. 276:291-298.
- Manjerovic\* MB., Kinahan AA, **Waterman JM**, Bennett NC, Bateman PW. 2008. Structure and allometry of genitalia in males and females of a social African ground squirrel with high polygyny. *Journal of Zoology*. 275:375-380.
- Hillegass\* M, **Waterman JM**, Roth JD. 2008. The influence of sex and sociality on parasite loads in an African ground squirrel. *Behavioral Ecology*. 19:1006-1011.
- Scantlebury M, **Waterman JM**, Bennett NC. 2008. Alternative reproductive tactics in male Cape ground squirrels *Xerus inauris*. *Physiology & Behavior* 94:359-367.
- Scantlebury M, **Waterman JM**, Hillegass\* M, Speakman JR, Bennett NC. 2007. Energetic costs of parasitism in the Cape ground squirrel *Xerus inauris*. *Proceedings of the Royal Society, Series B*. 274:2169-2177.
- Anderson\* CJ, Roth JD, **Waterman JM**. 2007. Can whisker spot patterns be used to identify individual polar bears? *Journal of Zoology (London)*. 273:333-339.
- Waterman JM**, Roth JD. 2007. Interspecific associations of Cape ground squirrels with two mongoose species: benefit or cost? *Behavioral Ecology & Sociobiology*. 61:1675-1683.
- Jackson TP, **Waterman JM**, Bennett NC. 2007. Pituitary LH responses to single doses of exogenous GnRH in female social Cape ground squirrels, *Xerus inauris*, exhibiting low reproductive skew. *Journal of Zoology (London)*. 273:8-13.
- Belton\* L, Ball N **Waterman JM**, Bateman PW. 2007. Trying to make scents of it all: do Cape ground squirrels (*Xerus inauris*) show avoidance of predator olfactory cues? *African Zoology*. 42:135-138.
- Pettitt\* BA, Wheaton CJ, **Waterman JM**. 2007. Effects of storage treatment on fecal steroid hormone concentrations of a rodent, the Cape ground squirrel (*Xerus inauris*). *General & Comparative Endocrinology*. 150:1-11.
- Bouchie\* L, Bennett NC, Jackson T, **Waterman JM**. 2006. Are Cape Ground squirrels, *Xerus inauris*, induced or spontaneous ovulators? *Journal of Mammalogy* 87:60-66.
- Herron\* M, **Waterman JM**, Parkinson CL. 2005. The phylogeography of two species of Xerines in southern Africa. *Molecular Ecology* 14:2773-2788.
- Rabatsky\* AM, **Waterman JM**. 2005. Non-rattling defensive tail display in the dusky pygmy rattlesnake, *Sistrurus miliarius barbouri*: A previously undescribed behavior. *Herpetological Review* 36:236-238.
- Rabatsky\* AM, **Waterman JM**. 2005. Ontogenetic shifts and sex differences in caudal luring in the dusky pygmy rattlesnake, *Sistrurus miliarius barbouri*. *Herpetologica* 61:87-91.
- Skurski\* D, **Waterman JM**. 2005. *Xerus inauris*. *Mammalian Species* 781:1-4.
- Waterman JM**, Herron\* M. 2004. *Xerus princeps*. *Mammalian Species* 751:1-3.
- Herron\* M, **Waterman JM**. 2004. *Xerus erythropus*. *Mammalian Species* 748:1-4.
- Eckhardt\* G, **Waterman JM**. 2004. Pocket Observer 2.0. *Animal Behaviour* 67:805-806.

- Eckhardt\* G, **Waterman JM**. 2004. The Observer Video-Pro 4.1 and 5.0 Software Package. *Animal Behaviour* 67:373-375.
- Waterman JM**. 2002. Delayed maturity, group fission and the limits of group size in female Cape ground squirrels. *The Journal of Zoology (London)* 256(1):113-120.
- Waterman JM**, Fenton MB. 2000. The effect of drought on the social structure and use of space in Cape ground squirrels, *Xerus inauris*. *EcoScience* 7:131-136.
- Fenton MB., Whitaker Jr.JO, Vonhof MJ , **Waterman JM**, Pedro WA, Aguiar LMS, Baumgarten JE, Bouchard S, Faria DM, Portfors CV, Rautenbach IL, Scully W, Zortea M. 1999. The diets of bats from southeastern Brazil: the relation to echolocation and foraging behaviour. *Revista Brasileira de Zoologia*. 16:1081-1085.
- Waterman JM**. 1998. Mating tactics of male Cape ground squirrels (*Xerus inauris*): consequences of year-round breeding. *Animal Behaviour* 56:459-466.
- Fenton MB, Portfors CV, Rautenbach IL, **Waterman JM**. 1998. Compromises: sound frequencies used in echolocation by aerial feeding bats. *Canadian Journal of Zoology* 76:1174-1182.
- Fenton MB, **Waterman JM**, Roth JD, Lopez E, Fienberg SE. 1998. Tooth breakage and diet: a comparison of bats and carnivores. *The Journal of Zoology (London)* 246:83-88.
- Waterman JM**. 1997. Why do male Cape ground squirrels live in groups? *Animal Behaviour* 53:809-817.
- Waterman JM**. 1996. Reproductive biology of a tropical, non-hibernating ground squirrel. *Journal of Mammalogy* 77:134-146.
- Waterman JM**. 1995. The social organization of the Cape ground squirrel. *Ethology* 101:130-147.
- Waterman JM**. 1992. The use of space by yearling Columbian ground squirrels before male dispersal. *Canadian Journal of Zoology* 70:2490-2493.
- Waterman JM**, Desroches, A, Hannon, S. 1989. A case of polyandry in the black-capped chickadee. *Wilson Bulletin* 101:351-355.
- Waterman JM**. 1988. Social play in free-ranging Columbian ground squirrels, *Spermophilus columbianus*. *Ethology* 77:225-236.
- Waterman JM**. 1986. Behaviour and use of space by juvenile Columbian ground squirrels (*Spermophilus columbianus*). *Canadian Journal of Zoology* 64:1121-1127.
- Waterman JM**. 1984. Infanticide in the Columbian ground squirrel, *Spermophilus columbianus*. *Journal of Mammalogy* 65:137-138.

### Papers Submitted

- Ewacha M, Kaapehi C, Waterman JM, Roth JD. Cape ground squirrels as ecosystem engineers: modifying habitat for plants, small mammals, and beetles in the Namib Desert. Submitted to the *African Journal of Ecology*.

### Peer-reviewed book chapters

- Scantlebury M, **Waterman JM**, Manjerovic MB, Jackson TP, Bennett NC. 2008. Reproductive physiology and behaviour of the social Cape ground squirrels, *Xerus inauris*. Pp 457-467. Morris S & Vosloo A, eds. 4th CBP Meeting in Africa: Mara 2008. *Molecules to Migration: The pressures of Life*. Medimond International Publishing, Bologna, Italy.
- Waterman JM**. 2007. Male mating strategies. Chapter 3 in: Wolff JO and Sherman P, eds.,



*Rodent Societies, An Ecological and Evolutionary Perspective*. University of Chicago Press, Chicago.

**Non-Peer Reviewed Publications** (\* denotes graduate or undergraduate student):

- Ewacha M, **Waterman JM**. 2015. Ecosystem Engineers. Conservation; Go Green Fund Special Edition. Venture Publication, Windhoek, Namibia.
- Waterman JM**. 2013. *Xerus erythropus*. In: *Mammals of Africa*, Vol. 3. Eds. D. Happold, J. Kingdon & T. Butynksi. Bloomsbury Publishing.
- Waterman JM**. 2013. *Xerus inauris*. In: *Mammals of Africa*, Vol. 3. Eds. D. Happold, J. Kingdon & T. Butynksi. Bloomsbury Publishing.
- Waterman JM**. 2013. *Xerus princeps*. In: *Mammals of Africa*, Vol. 3. Eds. D. Happold, J. Kingdon & T. Butynksi. Bloomsbury Publishing.
- Waterman JM**. 2013. *Xerus rutilus*. In: *Mammals of Africa*, Vol. 3. Eds. D. Happold, J. Kingdon & T. Butynksi. Bloomsbury Publishing.
- Waterman JM**, Pettitt\* BA, Manjerovic,MB\* 2006. Cape ground squirrels. *BBC Wildlife*. July 2006.
- Pettitt\* BA, **Waterman JM**. 2004. Environmental influences on the social structure of the Cape ground squirrel (*Xerus inauris*). *Roan News* 2004(1):12-14.
- Waterman JM**. 1993. Out on a limb in the Kalahari. *Imprint* 10(3):1-6. Bell Museum of Natural History, University of Minnesota.

**Published Abstracts** (\* denotes students):

- Pettitt\* BA, **Waterman JM**. 2006. Fecal progesterone profiles of pregnant and lactating free-living Cape ground squirrels (*Xerus inauris*). *Integrative and Comparative Biology* 46:E237-E237.
- Pettitt\* B, **Waterman JM**. 2005. Reproductive suppression in female Cape ground squirrels, *Xerus inauris*. *Integrative and Comparative Biology* 45:1178-1178.
- Anderson\* CJ, **Waterman JM**, Roth JD. 2005. Non-invasive identification of individual polar bears by whisker spot patterns. *Integrative and Comparative Biology* 45:1106-1106.
- Waterman JM**, Hillegass\* MA. 2004. Parasite removal and its impact on behavior and reproduction in a social African ground squirrel. *Integrative and Comparative Biology* 44:661-661.
- Waterman JM**. 2003. Environmental influences on the social system of the Cape ground squirrel, *Xerus inauris*. *Integrative and Comparative Biology* 43:845-845.
- Bouchie\* LM, **Waterman JM**, Bennett NC, Jackson T. 2003. Ovulation in a social ground squirrel. *Integrative and Comparative Biology* 43:856-856.
- Waterman JM**. 2002. Why African ground squirrels hang out with mongooses: are there benefits to interspecific associations? *Integrative and Comparative Biology* 42:1331-1332.
- Eckhardt\* GH, **Waterman JM**, Roth JD. 2002. The functional significance of play fighting in polar bears: are they asocial? *Integrative and Comparative Biology* 42:1224.

**Papers presented at professional meetings** (\* denotes graduate student; † undergraduate; \*\* high school student):

- Katz\*\* J, Silver\*\* C, Scheiderman\*\* E, Feely\*\* M, Salzberg\* A, Bunka\*\* J, Rogers J, Labun D, Waterman J. 2014. The use of Whiskerprint software to monitor fluctuating asymmetry in the whisker patterns of Western Hudson Bay polar bears. ArcticNet Conference. Ottawa. Dec. 8, 2014.
- Katz\*\* J, Silver\*\* C, Scheiderman\*\* E, Feely\*\* M, Salzberg\*\* A, Rogers J, Labun D, Waterman J. 2014. The Use of WhiskerPrint Software to Monitor the Fluctuating Asymmetry in the Whisker Patterns of Western Hudson Bay Polar Bears. Parks and Protected Areas Research Forum of Manitoba. Winnipeg. Nov. 20, 2014.
- Waterman JM. 2014. Reproduction investment, immunity and parasites in a North American ground squirrel with intense intraspecific competition. 14th Rodens et spatium, International conference on rodents biology, Lisbon. Portugal. July 30, 2014.
- van der Marel\* A, Lopez-Darias M, Waterman JM. 2014. A unique social structure in an invasive ground squirrel species. 14th Rodens et spatium, International conference on rodents biology, Lisbon. Portugal. July 30, 2014.
- O'Brien\* KA, Waterman JM. 2014. Eco-Immunology; manipulatively testing the trade-offs between reproduction and immunity in a free-ranging African ground squirrel. 14th Rodens et spatium, International conference on rodents biology, Lisbon. Portugal. July 29, 2014.
- Pond\* DE, Waterman JM. 2014. Investigating the advantages of providing alloparental care in a co-iperatively breeding African Ground Squirrel. International Society of Behavioral Ecology Conference, New York. Aug. 1<sup>st</sup>, 2014.
- O'Brien\* KA, Waterman JM. 2014. Testing trade-offs between testosterone and immunity in a free-ranging African ground squirrel. Genomes to Biomes CSEE-CSZ-SCL, Montreal QC. May 28th, 2014.
- Pond\* DE, Waterman JM. 2014. Alloparental care in an African Ground Squirrel: Is care directed to juveniles or a bi-product of living in groups? Prairie University Biological Symposium. Regina, SK. Feb 22nd 2014.
- O'Brien\* KA, Waterman JM. 2014. Does testosterone suppress immunity, or is it immunity that suppresses testosterone? Testing trade-offs between reproduction and immunity in a free-ranging African ground squirrel. Prairie University Biological Symposium, University of Regina, Regina SK. Feb. 22th, 2014.
- Archibald† AJ, Waterman JM. 2014. Who are you? Kin discrimination and the 'dear enemy phenonemon' in an African ground squirrel. Prairie University Biological Symposium, University of Regina, Regina SK. Feb. 22th, 2014.
- Anjos\* EAC Waterman JM. 2014. Why do Richardson`s ground squirrels testes masses decline during the breeding season? Prairie University Biological Symposium, University of Regina, Regina SK. Feb. 22th, 2014.
- Sojka\* JS Waterman JM. 2014. The effects of consistent individual differences on reproductive success in a non-aggressive African ground squirrel. Prairie University Biological Symposium, University of Regina, Regina SK. Feb. 21st, 2014.
- Katz\*\* J, Bird\*\* A, Roth\*\* T, Waterman J, Labun D. 2014. Comparing fluctuating asymmetry of polar bears using Whiskerprint software. Wapusk National Park Research & Monitoring Symposium, Winnipeg. Jan. 23, 2014.
- Beaumont† A, Beaumont† J, Waterman JM. 2013. How accurate are field methods in estimating

- parasite loads. University of Manitoba Undergraduate Poster Competition. Winnipeg MB. Oct 30, 2013.
- Archibald† A, Waterman JM. 2013. Who are you? Kin discrimination and the ‘dear enemy phenomenon’ in Cape ground squirrels. University of Manitoba Undergraduate Poster Competition. Winnipeg MB. Oct 30, 2013.
- Migally† B, Waterman JM. 2013. Eavesdropping of Cape ground squirrels on the alarm calls of avian co-foragers. University of Manitoba Undergraduate Poster Competition. Winnipeg MB. Oct 30, 2013.
- Nelson† A, Ewacha† M, Waterman JM, Roth JD. 2013. The Cape ground squirrel as an ecosystem engineer: modifying vegetation within a desert community. University of Manitoba Undergraduate Poster Competition. Winnipeg MB. Oct 30, 2013.
- Waterman JM. 2013. Male mating tactics in an African ground squirrel – it’s all in the nuts. Prairie University Biological Symposium, Winnipeg, MB. Invited talk.
- Pond\* DE, Waterman JM. 2013. Quantifying the presence of alloparental care in an African ground squirrels. Prairie University Biological Symposium, Winnipeg, Manitoba.
- O’Brien\* KA, Waterman JM. 2013. Effects of testosterone and cortisol on immunity in free-ranging African ground squirrels. Prairie University Biological Symposium, Winnipeg, MB.
- Beaumont† A, Beaumont† J, Waterman JM. 2013. Extreme warming spell affects the fitness of hibernating Richardson’s ground squirrels. Prairie University Biological Symposium, Winnipeg, MB.
- Ewacha† M, Waterman JM, Roth JD. 2013. The Cape ground squirrel as an ecosystem engineer: creating habitat for small mammal, invertebrate, and plant communities. Prairie University Biological Symposium, Winnipeg, MB.
- Ewacha† M, Waterman JM, Roth JD. 2012. The Cape ground squirrel as an ecosystem engineer: creating habitat for small mammal, invertebrate, and plant communities. University of Manitoba undergrad research forum, Winnipeg, MB.
- Makenbach† SA, Waterman JM, Roth JD. 2012. Let’s stay together: enhanced predator avoidance in interspecific association between yellow mongooses and Cape ground squirrels. Animal Behavior Society, New Mexico (won poster competition for undergraduates).
- Phillips MA\*, Waterman JM. 2012. The best defense is a good offense: Snake mobbing behavior in the Cape ground squirrel (*Xerus inauris*). Animal Behavior Society, New Mexico.
- Scantlebury M, Manjerovic\* MB, Bennett NC, Waterman JM. 2012. Seasonal body temperature daily rhythms in Cape ground squirrels. Society of Experimental Biology Conference, Salzburg, Austria.
- Waterman JM, Lavergne† S, Phillips\* MA. 2011. It’s a squirrel eat squirrel world: intersexual competition and the trade-off between reproduction and immunity in Richardson’s ground squirrels. Canadian Society of Ecology & Evolution, Banff, Canada.
- Phillips\* MA, Waterman JM. 2011. Cooperative anti-predator behavior in the Cape ground squirrel. Canadian Society of Ecology & Evolution, Banff, Canada.
- Bastos ADS, Manjerovic\* MB, Waterman JM. 2010. The *Xerus inaurus* Streptobacillary squirrel bite fever agent is distinct from *Streptobacillus moniliformis* and may be sexually transmitted. 4<sup>th</sup> International Conference on Rodent Biology and Management,

- Bloemfontein, South Africa.
- Manjerovic\* MB, Waterman JM. 2009. Making the best of a bad job in a highly promiscuous ground squirrel. American Society of Mammalogists. Fairbanks, Alaska.
- Manjerovic\* MB, Waterman JM. 2009. A tale of two tactics: how male reproduction is influenced by behavior and physiology. UCF Graduate Forum.
- Campbell † E, Trujillo † A., Chang † J, Egbert † K, Waterman JM. 2009. Changing dynamics: has the behavior and use of space of polar bears changed in the past 31 years? UCF Showcase of Undergraduate Research. April 2, 2009.
- Riley † K, Waterman JM, Roth JD. 2009. Weighing in: using photograph to estimate polar bear body condition. UCF Showcase of Undergraduate Research. April 2, 2009.
- Thompson † T, Waterman JM. 2009. Growing up fast: differences in the movement of juvenile Cape ground squirrels, *Xerus inauris*, prior to dispersal. UCF Showcase of Undergraduate Research. April 2 2009
- Nguyen † M, Manjerovic\* MB, Waterman JM. 2009. The pecking order of Cape ground squirrels. UCF Showcase of Undergraduate Research. April 2 2009.
- Waterman JM, Manjerovic\* MB. 2008. Love 'em and leave 'em...Intraspecific variation in male mating strategies in a highly promiscuous African ground squirrel. International Society of Behavioral Ecologists Conference, Ithaca, N.Y.
- Manjerovic\* MB, Waterman JM. 2008. Behavioral, and morphological differences in the alternative reproductive tactics of male Cape ground squirrels. International Society of Behavioral Ecologists Conference, Ithaca, N.Y.
- Kaapehi † CM, Roth JD, Waterman JM, Bird, TL. 2008. Cape Ground Squirrels (*Xerus inauris*) influence on invertebrates biodiversity. International Entomology Conference. Durban, South Africa.
- Scantlebury M, Waterman JM, Manjerovic\* MB, Jackson TP, Bennett NC. 2008. Reproductive physiology and behavior of social Cape ground squirrels, *Xerus inauris*. International Conference of Comparative Physiology & Biochemistry. Kenya, Africa.
- Bastos A, Manjerovic\* MB, Waterman JM. 2008. First genetic characterisation of the squirrel bite fever bacterial agent and evidence for sexual transmission in Cape ground squirrels. South African Genetics Conference. Cape Town, South Africa.
- Manjerovic\* MB, Waterman JM. 2008. Consequences of promiscuity on sperm physiology and immune function. UCF Graduate Research Forum, Orlando, FL.
- Blowers\* T, Waterman JM, Kuhar C, Bettinger T. 2008. Grouping behavior of captive female *Hippopotamus amphibious*. UCF Graduate Research Forum, Orlando, FL.
- Munim\* D, Noss R, Waterman JM. 2008. The conservation status of the Big Cypress fox squirrel (*Sciurus niger avicennia*). UCF Graduate Research Forum, Orlando, FL.
- Manjerovic\* MB, Waterman JM. 2008. Trade-offs of reproductive quality and immunity in a highly promiscuous species. Southeastern Ecology & Evolution Conference, Tallahassee, FL.
- Waterman JM, Roth JD, Kaapehi † C. 2007. Impact of Cape ground squirrels on desert communities in Namibia. Society of Conservation Biology, Port Elizabeth, South Africa.
- Waterman JM. 2007. Penary Talk: The Walmart effect on science. Southeastern Ecology & Evolution Conference, Orlando, Florida.
- Manjerovic\* MB, Waterman JM. 2007. No longer a man's world: sexual conflict and mate

- choice in promiscuous ground squirrels. Southeastern Ecology & Evolution Conference, Orlando, Florida.
- Hillegass\* M, Waterman JM, Roth, JD. 2007. Cape ground squirrels (*Xerus inauris*) and their parasites: is sociality a benefit? Southeastern Ecology & Evolution Conference, Orlando, Florida.
- Anderson\* CJ, da Vitoria Lobo N, Roth JD, Waterman JM. 2007. Facial profiling of polar bears: an automated approach. Southeastern Ecology & Evolution Conference, Orlando, Florida.
- Manjerovic\* MB, Waterman JM. 2007. Sexual conflict and mate choice in promiscuous ground squirrels. Graduate Research Forum, Univ. Central Florida.
- Waterman JM. 2007. Facultative cooperative breeding in a low skew society, the Cape ground squirrel. Winter Animal Behavior Conference, Steamboat Springs, CO.
- Pettitt\* BA, Waterman JM. 2007. Fecal progesterone profiles of pregnant and lactating free-living Cape ground squirrels (*Xerus inauris*). Society of Integrative & Comparative Biology Conference, Phoenix, AZ.
- Waterman JM., Hillegass\* MA, Roth JD. 2006. The cost of parasites to a social African ground squirrel. Animal Behavior Society, Snowbird, Utah.
- Pettitt\* BA, Waterman JM. 2006. Reproductive delay in female Cape ground squirrels (*Xerus inauris*). Animal Behavior Society, Snowbird, Utah.
- Munim\* D, Noss RF, Waterman JM. 2006. The distribution, abundance and habitat use of the Big Cypress fox squirrel, *Sciurus niger avicennia*. Ecological Society of America, Memphis, TN.
- Anderson\* C, Waterman JM, Roth JD. 2006. High complexity of whisker spot patterns of polar bears permits noninvasive individual identification. Ecological Society of America, Memphis, TN.
- Munim\* D, Noss RF, Waterman JM. 2006. Preferred habitat and distribution of the Big Cypress fox squirrel (*Sciurus niger avicennia*). American Society of Mammalogists, Amherst, Mass.
- Munim\* D, Noss RF, Waterman JM. 2006. Preferred habitat and distribution of the Big Cypress fox squirrel (*Sciurus niger avicennia*). Florida Ecology & Evolutionary Symposium, Archbold Biology Station. FL.
- Anderson\* CJ, Waterman, JM, Roth, JD. 2006. Reliability analysis of a method for identifying individual polar bears. UCF Graduate Forum, Orlando, FL
- Hillegass\* MA, Waterman JM, Roth JD. 2006. Costs of parasitism on a social species. UCF Graduate Forum, Orlando, FL.
- Manjerovic\* MB, Waterman JM. 2006. Reproductive morphology of a social Africa ground squirrel (*Xerus inauris*). UCF Graduate Forum, Orlando, FL.
- Pettitt\* BA, Waterman JM. 2006. Reproductive delay in female Cape ground squirrels: suppression, inbreeding avoidance and skew. Southeastern Ecology & Evolution Conference, Tuscaloosa, Alabama.
- Anderson\* C, Waterman JM, Roth JD. 2006. Photo-identification of individual polar bears by whisker spot pattern variation. Southeastern Ecology & Evolution Conference, Tuscaloosa, Alabama.
- Hillegass\* MA, Waterman JM, Roth JD. 2006. Parasite effects on a social sciurid, the Cape

- ground squirrel (*Xerus inauris*). Florida Academy of Sciences, Melbourne, FL.
- Pettitt\* BA, Waterman JM. 2006. Reproductive suppression in female Cape ground squirrels, *Xerus inauris*. Society of Integrative & Comparative Biology Conference, Orlando, FL.
- Anderson\* CJ, Waterman JM, Roth JD. 2006. Non-invasive identification of individual polar bears by whisker spot patterns. Society of Integrative & Comparative Biology Conference, Orlando, FL.
- Waterman JM. 2005. Masturbation and sperm competition in male Cape ground squirrels. Animal Behavior Conference, Snowbird, UT.
- Pettitt\* BA, Waterman JM. 2005. Influence of predation and habitat structure on social evolution in ground-dwelling sciurids: a comparative analysis. Animal Behavior Conference, Snowbird, UT.
- Pettitt\* BA, Waterman JM. 2005. Comparison of the effects of different storage methods on fecal progesterone concentrations: implications for sample transport. Southeastern Ecology & Evolution Conference, Athens, GA.
- Waterman JM, Hillegass\* MA. 2005. Parasite removal and its impact on behavior and reproduction in a social African ground squirrel. Society for Integrative & Comparative Biology conference, San Diego, CA.
- Eckhardt\* G, Waterman JM, Roth, JD. 2004. The effects of eco-tourism on the polar bears of Churchill, Manitoba, Canada. International Polar Bear Husbandry Conference, San Diego, CA.
- Eckhardt\* GH, Waterman JM, Roth JD. 2004. Effects of vehicle approaches on polar bear behavior in Churchill, Manitoba. Florida Academy of Sciences, Orlando, FL.
- Bouchie\* L, Waterman JM, Jackson TJ, Bennett NC. 2005. Evidence of spontaneous ovulation in the Cape ground squirrel, *Xerus inauris*. Florida Academy of Sciences, Orlando, FL.
- Pettitt\* BA, Waterman JM. 2004. Predation, habitat structure and evolution of sociality in ground-dwelling sciurids (Tribe Marmotini): a comparative analysis. Florida Academy of Sciences, Orlando, FL.
- Laible J<sup>†</sup>, Waterman JM, Roth JD, Eckhardt\* G. 2004. Body size estimation in polar bears. Florida Academy of Sciences, Orlando, FL.
- Herron\* MD, Waterman JM, Parkinson CL. 2004. Evolution of the African ground squirrel genus *Xerus*: Phylogenetic and phylogeographic patterns reflect the influence of climate change. Florida Academy of Sciences, Orlando, FL.
- Waterman JM. 2004. Environmental influences on the social system of the Cape ground squirrel, *Xerus inauris*. Society for Integrative & Comparative Biology conference, New Orleans, LA.
- Pettitt\* BA, Waterman JM. 2004. Social Evolution, Predation Pressure and Habitat Structure: A Comparative Analysis within Tribe Marmotini. Southeastern Ecology & Evolution Conference, Atlanta, Georgia.
- Bouchie\* L, Waterman JM, Bennett NC, Jackson TP. 2004. Evidence of spontaneous ovulation in the Cape ground squirrel: *Xerus inauris*. Society for Integrative & Comparative Biology Conference, New Orleans, LA.
- Waterman JM. 2003. Why African ground squirrels hang out with mongooses: are there benefits to interspecific associations? Society for Integrative & Comparative Biology Conference, Toronto, Ontario, Canada.

- Eckhardt\* GH, Waterman JM, Roth JD. 2003. The functional significance of play fighting in polar bears: are they asocial? Society for Integrative & Comparative Biology Conference, Toronto, Ontario, Canada.
- Eckhardt\* GH, Waterman JM, Roth JD. 2003. Play in polar bears: does size matter. Florida Academy of Sciences, Orlando, FL.
- Waterman JM. 2001. Why cohabitate with suricates and yellow mongooses? A squirrel's perspective on interspecific associations. Paper presented to the 8<sup>th</sup> International Theriological Congress, Sun City, South Africa.
- Waterman JM. 1999. The effect of drought on the social structure and use of space in Cape ground squirrels, *Xerus inauris*. American Society of Mammalogists, Seattle, WA.
- Waterman JM, Roth JD. 1998. Mobbing in cape ground squirrels: response to snakes near the burrow. Animal Behavior Society, Carbondale, IL.
- Waterman JM, Ramsay MA. 1996. Play fighting in male polar bears (*Ursus maritimus*). American Society of Mammalogists, Grand Forks, ND.
- Waterman JM. 1995. The mating system of an African ground squirrel. Animal Behavior Society, Lincoln, NB.
- Ramsay MA, Waterman JM. 1995. The social complexities of an asocial species; play fighting in male polar bears (*Ursus maritimus*). Animal Behavior Society, Lincoln, NB.
- Waterman JM. 1994. Constraints on female group size in the Cape ground squirrel. Animal Behavior Society, Seattle, WA.
- Waterman JM. 1993. The boyz 'n the veldt: all male social groups in the Cape ground squirrel. Animal Behavior Society, Davis, CA.
- Waterman JM. 1988. Use of space and social behaviour of Columbian ground squirrels prior to male dispersal. International Behavioral Ecology Conference, Vancouver, B.C.

### **Invited Seminars**

- Assiniboine Park Zoo (January 2015)
- Nature Manitoba (January 2014)
- Faculty of the Environment, U of Manitoba (October 2012)
- Dept. of Biology, U of Winnipeg (September 2011)
- Dept. of Entomology, U of Manitoba (March 2011)
- Dept. of Biology, U of Manitoba (March 2009)
- Archibold Research Station, Lake Placid, FL (March 2009)
- Southeastern Louisiana University, Hammond, LA (May 2008)
- University of Florida, Gainesville, FL (September 2006)
- University of Lethbridge, Alberta, Canada (January 2006)
- University of Pretoria, Pretoria, South Africa (June 2006 & 2002)
- Florida Institute of Technology, Melbourne (February 2002)
- Disney's Animal Kingdom, Orlando, FL (March 2001)
- University of California, Hayward (March 2000)
- Purdue University, Calumet, IN (February 2000)
- Acadia University, Halifax, Nova Scotia (April 1998)
- Lewis and Clark College, Portland, OR (January 1998)
- State University of New York, Potsdam (February 1998)

Cornell College, Mount Vernon, IA (February 1998)  
York University, Toronto, Ontario (February 1996)  
University of Saskatchewan, Saskatoon (January 1995)

## **RESEARCH FUNDING**

- Faculty of Science Field Work Support Program. 2014. Sociality and reproductive strategies in African ground-dwelling squirrels. \$6000
- Churchill Northern Science Centre NRF. 2014. Understanding the behaviour of polar bears and the impacts of tourism through the use of digital technology. 11 user days, 7 vehicle days, \$1500
- Natural Sciences & Engineering Research Council (NSERC) PromoScience Grant. 2014. Polar bears and permafrost at the edge of the Arctic: Student-led climate change field research in the Greater Wapusk Ecosystem (with J. Roth & R. Brook). \$133,500
- Faculty of Science Field Work Support Program. 2013. Sociality and reproductive strategies in African ground-dwelling squirrels. \$7500
- Faculty of Science Field Work Support Program. 2012. Sociality and reproductive strategies in African ground-dwelling squirrels. \$5222
- University of Manitoba Research Grants Program. 2012. The impact of ecotourism on the Churchill polar bear population. \$7500
- Natural Sciences & Engineering Research Council (NSERC) Discovery Grant. 2010-2015. Sociality and reproductive strategies in ground-dwelling squirrels: effects of infection on reproduction and sperm competition. \$170,000
- Canadian Foundation for Innovation (CFI) Leaders Opportunity Fund and the Manitoba Research & Innovation Fund. 2010. Reproductive and behavioural ecology of small mammals in the field and laboratory. \$174,880
- University of Manitoba Research Grants Program. 2010. Trade-offs between parasites and reproduction in Richardson's ground squirrels. \$7315
- Cotswold Foundation. 2003-2009. Polar Bear Research (with J. Roth). USD\$90,000
- National Science Foundation (NSF) CAREERS. 2002-2008. Division of Integrative Biology and Neuroscience. The evolution of cooperative breeding, reproductive suppression, and all-male groups in a southern African ground squirrel. USD\$570,308
- Go-Green Namibia. 2008. The effect of the Cape ground squirrel on the diversity and abundance of small mammals and invertebrate communities. USD\$3,800
- U.S. Fish & Wildlife Service. 2004-2007. The status and abundance of the Big Cypress Fox Squirrel (*Sciurus niger avicennia*) (with R. Noss). USD\$45,616
- Polar Bears International. 2006-2007. Non-invasive identification of polar bears (with J. Roth). \$2,650
- Earthwatch Institute, Center for Field Research. 2001-2006. The social complexities of an asocial species: play in adult polar bears (*Ursus maritimus*) (with J. Roth). \$271,583
- Polar Bears International. 2003-2006. Effect of ecotourism on the behaviour, use of space and energetics of polar bears near Churchill, Manitoba (with J. Roth). USD\$16,800
- NSF REU. 2006-2007. Division of Integrative Biology and Neuroscience. Interspecific communication: Do Cape ground squirrels extract information from the alarm calls of suricates? USD \$6000
- NSF REU. 2004-2005. Division of Integrative Biology and Neuroscience. Parasite removal and



its impact on behavior, use of space and reproduction in a social ground squirrel.  
USD\$6000

NSF Major Research Instrumentation Program. 2001-2004. Acquisition of an IRMS for applications in anthropology, ecology and conservation biology (with T Dupras, J Roth, A Chase, D Chase, & G Worthy). USD\$236,915

Presidential Initiative to fund Major Research Equipment, University of Central Florida. 2002. Acquisition of an IRMS for applications in anthropology, ecology and conservation biology (with T. Dupras and J. Roth). USD\$47,500

Burnett Honors College Undergraduate Research Grant, University of Central Florida. 2002. Space use and behavior of Sherman's fox squirrels in suboptimal habitat: implications for conservation (with S. Blaustein and J. Roth). USD\$2000

In House Grant, UCF. 2001-2002. Stable-isotope changes between diet and tissue of captive rodents: implications for dietary reconstruction in wildlife. USD\$7,500

**Research Awards:**

2007 UCF Research Incentive Program Award (\$5,000 increase in base salary).

**TEACHING:**

**Teaching Awards:**

2012 & 2013 Nominated for University of Manitoba University 1 Teaching Awards.

2008 UCF College of Sciences Excellence in Undergraduate Teaching Award (\$2,000 cash award).

2005 UCF Teaching Incentive Program Award (\$5,000 increase in base salary).

2004 UCF College of Arts & Sciences Excellence in Undergraduate Teaching Award (\$2,000 cash award)

**Courses taught at the University of Manitoba 2010-present**

*Skills in the Biological Sciences*

*Boreal Ecology*

*Biology of Mammals*

*Biology: Biological Diversity & Interaction*

*Special Topics: Field Ecology in Africa*

**Courses taught at UCF 2000-2009 (\* indicates graduate courses)**

*Behavioral Ecology\**

*Biology I*

*Biology II*

*Animal Behavior*

*Advanced Topics in Behavioral Ecology\**

*Methods of Data Collection & Analysis in Behavioral Ecology\**

*The Ecology and Behavior of Mammals in Southern Africa\**

*Mating Systems\**

**Courses taught 1994-2000 at the University of Saskatchewan, York University and Lewis-**

**Clark State College (All undergraduate courses).**

*Mammalogy*

*Animal Ecology*

*General Ecology*

*General Zoology*

*Ornithology*

*Conservation Biology*

*Introduction to Natural Sciences*

*Ecology & Behaviour of Small Mammals*

**Advising and mentoring activities:**

Postdocs mentored

Dr. Ymke Warren (2005- 2006), Dr. Tim Jackson (2002-2004)

Ph.D. Students Advised:

Current – Elaine dos Anjos, Anne Marie van der Marel

Completed – Mary Beth Manjerovic

Masters Students Advised:

Current – Kelsey O'Brien, Dylan Pond, Jennifer Sojka

Completed– Molly Phillips, Lieke Faber, Nicole Costantini, Heather Chasez, Tracy Blowers, Danielle Munim, Melissa Hillegass, Carlos Rosas-Anderson, Beth Pettitt, Doug Skurski, Corey Maggiano, Gillian Eckhard, Lynette Bouchie, Carolyn Unck, Barbara Fields, Rebecca Sellin, Ali Rabatsky

Graduate student committees:

UM PhD – Patricia Rosa, Mary Anne-Anne Collis

UM MSc – Ryan McDonald, Danielle Mocker, Ellen Pero

UCF – Alison Achey, Nicole Browning, Kelly Brock, Brandon Davis, Jennifer Fewster, Kristine Gross, Matt Herron, Kelly Kennedy, Genevieve Metzger, Cheryl Pinzone, Monica Ross, Jill Richardson, Rosanna Tursi, Ann Spellman, Angela Tringali.

External Examiner – Jesse Patterson (U Calgary); Jamie Gorell (U Alberta)

Undergraduate Projects Supervised

UM – Dana Kowalsky, Monica Mai, Justin Shave (UM VP URA), Jenna Black, Alex Hare, Kaitlyn Dyke, Carly Malowski, Michelle Ewacha, Bassem Migally (NSERC URA), Marina Cameron, Alyssa Archibald (FOS summer fellowship), Alix Nelson (NSERC URA), Jackie Beaumont (NSERC URA ; FOS summer fellowship), Alex Beaumont (NSERC URE ; FOS summer fellowship), Sarah Makenbach (honours student/NSERC URA), Sophia Lavergne (NSERC URA), Gabrielle Machlin (honours student), Matt Yunik (honours student), Heather Zanzerl,

UCF – Carolina Acevedo, Tiffany Thompson, Katharine Riley, Stephanie Koster (All Funded through the UCF NSF Excel Program), Jessica Cargill, Emily Campbell, Kayla Egbert, Juliana Chang, Alexa Trujillo, Nundia Louis, Jennifer Adams, Melissa Adams, Melissa Vogelsang, Marisa Nguyen, Ashton Thompson, Katherine Torrence, John Mizell (latter Funded through an

NSF REU supplement), Kimberley Wright, Shannon Segelsky, Rhonda Sawyer, Jillian Moran, Sumayya Qadri (Funded through UCF LEAD scholars), Heather Gontz, Melissa Hillegass (latter Funded through an NSF REU supplement), Jennifer Laible (Funded through the UCF Research and Mentoring Program), Melissa Chernick, Patricia Botero (Funded through UCF LEAD scholars), Melanie Cannon, Terry Corona, Wendi Reid, Steven Blaustein (Funded through a UCF Burnett Honors College Undergraduate Research Grant), Nechelle Nesmith (Funded through UCF LEAD scholars), Jaime Davey, Amy Lear.

### **Pedagogical publications & presentations:**

- Walters, L., Waterman, J.M. Nadelson, L.S. 2009. What Works Best? Classroom Undergraduate Research Experiences with Different Levels of Inquiry. Society of Integrative & Comparative Biology, Boston, January 3- 7.
- Nadelson, L. S., Walters, L., Waterman, J. M. 2008. What Works Best? Classroom Undergraduate Research Experiences with Different Levels of Inquiry. Florida Statewide Symposium. UCF campus, Orlando, Sept. 26-27.
- Waterman, J. M. 2008. Integrating the classroom and research through technology. *Faculty Focus* 7(3): 4-5.
- Jenkins, D. R., A. Morrison-Shetlar, P. Quintana-Ascencio, I. J. Stout, J. M. Waterman, & J. F. Weishampel. 2005. Assessing Undergraduate Biology Curriculum at the University of Central Florida. Presented at the National Science Foundation FIRST-II conference, Kellogg Biological Station, Michigan.
- Waterman, J. M., B. Boyers & A. Morrison-Shetlar. 2004. *General Biology Laboratory Manual*. Outernet Publishing, Eden Prairie, MN.
- Waterman, J. M. 2004. Bringing learning to life. *Faculty Focus* 3(2):2-3.

### **SERVICE**

#### **Service Awards**

- 2014 University of Manitoba Outreach Award  
2008 UCF Faculty Woman Making History Awardee from the Women's Research Center

#### **Professional activities**

- Senior Editor:* Journal of Zoology, London (2012 - present).
- Academic Editor:* PeerJ (2013 - present), PLoS ONE (2010 - present); Journal of Mammalogy (2006-2010).
- Journal Reviewer:* Acta Theriologica, Animal Behaviour, Arctic, Behavioral Ecology, Behavioral Ecology & Sociobiology, Biological Journal of the Linnean Society, Bioscience, Ethology, Journal of Mammalogy, Journal of Zoology, Naturwissenschaften, Oecologia, Phil. Trans. Roy. Soc. B, and Revista Chilena de Historia Natural.
- Grant Reviewer:* National Science Foundation (Animal Behavior Panel, Doctoral Dissertation Improvement Grant Panel, & *ad hoc* Reviewer), European Research Council, National Geographic Society, Austrian Science Foundation, National Science and Engineering Research Council of Canada, Canadian Research Chairs, Canadian Foundation for Innovation, South Africa National Research Foundation and the Animal Behavior Society Student Research Awards.

Jane Waterman

*Book Reviewer: Biology: How Life Works; chapter in “Sociobiology of caviomorph rodents: an integrative view”, for Wiley Blackwell Press.*

*Society Member: Animal Behavior Society, American Society of Mammalogists, International Society for Behavioral Ecology, Society for Conservation Biology, Canadian Society of Ecology & Evolution, Sigma Xi*

*Society Committees, American Society of Mammalogists (Merriam Award Committee and Publication Committee); Animal Behavior Society (Student Awards)*

*Conference Abstract Reviewer: International Society of Behavioral Ecologists*

*Advisory Boards:*

International Polar Bear Conservation Centre (IPBCC) Advisory Board

**University of Manitoba service:**

University of Manitoba Writing Tutor Program Advisory Committee

Faculty of Science Field Work Advisory Committee

Faculty of Science Tenure Nucleus Committee

Dept. of Biological Sciences Honours Committee

Dept. of Biological Sciences Ad Hoc Collections Committee

Dept. of Biological Sciences Safety Committee

Dept. of Biological Sciences Student Retention and Recruitment Committee

Dept. of Biological Sciences Graduate Committee

Dept. of Biological Sciences CRC search committee

Dept. of Biological Sciences Tenure committee, 2012

Dept. of Biological Sciences Parasitologist search committee, 2012

Dept. of Biological Sciences Ornithologist search committee, 2013

Chair, Ecology Theme Group (2012-2013)

**University of Central Florida service:**

UCF Institutional Animal Care and Use Committee (IACUC).

UCF Animal Care Facility Design Committee, Chair

College of Sciences Field Safety Task Force

College of Science Teaching Incentive Procedures Committee

College of Sciences Teaching Incentives Selection Committee

College of Science Sabbatical Committee

Dept. of Biology Chair’s Advisory Committee

Dept. of Biology Graduate Committee

Dept. of Biology Curriculum Committee

Dept. of Biology Curators Committee

Dept. of Biology Chair Search Committee 2007

4 Faculty search committees, Dept. of Biology, 2003-2006

**Public recognition of research:**

My research has been featured in the following popular scientific, news and media outlets:

*Arctic Voices.* Travelling exhibit by Science North & the Museum of Nature. 2014.

- Finally, a day just for squirrels* by Sean Moore of UM Today. 2014.
- Mission: Polar Bear Rescue*. By Nancy Castaldo. National Geographic Kids. 2014.
- Tale of Miracle Earth, episode on Churchill, MB*, by TV ASAHI Japan. Due to air early January, 2013. <http://www.tv-asahi.co.jp/miracle-earth/index.html>
- Polar express, Tourists provide valuable photographic data for scientists studying Manitoba polar bears* by Martin Zelig, Winnipeg Free Press, Oct. 29, 2011.
- Squirrels masturbate to avoid sexually transmitted infections* by Ed Yong. Discover Magazine, Sept. 28, 2010  
(<http://blogs.discovermagazine.com/notrocketscience/2010/09/28/squirrels-masturbate-to-avoid-sexually-transmitted-infections/#.UOXYIXfNn5w>) and National Geographic Online (<http://phenomena.nationalgeographic.com/2010/09/28/squirrels-masturbate-to-avoid-sexually-transmitted-infections/>)
- Assessing the effects of resource availability and parity on reproduction in female Cape ground squirrels: resources do not matter*, *Journal of Zoology* Podcast. 2009.  
<http://www.wiley.com/bw/journal.asp?ref=0952-8369>
- Minnesota-trained biologist tracking polar bears by whisker* by Tom Meersman, *Minneapolis Star Tribune*, Dec. 15, 2008.  
[http://www.startribune.com/local/36207129.html?elr=KArks:DCiUIPciUoaEYY\\_4PcUU](http://www.startribune.com/local/36207129.html?elr=KArks:DCiUIPciUoaEYY_4PcUU)
- Scientists solicit photos of polar bears in wild* by Jennifer Viegas, MSNBC News, Nov. 17, 2008. <http://www.msnbc.msn.com/id/27773811>
- Wanted: Polar Bear Pics for Science* by Jennifer Viegas, Discovery News, Nov. 17, 2008.  
<http://dsc.discovery.com/news/2008/11/17/polar-bear-pics.html>
- Scientists need your polar bear photographs* by Jennifer Viegas, Discovery New Blogs, Nov. 17, 2008. [http://blogs.discovery.com/news\\_animal/2008/11/index.html](http://blogs.discovery.com/news_animal/2008/11/index.html)
- Of fingerprints and polar bear whiskers* by Alistair Doyle, Reuters News Online, Nov. 14, 2008. <http://blogs.reuters.com/environment/2008/11/14/of-fingerprints-and-polar-bear-whiskers>
- Scientist wants tourists' pics to help track polar bears* by the *Winnipeg Free Press*, Nov. 13, 2008.
- NASA Tool Helps Track Whale Sharks, Polar Bears* by John Roach, *National Geographic News*, August 25, 2008. [http://news.nationalgeographic.com/news/2008/08/080825-whale-sharks-missions\\_2.html](http://news.nationalgeographic.com/news/2008/08/080825-whale-sharks-missions_2.html)
- The Bears of Churchill* by Jon Mooallem & Nick Miroff. American Radio Works, American Public Media, 2009.  
<http://americanradioworks.publicradio.org/features/earllysigns/g1.html>
- On Thin Ice* by Chris Woolston, *Via Magazine*, September 2008.  
[http://www.viamagazine.com/top\\_stories/articles/wild\\_animal08.asp](http://www.viamagazine.com/top_stories/articles/wild_animal08.asp)
- South African squirrels: well-endowed* by Ewan Callaway, *New Scientist Blogs*, August 15, 2008. <http://www.newscientist.com/blog/shortsharpscience/2008/08/south-african-squirrels-well-endowed.html>
- Waterman UCF Polar Bears* by WFTV News, Orlando, Dec. 6 2007.  
<http://www.youtube.com/watch?v=urYX4YfVENQ>
- Przychodzi Kojot dohorsuka* [interspecific cooperation] in the Polish science magazine “*Focus*” in October, 2007.
- Early Signs: Reports From a Warming Planet* by Jon Mooallem and Nick Miroff, *National*

Public Radio Living on Earth March 17-19, 2006. [www.loe.org](http://www.loe.org) Also written story on [www.salon.com](http://www.salon.com) (HBO site).

*Climate change threat to polar bears* by David Shukman, BBC World News, November 18, 2005.

*Polar bears face up to warmer future* by Kevin Bishop, BBC World News, November 19, 2005.

*Face to Face with the Polar Bear* by Jerome Bouvier, Saint Thomas Productions, Produced for Animal Planet, Fall 2005.

*Built for the Arctic: A Species' Splendid Adaptations* by Natalie Angier, The New York Times Science Section, January 27, 2004. <http://www.nytimes.com/2004/01/27/science/built-for-the-arctic-a-species-splendid-adaptations.html?fta=y&pagewanted=all>

*Polar Bears are bothered by tundra buggies: study* by Helen Fallding, Winnipeg Free Press, March 22, 2004.

*The Frozen Tundra: A Web of Life* by Philip Johansson, Enslow Publishers, 2004.

*Going Wireless in the Wilderness* by Charles Mandel, Wired.com, August 7, 2003.

<http://www.wired.com/science/discoveries/news/2003/07/59546>

*Squirrels: a Window into Social Evolution* by R. Thorington Jr., *Bioscience*, 52(6) p544, June 2002.

*Canada's 'Gentle Giants' Await Vanishing Winter* by James Brooke, The New York Times Science Section, Nov. 12, 2000.

<http://www.nytimes.com/2000/11/12/world/canada-s-gentle-giants-await-vanishing-winter.html>

**ISOBEL WATERS**  
**SENIOR INSTRUCTOR**  
**Department of Biological Sciences**  
**University of Manitoba**  
**Winnipeg, Manitoba, Canada**

**CITIZENSHIP:** Canadian  
**DATE AND PLACE OF BIRTH:** 24 June 1952, Winnipeg, Manitoba  
**FAMILY:** Married with two children

***POST-SECONDARY EDUCATION***

1989. Doctor of Philosophy (Botany), University of Manitoba. Subject: Plant ecology.  
Thesis title: The ecology of *Typha glauca* Godr.: field studies along a water depth gradient.  
1980. Master of Science (Plant Science), University of Manitoba. Subject: Plant physiology.  
Thesis title: Effect of cold acclimation on gas exchange and growth parameters of winter rape.  
1977. Bachelor of Science in Agriculture (Plant Science), University of Manitoba.  
1977. Bachelor of Arts (English), University of Manitoba.

***EMPLOYMENT HISTORY***

Position	Institution/Organization	Dates
Senior Instructor	University of Manitoba (Biology)	1996 – present
Sessional Lecturer	University of Manitoba (Botany)	1990 – 1996
Lab co-ordinator	University of Manitoba (Botany)	1989-1991
Research Associate	University of Manitoba (Plant Science)	1980-1981

**Courses taught include:** 1<sup>st</sup> year Biology; Biology for Teachers; Introduction to the University; Plant Structure and Function; The Flowering Plants; Plant Physiology; Plant Physiological Ecology; Introductory Ecology (for non-majors); Principles of Ecology (for majors); Community Ecology; Forest Botany; Pollution Biology; Field Ecology; Plants in the Prairie Landscape; Environmental Issues for Engineers

***ACADEMIC HONOURS AND AWARDS***

University of Manitoba, Saunderson Award for Excellence in Teaching, 1998.  
University of Manitoba Graduate Fellowship, 1998.  
University of Manitoba Alumni Association Scholarship, 1987.  
NSERC Postgraduate Fellowships, 1985-87, 1978-80.  
1977. University of Manitoba Gold Medal (Agriculture).  
1976-1977. Canadian Wheat Board Undergraduate Scholarship.

***PROFESSIONAL AND SCHOLARLY ACTIVITIES***

Scholarly

Reviewer, NSERC grant application, 2005.  
Reviewer, papers for various journals including *Canadian Journal of Forest Research*, *Canadian Journal of Botany*, and *Forest Ecology and Management*.  
Treasurer and assistant organizer, Canadian Botanical Association conference, Wpg, 2004.  
Numerous academic conferences in botany (most recently June 2014) and literature.

Administrative Experience/Service:

Department Head Selection Committees, 1993, 1998, and 2009.  
 Department Hiring Committees for Botany, Environmental Science, and Chemistry.  
 Women in Sciences Committee, 1992-1995.  
 University of Manitoba Endowment Fund Committee, 1998-89.  
 Departmental Committees: space, curriculum, appeal of term work, ecology, awards.  
 Biology Restructuring Committee.

Outreach:

Field trips for Association for Manitoba Seniors (on several occasions; with Bruce Ford).  
 Membership chair, Manitoba Association of Plant Biologists, 2004-present.  
 Scientific advisor to Manitoba Museum on Parklands gallery. 2003.  
 Interview, CBC radio, on flooding effects on Red River valley forests, 1998.  
 Guest lecturer, Manitoba Naturalists Society on effects of flooding on the Red River valley forests. 1998.  
 Guest lecture, University Womens Club on raspberry and strawberry culture. 1996.  
 Guest lecture, Manitoba Naturalists Society on boreal forest types in Manitoba. 1995.  
 Workshop, Manitoba Naturalists Society, winter twig identification 1994, 2005.  
 Various activities including school presentations, Science Fair judging, etc.  
 Scientific advisor (unpaid) to the Children's Museum display on photosynthesis. 1993.  
 Workshops for the Biology Teachers Organization on two occasions (1991 and 1992).

**RESEARCH FUNDING**

Year: 1998

Title: Island biogeography study in Whiteshell Provincial Park.

Source: Canadian Shield Foundation

Amount: \$2,000

Year: 1996

Title: Impact of alternative harvesting methods on forest regeneration and understory.

Source: Manitoba Model Forest, Pine Falls Paper Co.

Amount: \$28,000

Year: 1995

Title: Riverbottom Forest Remnants in St. Norbert.

Source: St. Norbert Labarriere Greenspace Committee

Amount: \$5,000

Years: 1993-1994

Title: Impact of alternative harvesting methods (follow-up study).

Source: Manitoba Model Forest, Abitibi-Price Inc., Pine Falls Paper Co.

Amount: \$49,500

**PUBLICATIONS**Books:

Smith, T.M., Smith, R.L., and **Waters**, I. *Elements of Ecology: First Canadian edition*. Toronto: Pearson, 2014.

Hoople, Robin P. *Inexorable Yankeehood: Henry James Rediscovered America, 1904-1905*.

Edited and with additions by Isobel **Waters**. 2009. Lewisburg: Bucknell University Press.



**Papers in Referred Journals:**

Newediuk, J., J. Hare and I. **Waters**. 2013. Aspen parkland pasture plant community altered by Richardson's ground squirrels (*Urocitellus richardsonii* Sabine). Accepted by *Canadian Field Naturalist*.

**Waters**, Isobel. "Still and Still Moving": The House as Time Machine in Henry James's *The Sense of the Past*. 2009. *Henry James Review* 30(2):180-195.

**Waters**, Isobel, Essery, Erin, Ruta, Tracy, and Shay, Jennifer. 2008. Impact of a severe flood on canopy composition, tree regeneration, and ground flora of the lower floodplain of gallery forests along the Red River, Canada. *Davidsonia* 19(2): 54-76.

S.W. Kembel, I. **Waters**, and J.M. Shay. 2008. Short-term effects of cut-to-length versus full-tree harvesting on understorey plant communities and understorey-regeneration associations in Manitoba boreal forests. *Forest Ecology and Management* 255:1848-58.

**Waters**, Isobel. "Disengaged": Bolting and Remarriage in Henry James's Short Fiction. 2008. *Henry James Review* 29(3), Fall 2008:265-274.

**Waters**, I., S. Kembel, J.-F. Gingras and J.M. Shay. 2004. Short-term effects of cut-to-length versus full-tree harvesting on conifer regeneration in jack pine, mixedwood and black spruce forests in Manitoba. *Canadian Journal of Forest Research* 34: 1938-1945.

**Waters**, I. and J.M. Shay. 1991. Effect of water depth on population parameters of a *Typha glauca* Godr. stand. *Canadian Journal of Botany* 70: 349-351.

**Waters**, I. and J.M. Shay. 1991. A field study of the effects of water depth, order of emergence and flowering on the growth of *Typha glauca* Godr. using the Richards model. *Aquatic Botany* 39: 231-42

**Waters**, I. and J.M. Shay. 1990. A field study of the morphometric response of *Typha glauca* shoots to a water depth gradient. *Canadian Journal of Botany* 68: 2339-2343.

# **CURRICULUM VITAE**

## **I. Personal Information:**

Name: **Dirk Weihrauch**

Date of Birth: April 5, 1967

Citizenship: German/Permanent Resident of Canada

Home Address: 538 Oakenwald Ave  
Winnipeg, MB, Canada, R3T 1M2  
Tel (204) 219-3385

Business Address: W467 Duff Roblin  
Department of Biological Sciences  
University of Manitoba  
190 Dysart Rd., Winnipeg, MB, Canada, R3T 2N2  
Tel (204) 474-6310  
Fax (204) 474-7588  
Email Dirk.Weihrauch@ad.umanitoba.ca

## **II. Positions Held:**

Apr. 1999-Jul. 2001 **Postdoctoral Research Fellow**  
Department of Biology  
Lake Forest College  
Lake Forest, IL, USA

Sep. 2001-Jul. 2003 **Postdoctoral Research Fellow**  
Department of Physiology and Biophysics  
University of Illinois at Chicago  
Chicago, IL, USA

Oct. 2003-Dec. 2006 **Independent Project Leader**  
Section Physiology  
Department of Biology and Chemistry  
University of Osnabrück  
Osnabrück, Germany

Jul. 2007-2013 **Assistant Professor**  
Department of Biological Sciences  
University of Manitoba  
Winnipeg, Manitoba, Canada

Jul. 2013-present **Associate Professor**  
Department of Biological Sciences  
University of Manitoba  
Winnipeg, Manitoba, Canada

**III. EDUCATION:**

Apr.1989-Mar. 1992

**Vordiplom** (B.S. equivalent) in Biology, Grade: A+  
Graduated in Biology, Chemistry and Physics  
University of Hamburg  
Hamburg, Germany

Apr.1992- Nov.1995

**Diplom** (M.Sc. equivalent), Biology; Grade: A+  
Biologische Anstalt Helgoland, University of Hamburg  
Major: Zoology, Microbiology, Genetics  
Thesis: Zur Stickstoff-Exkretion der Strandkrabbe *Carcinus maenas*  
Supervisors: Professor W. Becker and Professor D. Siebers  
University of Hamburg  
Hamburg, Germany

Dec.1995- Jan.1999

**Ph.D.**, Biology; Grade: "Magna cum laude"  
Biologische Anstalt Helgoland, University of Hamburg  
Thesis: Zur Stickstoff-Excretion aquatischer Brachyuren: *Carcinus maenas*, *Cancer pagurus* und *Eriocheir sinensis*.  
Supervisors: Professor W. Becker and Professor D. Siebers  
University of Hamburg  
Hamburg, Germany

**IV. TRAVEL AWARDS:**

Weihrauch, D. Travel grant from the **Friedrich-Ebert-Stiftung** for malaria research in Papua New Guinea (September – December 1992). Total amount of travel award: **\$5,250.00**.

Weihrauch, D. Travel grant from the **German Academic Exchange Service** (DAAD) for molecular research in the laboratory of Prof. Dr. Towle (Lake Forest College; April – July 1997). Total amount of travel award: **\$3,750.00**.

Weihrauch, D. Travel grant from the **American Physiological Society** for the XXXIV International Congress of Physiological Sciences, New Zealand, August 26-31, 2001. Total amount of travel award: **\$2,000.00**.

**V. SCHOLARLY AND PROFESSIONAL ACTIVITIES:****Journal Referee:**

American Journal of Physiology - Regulatory, Integrative and Comparative Physiology  
Biochimica et Biophysica Acta  
Biological Bulletin  
Comparative Biochemistry and Physiology  
Frontiers in Zoology  
Frontiers in Physiology  
Insect Biochemistry and Molecular Biology  
International Journal of Biochemistry and Cell Biology  
Invertebrate Biology  
Journal of Comparative Physiology B  
Journal of Experimental Biology  
Journal of Experimental Zoology A  
Journal of Experimental Marine Biology and Ecology  
Marine Biology  
Physiological and Biochemical Zoology  
PLOSone

**Journal Editor:**

Guest Associate Editor for "Frontiers in Aquatic Physiology" since 2010.  
Specialty Chief Editor: David Evans, University of Florida, USA  
Indexed in: DOAJ, CrossRef, PubMed Central and PubMed, Google Scholar

**Professional Associations:**

Society of Experimental Biology (SEB), (Member, 2003-present).  
The Society for Integrative and Comparative Biology (SICB), (Member, 1999- 2008, 2012).  
Deutscher Hochschulverband (DHV), (Member, 2003-present).  
Deutsche Zoologische Gesellschaft (DZG), (Member, 2003-present).  
Canadian Society of Zoologists (CSZ), (Member, 2007-present)

**VI. Administrative Activities (University of Manitoba)**

- Physiology Teaching Committee (2007- present)
- Departmental Speaker Committee (2009- present)
- Honours Thesis Committee (Course 4100; 2009 – 2013, 2013 chair)
- Holiday Festivities Organizing Committee (2011)
- Adjunct Professor Committee (2012-present)

- Fire warden 2008-2009 (4<sup>th</sup> level, Duff Roblin), 2011 (6<sup>th</sup> level Buller), 2012-present (4<sup>th</sup> level, Duff Roblin).

**VII. TEACHING:****University of Osnabrück, Germany (2004-2006), Graduate courses****2004**

- Seminars: Molecular biology of the cell. Summer term (1 credit hour course)  
Pathophysiology. Winter Term (1 credit hour course)
- Lab class: Animal Physiology, sub-module Transport Physiology/Molecular Biology. Taught in both, Summer and Winter term (3 credit hour course)

**2005**

- Seminars: Molecular biology of the cell. Summer term (1 credit hour course)  
Pathophysiology. Winter term (1 credit hour course)
- Lab class: Animal Physiology, sub-module Transport Physiology/Molecular Biology. Taught in both, Summer and Winter term (3 credit hour course)

**2006**

- Seminars: Molecular biology of the cell. Summer term (1 credit hour course)
- Lab class: Animal Physiology, sub-module Transport Physiology/Molecular Biology. Taught in Summer term (3 credit hour course)

**Courses taught at the University of Manitoba (2007-present)****Undergraduate Courses****Winter 2008:**

BIOL-3462: Environmental Physiology of Animals 2

**Fall 2008:**

BIOL-4460: Molecular Biology Techniques for Eukaryotes

**Winter 2009:**

BIOL-3462: Environmental Physiology of Animals 2

BIOL-2420: Human Physiology 2

**Fall 2009:**

BIOL-4100: Honours Thesis Course

**Winter 2010:**

BIOL-3462: Environmental Physiology of Animals 2

BIOL-2420: Human Physiology 2

BIOL-4100: Honours Thesis Course

**Fall 2010:**

BIOL-4552: Molecular Biology Techniques for Eukaryotes  
BIOL-4100: Honours Thesis Course

**Winter 2011:**

BIOL-3462: Environmental Physiology of Animals 2  
BIOL-2420: Human Physiology 2  
BIOL-4100: Honours Thesis Course

**Fall 2011:**

BIOL-4552: Molecular Biology Techniques for Eukaryotes  
BIOL-4100: Honours Thesis Course

**Winter 2012:**

BIOL-3472: Environmental Physiology of Animals 2  
BIOL-2420: Human Physiology 2  
BIOL-4100: Honours Thesis Course

**Fall 2012:**

BIOL-4552: Molecular Biology Techniques for Eukaryotes  
BIOL-4100: Honours Thesis Course

**Fall 2013:**

BIOL-4556: Molecular Biology Techniques for Eukaryotes (RNA)  
BIOL-4100: Honours Thesis Course

**Winter 2014:**

BIOL-3472: Environmental Physiology of Animals 2  
BIOL-2420: Human Physiology 2  
BIOL-4100: Honours Thesis Course

**Fall 2015:**

BIOL-4556: Molecular Biology Techniques for Eukaryotes (RNA)  
BIOL-4100: Honours Thesis Course

**Graduate Courses**

**Fall 2008**

BIOL-7460: Molecular Biology Techniques for Eukaryotes

**Fall 2010:**

BIOL-7530: Molecular Biology Techniques for Eukaryotes

**Fall 2011:**

BIOL-7530: Molecular Biology Techniques for Eukaryotes

**Fall 2012:**

BIOL-7530: Molecular Biology Techniques for Eukaryotes

**Fall 2013:**

BIOL-7556: Molecular Biology Techniques for Eukaryotes (RNA)

**Fall 2014:**

BIOL-7556: Molecular Biology Techniques for Eukaryotes (RNA)

**Fall 2015:**

BIOL-7556: Molecular Biology Techniques for Eukaryotes (RNA)

**Weihrauch Lab Trainees:**

Summer Students:

Sascha Brunzel (University of Osnabrück, 2003).

Project: Identification of aquaporins in *Manduca sexta*.

Karin Bracht (University of Osnabrück, 2004).

Project: Identification of Rh-proteins in *Manduca sexta*.

Alina Tabor (University of Osnabrück, 2005).

Project: In situ hybridization studies on NHE in *Manduca sexta*.

Henning Simon (University of Osnabrück, 2006).

Project: Role of NHE proteins in ammonia transport of *Manduca sexta*.

David Vancura (University of Manitoba, 2008)

Project: Ammonia transport of Caco-2 cells grown to an artificial epithelium

Cory Anderson (NSERC student, 2008)

Project: Ammonia transport across the skin of the leopard frog *Rana pipiens*.

Paolo Camorlinga (NSERC student, University of Manitoba, 2009)

Project: The effects of different ammonia concentrations (acute and chronic) on cell growth, cell morphology and gene-expression patterns of Rhesus-like ammonia transporters (RhBG, RhCG) in cultured human fetal intestinal cells (FHS 74 Int).

Mary M. Sourial (NSERC student, University of Manitoba, 2009 & 2010)

Project: Gene expression analysis of transporters relevant to transepithelial ammonia transports in invertebrates and frogs

Joshua Kaluzny (University of Manitoba, 2009 & 2010)

Project: Ammonia excretion and ammonia hemolymph concentration in crayfish



Anisley Chan (University of Manitoba, 2009 & 2010)

Project: The ammonia excretion mechanism in the freshwater flatworm *Schmidtea mediterranea*.

Ming Munikar (University of Manitoba, Undergraduate Student Research Award, 2012).

Project: Ammonia transport properties of an artificial human intestinal epithelium employing flux studies and electrophysiological methods.

Kirill Schroth (University of Manitoba, Undergraduate Student Research Award, 2012).

Project: Investigation of the ammonia transport characteristics mechanism in the human intestinal cell line Caco-2

Evan Cunningham (University of Manitoba, Undergraduate Student Research Award, 2013). Urea excretion in the Ribbon leech.

Joana Picoto Carneiro Ribeiro Correia (University of Manitoba). The mechanism of acid-base regulation of Dungeness crab (*Metacarcinus magister*).

### **Co-op Undergraduate student:**

Melissa J. Cruz (University of Manitoba, 2010-2012)

Project: The role of the skin in ammonia and urea excretion in the aquatic frog *Xenopus laevis*.

### **Undergraduate BSc/Honours Students:**

Nancy Speck (BSc, University of Osnabrück, 2006)

Thesis: Molecular analysis of 2 Rh-like proteins in *Manduca sexta*.

Michael Martin (Honours student, University of Manitoba, 2008-2009, Summer student, 2010)

Thesis: Effect of environmental ammonia stress on branchial ammonia transport in a stenohaline, marine crab (*Cancer magister*).

Vanessa Grandmaison (Honours student, University of Manitoba, 2009-2010)

Thesis: The influence of environmental calcium on calcium flux across the anterior intestine of the lake sturgeon, *Acipenser fulvescens*.

Alex Quijada-Rodriguez (Honours student, University of Manitoba, 2011-2012)

Thesis: Ammonia and urea excretion in the freshwater carnivorous ribbon leech (*Nephelopsis obscura*)

Stephanie Hans (Honours student, University of Manitoba, 2012- 2013)

Thesis: The effect of predicted future pCO<sub>2</sub> levels on the acid-base regulation of the perfused gills of Dungeness crabs (*Metacarcinus magister*).

### **M.Sc. Students:**

Britta Heinze (University of Osnabrück, Germany). Completed: May 2005

Thesis: Physiologische und molekularbiologische Untersuchungen zum Ammoniaktransport über das Darmepithel von Säugetieren.

Tobias Obermeyer (University of Osnabrück, Germany). Completed: October 2005

Thesis: Spielen Mitglieder der NHE-Familie eine Rolle beim Ammoniak-Transport im Säugerdarm?

Gunnar Broehan (University of Osnabrück, Germany). Completed: December 2005  
Thesis: The role of the NHE-family in the insect gut.

Anne-Katrin Blässe (University of Osnabrueck, Germany). Completed: March 2007  
Thesis: Molecular characterization and mRNA expression analysis of two cation/proton exchangers in the tobacco hornworm *Manduca sexta*.

Alex Quijada-Rodriguez (University of Manitoba). Completed: April 2015  
Thesis: Nitrogen Excretion in the Freshwater Dwelling Ribbon Leech (*Nephelopsis obscura*): the regulation/mechanism of ammonia excretion osmoregulatory links and role of urea (FOS, **GETS**)

Stephanie Hans (University of Manitoba) Completed: December 2015  
Thesis: Acid-base regulation in the American horseshoe crab, *Limulus polyphemus* (FOS, GETS).

Garett Joseph Patrick Allen. (University of Manitoba) Start date 1. Sept 2015  
Thesis: Acid-base regulation in the freshwater crayfish.

#### Ph.D. Students:

Jutta Harten (Ph.D. program, University of Osnabrück, Germany). 2003- 2005, discontinued.  
Thesis: Molekulare Charakterisierung potentieller Ammoniak-Transporter im Säugetierdarm.

Aida Adlimoghaddam (University of Manitoba, 2010- present) (**UMGF-grant**) Completed August 2015  
Thesis: Molecular Physiological Function of Ammonia Transporters in *Caenorhabditis. elegans*

Sandra Fehsenfeld (University of Manitoba, 2011- present) (**UMGF-grant**)  
Thesis: Effects of elevated  $p\text{CO}_2$  on acid-base balance, ion regulation, and nitrogen household in crustaceans.

Alex Quijada-Rodriguez (University of Manitoba). Started September 2015  
Thesis: Hormonal regulation of the nitrogen excretion and acid-base status in different haline crab species.

#### Research Associate

Dr. Frauke Fehrmann (University of Manitoba, 2012-present)  
Development of cell culture system employing the human carcinoma cell lines Caco-2BBE and HT-29MTX E12.

#### Exchange Students:

Jörn Thomson (Ph.D. program (completed), University of Kiel, Germany). Supervised during the time of his stay at the University of Manitoba (Aug.-Oct. 2011). Thesis: Impacts of elevated  $p\text{CO}_2$  on the ecophysiology of *Mytilus edulis*.

**Student Advisory Committees:**Honour student Advisory Committee (U. of Manitoba)

<u>Name</u>	<u>Role</u>	<u>Term</u>
Ms. Patricia Dasiewicz	external examiner	2008
Ms. Olwyn Friesen	internal advisor	2009-2010
Mr. Mark Kovalski	internal advisor	2009-2010
Ms. Laura Gardiner	internal advisor	2009-2010
Ms. Katie Sheppard	internal advisor	2009-2010
Mr. Jordan Becker	internal advisor	2009-2010
Mr. Jarrod Sumlak	internal advisor	2009-2010
Ms. Erin Spice	internal advisor	2009-2010
Ms. Heidi Friesen	internal advisor	2009-2010
Mr. Calen Ryan	internal advisor	2009-2010
Ms. Angel Owens	internal advisor	2009-2010
Mr. Matt Yunik	internal advisor	2010-2011
Mr. Murtaza Kapasi	internal advisor	2010-2011
Ms. Marina Beaudry	internal advisor	2010-2011
Ms. Jill Newediuk	internal advisor	2010-2011
Ms. Gabrielle Macklin	internal advisor	2010-2011
Mr. Joshua Kaluzny	internal advisor	2011-2012
Ms. Ashleigh Westphal	internal advisor	2011-2012
Ms. Karen Oswald	internal advisor	2011-2012
Ms. Alison Patridge	internal advisor	2011-2012
Ms. Sarah Mackenbach	internal advisor	2011-2012
Mr. Ben Carriere	internal advisor	2011-2012
Ms. Ashley Soloway	internal advisor	2012-2013
Ms. Lauren Shute	internal advisor	2012-2013
Mr. Timothy Gingera	internal advisor	2012-2013
Ms. Catherine Brandt	internal advisor	2012-2013
Mr. Cameron Bauer	internal advisor	2012-2013
Mr. Jacob Caver	internal advisor	2013-2014
Ms. Samantha Fulton	internal advisor	2013-2014
Ms. Jennifer Lawyer	internal advisor	2013-2014
Ms. Stacey Colleroner	internal advisor	2013-2014
Mr. Chris Adams	internal advisor	2013-2014
Ms. Deidre Khan	internal advisor	2013-2014
Ms. Alicia Fox	internal advisor	2014-2015
Ms. Amy Stead	internal advisor	2014-2015
Lauren Wiens	internal advisor	2014-2015
Taylor Connolly	internal advisor	2014-2015
Kathryn Kroeker	internal advisor	2015-2016
Matthew Martens	internal advisor	2015-2016

University of Manitoba M.Sc. Committees

<u>Name</u>	<u>Role</u>	<u>Term</u>	<u>Outcome</u>
Ms. Rehab Alharbi	external examiner	2013-present	
MinKyung Kang-Choi	external examiner	2014-present	

University of Manitoba Ph.D. Committees

<u>Name</u>	<u>Role</u>	<u>Term</u>	<u>Outcome</u>
Mr. David Shearer	internal examiner	2009-2011	Graduated
Ms. Adhikari Timsina	internal examiner	2008-2013	Graduated
Mr. Anthony Signore	internal examiner	2010-present	
Mr. Ibhrahim Abou Elsaad	internal examiner	2011-present	
Atta Kofi Agyekum	internal examiner	2012-present	
Samuel Mwangi Waititu	internal examiner	2012-present	

External Ph.D. Committees

<u>Name</u>	<u>Role</u>	<u>Term</u>	<u>Outcome</u>
Ms. Michele Nawata (McMaster)	external examiner	2010	Graduated

**VIII. RESEARCH GRANTS:**

Weihrauch, D. Funding period: 1992-1995. Study Stipend from the "Friedrich Ebert Stiftung". Amount awarded: **\$10,800.00**.

Weihrauch, D. Funding period: 1995-1996. Research Stipend from the "Biologische Anstalt Helgoland". Amount awarded: **\$18,000.00**.

Weihrauch, D. (Principal Investigator). Title: Ammoniak-Transport im Säugetier-Darm. Funding period: 2004-2005. German Research Foundation (DFG, WE2868/1). Amount awarded: **\$239,040.00**.

Weihrauch, D. (Principal Investigator). Title: Molecular physiology of the ammonia transport in the intestine of mammals and insects. Funding period: 2006. German Research Foundation (DFG, WE2868/1-2). Amount awarded: **\$119,520.00**.

Weihrauch, D. (Principal Investigator). University of Manitoba Start-Up Funds. Funding period: 2007. Amount awarded: **\$75,000.00**.

Weihrauch, D. (Principal Investigator). Title: Molecular physiology of ammonia excretion in aquatic invertebrates: Mechanism, regulation and the specific role of Rhesus-like ammonia transporters. Funding period: 2008- 2013. **NSERC (Discovery)**. Amount awarded: **\$160,000.00**.

Weihrauch, D. (Principal Investigator). Title: Molecular identification of Rh-like ammonia transporters in annelids. Funding period: 2008. **University Research Grants Program (URGP)**. Amount awarded: **\$7,397.00**.

Diehl-Jones, W. (Principal Investigator), Weihrauch, D. (Co-Investigator). Title: Regulation of ammonia transport across the human intestinal epithelium. Funding period: 2008. **CIHR Research Advisory Group (CRAG)**. Amount awarded: **\$3,850.00**.

Weihrauch, D. (Principal Investigator), Brassinga, A.-K. (Co-Applicant). Dynamic Molecular Imaging Laboratory. CFI Infrastructure Operating Fund (IOF) Funding period: 2012-2016. Amount awarded: **\$ 118,337.00**.

Weihrauch, D. (Principal Investigator), Brassinga, A.-K. (Co-Applicant). Title: Dynamic Molecular Imaging Laboratory. Funding period: 2009. **Canada Foundation for Innovation (Leaders Opportunity Fund)**. Amount awarded: **\$999,071.00**.

Weihrauch, D. (Principal Investigator). Title: Tools to investigate transepithelial ammonia transports. Funding period 2010. **NSERC (Research Tools and Instruments Category 1)**. Amount awarded: **\$29,301.00**.

Weihrauch, D. (Principal Investigator). Title: A Novel In Vitro Model for Investigating Hyperammonemia in the Human Intestine. Funding period: 2012-2013. **Manitoba Medical Service Foundation**. Amount awarded: **\$23,000.00**.

Weihrauch, D. (Principal Investigator). Title: Development of a cell culture system for "reconstructing" a gill epithelium from crustaceans. Funding period: 2012-13. **University Research Grants Program (URGP)**. Amount awarded: **\$7,000.00**.

Weihrauch, D. (Principal Investigator). Title: Nitrogen excretion and acid base-regulation in invertebrate systems: Mechanisms, regulation and the specific role of Rh-proteins and AMTs.. Funding period: 2013- 2018. **NSERC (Discovery)**. Amount awarded: **\$165,000.00**.

Weihrauch, D. (Principal Investigator). Title: Identification of acid-base regulatory mechanisms in the Pacific green crab, *Carcinus maenas*. Funding period 2013. Field Work Support Grant (University of Manitoba). Amount awarded: **\$ 2,670.00**.

Weihrauch, D. (Principal Investigator). **Graduate Enhancement of Tri-Council Stipends (GETS)** (for support of Alex Quijada-Rodriguez, 2013-2014, **\$ 7000.00**.)

Weihrauch, D. (Principal Investigator). **Graduate Enhancement of Tri-Council Stipends (GETS)** (for support of Stephanie Hans 2014-2015, **\$ 7000.00**.)

Weihrauch, D. (Principal Investigator). **Graduate Enhancement of Tri-Council Stipends (GETS)** (for support of Sandra Fehrsenfeld 2014-2015, **\$ 3200.00**.)

Weihrauch, D. (Principal Investigator). **Faculty of Science Field Work Support Program (FWSP)** Field research grant for conducting experiments at Bamfield Marine Sciences Centre Field Station. (2013, **\$2670.00**)

Weihrauch, D. (Principal Investigator). **Faculty of Science Field Work Support Program (FWSP)** Field research grant for collecting animals and conducting experiments at Whitney Laboratory for Marine Bioscience, St. Augustine, FL. USA. (2014, **\$2000.00**).

Weihrauch, D. (Principal Investigator). **Graduate Enhancement of Tri-Council Stipends (GETS)** (for support of Alex Quijada-Rodriguez, 2015-2019, **\$ 15,000.00**.)

Weihrauch, D. (Principal Investigator). **Graduate Enhancement of Tri-Council Stipends (GETS)** (for support of Garrett Allen 2015-2017, **\$ 11,666.00**.)

**IX. PUBLICATIONS:**

Note: Underlined names are HQP trained directly under my supervision.

**Published books**

**Weihrauch, D.** (1999). Zur Stickstoff-Exkretion aquatischer Brachyuren: *Carcinus maenas* (Linnaeus 1758, Decapoda, Portunidae), *Cancer pagurus* Linnaeus 1758 (Decapoda, Cancridae) und *Eriocheir sinensis* H. Milne Edwards 1853 (Decapoda, Grapsidae). VWF Verlag für Wissenschaft und Forschung GmbH, Berlin. ISBN: 3-89700-061-X.

**Peer-reviewed book:**

**Book title:** Acid-Base Balance and Nitrogen Excretion in Invertebrates - Mechanisms and Strategies in various Invertebrate Groups with Considerations of Challenges caused by Ocean Acidification.

**Editors:** **Weihrauch D.** and O'Donnell M.J..

Publisher: Springer International Publishing AG

**Chapters:**

Weihrauch, D., Fehsenfeld, S. Quijada-rodriguez, A..  
Nitrogen excretion in aquatic crustaceans.

Linton, S.

Nitrogenous waste metabolism within terrestrial Crustacea, with special reference to purine deposits and their metabolism.

Leone, F.de A., Lucena, M. N., Garçon, D.P., Pinto, M. R. and McNamara, J. C.  
Gill ATPases and ammonia excretion in crustaceans.

O'Donnell, M.J. and Donini, A.

Nitrogen Excretion and Metabolism in Insects

Quijada-Rodriguez, A. And Weihrauch, D.

Nitrogen excretion in nematodes, flatworms and annelids

Fehsenfeld, S. and Weihrauch, D.

Acid-base Regulation in Aquatic Decapod Crustaceans

Tresguerres, M.

Acid/base regulation and ion transport in reef-building corals

Matthews, P.

Acid-base regulation in insect haemolymph

Onken, H and Moffett, D.

Acid-base loops in insect larvae with extremely alkaline midgut regions

Stumpp, M. And Hu, M.

pH regulation and excretion in echinoderms

Hu, M. and Yung-Tse, T.

Acid-base regulation and ammonia homeostasis in cephalopods: an ontogenetic overview

Rheault, M.

Sodium hydrogen antiporters: Their role in invertebrate acid-base balance and ammonia excretion

### Peer reviewed articles (834 citations since 2010)

1. **Weihrauch, D.**, Becker, W., Postel, U., Riestenpatt, S., and Siebers, D. (1998). Active excretion of ammonia across the gills of the shore crab *Carcinus maenas* and its relation to osmoregulatory ion uptake. *Journal of Comparative Physiology B* 168, 364-376.
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#### Short Publication

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#### **X. ABSTRACTS:**

Note: Underlined names are HQP trained directly under my supervision.

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  32. **Weihrauch, D.**, Marhenke, S., Harten, J., Meyer, H. (2004). Active ammonia uptake in the midgut of the tobacco hornworm *Manduca sexta*: Evidence for a Rh-like ammonia transporter. Deutsche Zoologische Gesellschaft, Greifswald, Germany
  33. **Weihrauch, D.** Marini, A.-M., and Towle, D.W. (2004). Rh-like ammonia transporter in crustaceans: Expression analysis and functional studies of the branchial ammonia transporter RhCM from the shore crab *Carcinus maenas*. Society for Integrative and Comparative Biology, New Orleans, USA.
  34. **Weihrauch, D.**, McNamara, J.C., Towle, D.W. and Onken, H. (2004) The gills of the red freshwater crab *Dilocarcinus pagei*: microanatomy, ion-motive ATPases and NaCl absorption. Society for Integrative and Comparative Biology, New Orleans, USA.
  35. Kanchanapoo, J., **Weihrauch, D.**, Ao, M., Piyachaturawat, P. and Rao, M.C. (2004). WN not AD rabbit distal colon exhibits net bile acid absorption: putative roles for Na<sup>+</sup>-dependent bile acid transporter (Asbt) and lipid binding protein (LBP). *Digestive Disease Week*, New Orleans, USA. *Gastroenterology*, 126: A-298.
  36. **Weihrauch, D.** (2005). Active ammonia absorption in the midgut of *Manduca sexta* larvae: Flux studies and first molecular evidence for a Rhesus-like ammonia transporter and a cation/H<sup>+</sup> - exchanger. Society of Experimental Biology, Barcelona, Spain.
  37. Broehan, G., Blaesse, A.-K., Simon, H., and **Weihrauch, D.** (2006). Do members of the NHE family play a role in transepithelial ammonia transport in the midgut of the tobacco hornworm *Manduca sexta*? Deutsche Zoologische Gesellschaft, Muenster, Germany.
  38. Speck, N. and **Weihrauch, D.** (2006). Molecular identification and mRNA expression analysis of a Rhesus-like ammonia transporter in the tobacco hornworm *Manduca sexta*. Deutsche Zoologische Gesellschaft, Muenster, Germany.

39. Blaesse, A.-K., Broehan, G., and Weihrauch, D. (2006). Molecular characterization and mRNA expression analysis of two lepidopteran NHE isoforms by semi-quantitative triplex RT-PCR. Deutsche Zoologische Gesellschaft, Muenster, Germany.
40. Walsh, P., McDonald, D., Veauvy, C., and **Weihrauch, D.** (2007). Comparison of the mechanisms of ammonia tolerance in ureotelic (toadfish) versus ammoniotelic (midshipman) fish. Society for Experimental Biology, Glasgow, UK, Comparative Biochemistry and Physiology a-Molecular & Integrative Physiology 146, S93-S93.
41. **Weihrauch, D.** (2007). Active ammonia uptake in the midgut of the tobacco hornworm *Manduca sexta*. Society for Integrative and Comparative Biology, Phoenix, USA.
42. Blaesse, A.-K., Broehan, G., and Weihrauch, D. (2007). A study on cation/H<sup>+</sup> exchangers in the midgut of *Manduca sexta* larvae: Flux experiments, tissue mRNA expression analysis and cellular localization. Society for Integrative and Comparative Biology, Phoenix, USA.
43. **Weihrauch, D.**, Piermarini, P., and Beyenbach, K.W. (2007). Identification of an NHE-like protein in Malpighian tubules of the yellow fever mosquito *Aedes aegypti*. BioMedical Transporters, Bern, Switzerland.
44. **Weihrauch, D.**, Piermarini, P.M., and Beyenbach, K.W. (2008). Identification and localization of NHE8 in Malpighian tubules of the yellow fever mosquito *Aedes aegypti*. Society for Integrative and Comparative Biology, San Antonio, USA.
45. **Weihrauch, D.**, Blaesse, A.-K., and Broehan, G. (2008). Epithelial ammonia transport in arthropods: A comparative study. Canadian Society of Zoologists, Halifax, Canada.
46. Walsh, P.J., Clemence Veauvy and **Weihrauch D.** (2008). Comparison of the mechanisms of ammonia tolerance in ureotelic (toadfish) versus ammoniotelic (midshipman) fish. Comparative Biochemistry and Physiology - Part A Molecular & Integrative Physiology 148(4):464-465
47. Anderson, W.G., Liban, S., Taylor, J., Grosell, M., and **Weihrauch, D.** (2009). Waste not want not: Intestinal handling of solutes and water in elasmobranch fish Society for Experimental Biology, Glasgow.
48. Allen, P.J., Peake, S.J., **Weihrauch, D.**, and Anderson, W.G. (2009). Calcium metabolism in a freshwater cartilaginous fish, the lake sturgeon, *Acipenser fulvescens*. Society for Experimental Biology, Glasgow, UK.
49. Blaesse, A.-K., Edwards, S.L., Towle, D.W., and Weihrauch, D. (2009). Localization of a Rhesus-related ammonium transporter and gene expression patterns in gills of *Carcinus maenas* exposed to high environmental ammonia. Society for Experimental Biology, Glasgow, UK.
50. Martin, M. and **Weihrauch, D.** (2010) Effect of environmental ammonia stress on branchial ammonia transport in the stenohaline marine crab *Cancer magister* Canadian Society of Zoologists, Vancouver, Canada.



51. Chan, A., Sourial, M.M., Weihrauch, D. (2010). Ammonia excretion in the freshwater flatworm *Schmidtea mediterranea*. Canadian Society of Zoologists, Vancouver, Canada.
52. Allen, P.J., Dasiewicz, P., Grandmaison, V., Peake, S.J., Weihrauch, D., and Anderson, W.G. (2010). Calcium metabolism in a freshwater cartilaginous fish, the lake sturgeon, *Acipenser fulvescens*. Canadian Society of Zoologists, Vancouver, Canada.
53. Anderson, W.G., Nawata, M., Wood, C. M., Piercey-Normore, M., and **Weihrauch, D.** (2011). The role of the colon in nitrogen balance in two chondrichthyan fishes, the ratfish, *Hydrolagus colliei*, and spiny dogfish, *Squalus acanthias*. Canadian Society of Zoologists, Ottawa, Canada.
54. Scott, K. and **Weihrauch, D.** (2011). Ammonia excretion across the crab gill epithelium: A novel physiology teaching laboratory exercise. Canadian Society of Zoologists, Ottawa, Canada.
55. Cruz, M., Chan, A., Sourial, M.M., Weihrauch, D. (2011). Ammonia transport in the skin of the African Clawed Frog, *Xenopus laevis*. Canadian Society of Zoologists, Ottawa, Canada.
56. Weihrauch D., Fehsenfeld, S., Marini A.-M., Ziegler A., Edwards S., Meyer H., Siebers D., Towle D.W. (2011). Ammonia excretion in the green shore crab *Carcinus maenas*. SICB, Charleston, USA.
57. Cruz, M., Sourial M.M., and **Weihrauch, D.** (2012). High environmental ammonia (HEA) impairs net ammonia secretion over the skin of the African clawed frog, *Xenopus laevis*. Society for Integrative and Comparative Biology, Charleston, USA.
58. **Weihrauch, D., Fehsenfeld, S.,** Edwards, S., and Towle, D. (2012). mRNA expression levels of RhCM, V-ATPase and aquaporin correlate with branchial ammonia excretion rates in green crabs *Carcinus maenas* acclimated to marine and brackish environments. Canadian Society of Zoologists, Mount Allison University, Canada.
59. Adlimoghaddam, A. and **Weihrauch, D.** (2012). Ammonia excretion in the soil nematode *Caenorhabditis elegans* occurs via ammonia trapping across the hypodermis. Canadian Society of Zoologists, Mount Allison University, Canada.
60. Fehsenfeld, S. and **Weihrauch, D.** (2012). Acid-base regulatory patterns in the gills of the green crab, *Carcinus maenas*. Canadian Society of Zoologists, Mount Allison University, Canada.
61. Cruz, M., Sourial M.M., and **Weihrauch, D.** (2012). High environmental ammonia (HEA) impairs net ammonia secretion over the skin of the African Clawed Frog, *Xenopus laevis*. Canadian Society of Zoologists, Mount Allison University, Canada.
62. Quijada-Rodriguez, A. and **Weihrauch, D.** (2012). Nitrogen excretion in the freshwater ribbon leech *Nephelopsis obscura*. Canadian Society of Zoologists, Mount Allison University, Canada.
63. Fehsenfeld S, Wood CM, Goss G, **Weihrauch D.** (2013). Acid-base balance of the green crab *Carcinus maenas* – is branchial mediated pH regulation dependent on ammonia excretion? *Annual Meeting of the Canadian Society of Zoologists, May 13-17 2013, Guelph/Canada.*

64. Fehsenfeld S, Weihrauch D. (2013). Ammonia excretion and pH regulation– team players in acid-base balance of the green crab *Carcinus maenas*? *Prairie University Biology Symposium, University of Manitoba, Feb 21-23 2013, Winnipeg/Canada.*
65. Agyekum, A. K., J. S. Sands, A. Regassa, E. Kiarie, **D. Weihrauch**, W. K. Kim, and C. M. Nyachoti. 2013. Effects of dietary fiber and a xylanase and  $\beta$ -glucanase blend on performance and jejunal electrophysiological properties and transport associated gene expression in growing pigs. ASAS/ADSA Joint Annual Meeting, Indianapolis, Indiana, USA. July 10, 2013.
66. Hans, S., Fehsenfeld, S., and Weihrauch, D. (2013). Predicted future seawater  $p\text{CO}_2$  causes changes in hemolymph carbonate system and ion composition, as well as ammonia excretion rates in the Dungeness crab (*Metacarcinus magister*). Poster session presented at: Prairie University Biology Symposium 2013; Feb 21-23, 2013; Winnipeg, MB.
67. Hans, S., Fehsenfeld, S., and Weihrauch, D. (2013). The effects of predicted future seawater  $p\text{CO}_2$  on acid-base regulation in the Dungeness crab (*Metacarcinus magister*). Poster session presented at: 2013 Annual Meeting of the Canadian Society of Zoologists; Guelph, ON.
68. Quijada-Rodriguez, A., Treberg, J., Weihrauch, D. (2013). Mechanism of Ammonia Transport in the Integument of the Freshwater Ribbon Leech *Nephelopsis obscura*. Annual Canadian Society of Zoologist Conference 2013 (University of Guelph). Guelph, On. May 14, 2013.
69. Quijada-Rodriguez, A., Treberg, J., Weihrauch, D. (2013). Active Ammonia Excretion in the Freshwater Ribbon Leech *Nephelopsis obscura*. Prairie University Biology Symposium 2013 (University of Manitoba). Winnipeg, MB. February 22, 2013.
70. Quijada-Rodriguez, A., Anderson, G., Weihrauch, D. (2013). Does HEA, Alkaline Environments or Salinity Stress Trigger Ureotelism in the Freshwater Ribbon Leech *Nephelopsis obscura*? Annual Canadian Society of Zoologist Conference 2013 (University of Guelph). Guelph, On. May 15, 2013.
71. Tahmasebi Z. M., **Weihrauch D.**, and Donini A. 2013. Effects of rearing salinity on unstimulated and stimulated larval Malpighian tubule secretion of *Chironomus riparius*. Annual Canadian Society of Zoologist Conference 2013 (University of Guelph). Guelph, On. May 15, 2013.
72. Adlimoghaddam A., Brassinga A.-K., O'Donnell M., Weihrauch D. (2013). Investigation of the pH–regulation and ammonia excretion mechanism in the soil nematode *Caenorhabditis elegans*. Annual Canadian Society of Zoologist Conference 2013 (University of Guelph). Guelph, On. May 15, 2013.
73. Adlimoghaddam A., Brassinga A.-K., O'Donnell M., and Weihrauch D. (2013). Investigation of the ammonia excretion mechanism in the non-parasitic nematode *Caenorhabditis elegans*. Prairie University Biology Symposium 2013 (University of Manitoba). Winnipeg, MB. February 22, 2013.
74. Ionescu A., Bui P, Weihrauch D. and Donini A. (2014). Ammonia transport mechanisms of anal papillae in the mosquito, *Aedes aegypti*; expression of ammonia transporters and involvement of

V-ATPase, NHE3 and Na<sup>+</sup>/K<sup>+</sup>-ATPase. Joint Conference of CSEE, CSZ SCL: Genomes to/aux Biomes 2014, Montreal (25-29 May).

75. Adlimoghaddam A., O'Donnell, M., Merz D., Kormish J., Weihrauch D. (2014). Function and localization of the primitive ammonia transporter (Rhr-2) in the non-parasitic soil nematode *Caenorhabditis elegans* Joint Conference of CSEE, CSZ SCL: Genomes to/aux Biomes 2014, Montreal (25-29 May).
76. Fehsenfeld S. and Weihrauch D. (2014). An ancestral potassium channel = a novel ammonia transporter involved in crustacean acid-base balance? Joint Conference of CSEE, CSZ SCL: Genomes to/aux Biomes 2014, Montreal (25-29 May)
77. Picoto Correia J. Fehsenfeld S., Hans, S., Quijada-Rodriguez A. Weihrauch D. (2014). The mechanism of acid-base regulation in Dungeness crabs (*Metacarcinus magister*). Joint Conference of CSEE, CSZ SCL: Genomes to/aux Biomes 2014, Montreal (25-29 May)
78. Quijada-Rodriguez A., Schultz A., Goss G., Weihrauch D. (2014). Ammonia independent apical sodium uptake in the integument of the freshwater ribbon leech (*Nephelopsis obscura*) Joint Conference of CSEE, CSZ SCL: Genomes to/aux Biomes 2014, Montreal (25-29 May).
79. Weihrauch, D., Meyer H., Purschke G., Thiel D., Hugenschütt M. (2014). Ammonia excretion in the marine fire worm *Eurythoe complanata*: transport studies and identification of the "gills". Joint Conference of CSEE, CSZ SCL: Genomes to/aux Biomes 2014, Montreal (25-29 May).
80. Hans S., Quijada-Rodriguez A. Weihrauch D. (2014). Acid-base regulation in the American horseshoe crab, *Limulus Polyphemus*. Joint Conference of CSEE, CSZ SCL: Genomes to/aux Biomes 2014, Montreal (25-29 May).
81. Thomsen J., Himmerkus N., Melzner F., and Weihrauch D. (2014). Society for Experimental Biology, Manchester Glasgow, UK (1.-4. July 2014).
82. Weihrauch D. (2014). Ammonia excretion in invertebrates: from seawater to freshwater to land. Society for Experimental Biology, Manchester Glasgow, UK (1.-4. July 2014).
83. Fehsenfeld S., Wood, C.M., Goss G., Weihrauch D. (2014). Linking acid-base regulation with ammonia excretion in the green crab, *Carcinus maenas*. Society for Experimental Biology, Manchester Glasgow, UK (1.-4. July 2014).
84. Adlimoghaddam A., O'Donnell, M.J., and Weihrauch D. (2014). The potential involvement of Rh proteins in the ammonia excretory system in *Caenorhabditis elegans*. Society for Integrative and Comparative Biology West Palm Beach, USA (3.-7. January 2015).
85. Chasiotis H., Ionescu A., Bui P., Misyura L., Weihrauch D., Donini A. (2015). Expression and dsRNA knockdown of putative ammonia transporters in larval mosquito, *Aedes aegypti*. Annual meeting of the Society of Experimental Biology, Prague, 29 June-3 July.

86. Weihrauch D., Hu M.Y. Sung P.-H., Hwang P.-P., and Tseng Y.-C. (2015). Acid-base regulation and ammonia excretion in the gills of the cephalopod *Octopus vulgaris*. Annual Canadian Society of Zoologist Conference 2015 (University of Calgary). Calgary, AB. May 25-29, 2015.
87. Quijada-Rodriguez A., Treberg J.R., and Weihrauch D. (2015). The ribbon leech *Nepheopsis obscura* as a model system to investigate cutaneous ammonia transports in freshwater invertebrates. Annual Canadian Society of Zoologist Conference 2015 (University of Calgary). Calgary, AB. May 25-29, 2015.
88. Fehsenfeld S., Towle D.W., Marini A.-M., Tsai, J.R., and Weihrauch D. (2015). Characterization of the crustacean Rhesus-like protein (RhCM) and its role in branchial ammonia excretion in the green crab, *Carcinus maenas*. Annual Canadian Society of Zoologist Conference 2015 (University of Calgary). Calgary, AB. May 25-29, 2015.
89. Hans S., Onken H., and Weihrauch D. (2015). Acid-base regulatory role of different book gill regions of the American horseshoe crab (*Limulus polyphemus*). Annual Canadian Society of Zoologist Conference 2015 (University of Calgary). Calgary, AB. May 25-29, 2015.

**Winner of George F. Holeton Prize.** The George F. Holeton Prize is given for the most outstanding student poster presentation in the Comparative Physiology and Biochemistry (CPB) Section at the Annual Conference of the CSZ

90. Quijada-Rodriguez, A, Schultz, A, Goss. G. Weihrauch, D. (2015). Understanding the relationship between cutaneous ammonia excretion and sodium uptake in the freshwater ribbon leech (*Nepheopsis obscura*). Annual meeting of the Society of Experimental Biology, Prague, 29 June-3 July.
91. Hans, S., Onken, H, Quijada-Rodriguez, A., and Weihrauch, D. (2015) . Ammonia excretion in American horseshoe crab (*Limulus polyphemus*): distinct regions within the branchial lamella and effects of high environmental ammonia. Annual meeting of the Society of Experimental Biology, Prague, 29 June-3 July.
92. Weihrauch, D. Meyer, H., Purschke, G. Thiel, D., and Hugenschütt, M. (2015). Ammonia excretion in the marine fire worm *Eurythoe complanata*: transport studies and identification of the "gills". . Annual meeting of the Society of Experimental Biology, Prague, 29 June-3 July.
93. Hu, M., Sung, P.-H., Weihrauch, D., Hwang, P.-P., and Yung-Che Tseng, Y.-C. (2015). Perfused gills of the cephalopod *Octopus vulgaris* as a model to study ammonia transport in molluscan excretory organs. Annual meeting of the Society of Experimental Biology, Prague, 29 June-3 July.

**XI. INVITED SEMINARS AND PRESENTATIONS:**

1. Weihrauch, D. (2000). Exocytosis as a new mechanism for active ammonia excretion found in the euryhaline shore crab *Carcinus maenas*. Wright University, Biology Department, OH, USA.
2. Weihrauch, D. (2001). Ammonia excretion in euryhaline crabs: The Whole Story. Salisbury State University, Biology Department, Salisbury, MD, USA.
3. Weihrauch, D. (2003). Expression of Putative Bile Acid Transporters and Receptors in the Developing Rabbit Colon. 3<sup>rd</sup> GEM meeting (2003), Rush University, Chicago, USA.
4. Weihrauch, D., Marini, A.-M., Ziegler, A., and Towle, D.W. (2003). Not the simple way: Ammonia excretion in crabs. Society of Experimental Biology, Southampton, UK.
5. Weihrauch, D. (2004). Epithelial ammonia transport; from crabs to mice. University of Witten/Herdecke, Institut für Physiology and Pathophysiology, Witten, Germany
6. Weihrauch, D. (2004). Mechanisms of ammonia transport investigated in the crustacean gill. Université Libre de Bruxelles, Laboratoire de Biologie du Développement, Brussels, Belgium.
7. Weihrauch, D. (2006). Ammonia excretion in crabs: past, present, future. National University of Ireland, Galway, Department of Zoology, Galway, Ireland
8. Weihrauch, D. (2006). Ammonia excretion in aquatic crabs. University of Bristol, School of Biological Sciences, Bristol, UK.
9. Weihrauch, D. (2008). Ammonia excretion: a crab's tale. University of Ottawa, Department of Biology (2008). ON, Canada.
10. Walsh, P. and Weihrauch, D. (2008). Nitrogen (ammonia and urea) transporters in gills of fish and crustacean. Journal of Experimental Biology Discussion Meeting, Epithelial Solute Transporters and Acid-Base Regulation, Le Chateau Montebello, QC, Canada.
11. Weihrauch, D. (2009). Ammonia transport: a lesson from crabs. University of Guelph, Department of Integrative Biology. ON, Canada.
12. Weihrauch, D. (2009). Ammonia transport in the insect gut: Participation of cation/proton exchanger, H<sup>+</sup>-ATPase and a functional microtubule network. McMaster University, Department of Biology, ON, Canada.
13. Weihrauch, D. (2010). Ammonia transport in aquatic invertebrates. IFM-GEOMAR, Leibniz-Institut für Meereswissenschaften an der Universität Kiel, Kiel, Germany.
14. Weihrauch, D., Blaesse, A.-K., Broehan, G., and Meyer H. (2011). Ammonia transport in the tobacco hornworm *Manduca sexta*. Society for Experimental Biology, Glasgow, UK.

15. Weihrauch, D., Chan, A., and Sourial, M.M. (2011). Ammonia excretion in the non-parasitic freshwater planarian *Schmidtea mediterranea*. Canadian Society of Zoologists, Ottawa, Canada.
16. Weihrauch, D., Fehsenfeld, S., Marini, A.-M., Ziegler, A., Edwards, S., Meyer, S., Siebers, D., and Towle, D.W. (2012). Ammonia excretion in the green shore crab *Carcinus maenas*. Society for Integrative and Comparative Biology Charleston, USA.
17. Weihrauch, D. (2012). Ammonia transport in insects: A story from the tobacco hornworm *Manduca sexta*. University of Manitoba, Department of Entomology, MB, Canada.
18. Weihrauch, D. (2013). The way to success. University of Kiel, Germany.
19. Weihrauch, D. (2014). Ammonia Excretion in Invertebrates: from Seawater to Freshwater to Land. Society of Experimental Biology, Manchester, UK. (**Keynote speaker**).
20. Weihrauch D. (2014). Ammonia excretion mechanism in invertebrate systems. Academia Sinica, Taipei, Taiwan. (14. August 2014).
21. Weihrauch D. (2014). Decapod crabs as useful models to discover mechanisms involved in ammonia excretion. Tunghai University, Taiwan (21. August 2014).
22. O'Donnell M.J. and Weihrauch D. (2015) Links between detoxification, excretion and osmoregulation in insects and crustaceans. Society for Integrative and Comparative Biology West Palm Beach, USA (3. – 7. January)

## Curriculum Vitae - Steven Whyard

### CONTACT DETAILS:

Department of Biological Sciences  
University of Manitoba  
Winnipeg, MB, R3T 2N2  
Tel: (204) 474 9418  
Email: Steve.Whyard@umanitoba.ca

### EXPERTISE:

Molecular biology, genetics, functional genomics, developmental biology, cell biology, protein biochemistry, genetic engineering, invertebrate physiology, biotechnological approaches to pest control

### EDUCATION:

PhD, Biology, Queen's University, Canada, 1993  
BSc (Honours), Queen's University, Canada, 1986

### PROFESSIONAL RESEARCH EXPERIENCE

04/09 – present	Associate Professor, Dept. of Biological Sciences, University of Manitoba
08/04 – 03/09	Assistant Professor, Department of Zoology, University of Manitoba
04/03 – 07/04	Senior Research Scientist, Project Leader - Functional Genomics, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Canberra, Australia
04/99 – 03/03	Project Leader – Invertebrate Transformation, CSIRO, Australia
04/96 – 03/99	Research Scientist – Invertebrate Transformation, CSIRO, Australia
10/93 – 03/96	Postdoctoral Research Fellow – Insect Molecular Biology, CSIRO, Australia

### RESEARCH INTERESTS

- Molecular mechanisms of invertebrate development – Identification and regulation of genes involved in germline development, sex determination, and sexual differentiation.
- RNA interference (RNAi) – Examination of the roles of RNAi in genomic stress and the roles of microRNAs in gene regulation and development.
- RNAi applications – development of RNAi for high throughput functional genomics, species-specific pesticides, and vaccination against pathogens.
- Transposon function and evolution – Examination of the impact of transposons on genomes and factors (intrinsic and environmental) that influence transposon activity.
- Host-vector interactions – Identification of host genes involved in pathogen transmission

### Training of highly qualified personnel: (past 6 years only)

#### Postdoctoral Fellows

- Suresh Desai
  - RNAi technologies to control crop pests

#### Graduate Students – Principal Supervisor: (15 in total)

- Carlos Cruz, MSc student, University of Manitoba (2015-present)
  - Sterile insect technique in tephritid pests
- David Giesbrecht, PhD student, University of Manitoba (2015-present)
  - RNA interference technologies in mosquitoes
- Natalie Doughty, MSc student, University of Manitoba (2013-present)
  - MicroRNAs associated with oxidative stress in insects
- Cass Erdelyan, PhD student, University of Manitoba (2012 –present)
  - Molecular basis of West Nile virus infections in mosquitoes
- Noor Muhammad, PhD visiting student, U of Faisalabad, Pakistan (2012-13)
  - Heat shock responses in insects of stored grains
- Alison Partridge, MSc student, University of Manitoba (2011-2015)
  - Mosquito resistance factors to West Nile virus
- Hamza Safi, MSc student, University of Manitoba (2011-2013)
  - MicroRNAs regulating spermatogenesis in insects
- Darcy Childs, MSc student, University of Manitoba (2010-2013)
  - Homeobox gene expression in lampreys
- Johannes Huver, MSc student, University of Manitoba (2010-2013)
  - Environmental DNA detection of aquatic parasites
- George Heath, MSc student, University of Manitoba (2010-2012)
  - RNAi control technologies for lampreys
- Thomas Mahood, MSc student, University of Manitoba (2009-2012)
  - Innate immunity in mosquitoes
- David Shearer, PhD student, University of Manitoba (2008-2012)
  - Regulation of connexin proteins
- Tarek Bader, PhD student, University of Manitoba (2008-2011)
  - Biotechnologies in fish
- Liang Tao, PhD student, University of Manitoba (2008-2009)
  - Connexin gene regulation in zebrafish
- Aditi Singh, MSc student, University of Manitoba (2005-2009)
  - RNAi technologies in mosquitoes

#### Graduate Students – Secondary Supervisor, providing extensive training: (4 in total)

- Erin Spice, MSc Biological Sciences, University of Manitoba (2013-2014)
  - Gene expression studies in lampreys
- Lars Andreassen, PhD Entomology, University of Manitoba (2011 –2012)
  - Molecular analyses of insect predation
- Suresh Desai, PhD Entomology, University of Manitoba (2010-12)
  - RNAi technologies in honeybees
- Wolly Wijayarathne, PhD Entomology, University of Manitoba (2010-2011)



- Molecular analyses of heat stress in stored grain pests

**BSc Honours Students:** (11 in total)

- William Sutherland, Mosquito olfaction, U of Manitoba (2015-present)
- Cassie Dugray, Insect developmental genetics, U of Manitoba (2014-present)
- Aditya Kumar, Antifungal RNAi technologies, U of Manitoba (2014-present)
- Danielle Chu, Mosquito olfaction, U of Manitoba (2013-14)
- Stefany Morrison, Biomedical RNAi applications, U of Manitoba (2012-13)
- Michelle Francisco, Mosquito sex determination, U of Manitoba (2011-12)
- Cassidy Erdelyan, Mosquito olfaction, U of Manitoba (2010-11)
- Riley Sault, Cytochrome P450s in insect spermatogenesis, U of Manitoba (2010-11)
- Robert Beattie, Hormonal regulation of insect spermatogenesis, U of Manitoba (2009-10)
- Heather Collins, Sex determination genes in mosquitoes, U of Manitoba (2009-10)
- Xiaoqing Hou, Testis gene expression in mosquitoes, U of Manitoba (2008-09)

**Summer Research students:** (24 in total)

- William Sutherland – Sex determination in mosquitoes, U of Manitoba (2015)
- Cassie Dugray – Summer NSERC, MicroRNAs in insect reproduction, U of Manitoba (2015)
- Anna Liu - Summer NSERC, Insect reproduction, U of Manitoba (2015)
- Morgan Taverner – USRA recipient, RNAi-based insecticides, U of Manitoba (2015)
- Cole Slater – Faculty of Science award, Fungal RNAi, U of Manitoba (2015)
- Aditya Kanojia – Anti-fungal technologies, U of Manitoba (2015)
- Racheal Wadlow – Summer NSERC, Tephritid RNAi technologies
- Suhyun Kim – Summer NSERC, Mosquito immunity, U of Manitoba (2014)
- Patrick Quimio – Mosquito development, U of Manitoba (2014)
- Phoebe Chen – Summer NSERC, Fungal RNAi, U of Manitoba (2014)
- Erin Lee – Mosquito development, U of Manitoba (2013)
- Andrew Turko – Fungal RNAi, U of Manitoba (2013)
- Ingrid Houghton – Summer NSERC – Mosquito gene regulation, U of Manitoba (2012)
- Richard Jung – Summer NSERC – Mosquito gene regulation, U of Manitoba (2012)
- Natalie Doughty – MicroRNAs in development, U of Manitoba (2012)
- Shayne Reitmeier – USRA recipient – West Nile virus protein analyses (2011)
- Aakanksha Sharma – Mosquito immunity, U of Manitoba (2011)
- Ryan Persaud – Frog parasitology, U of Manitoba (2011)
- Cassidy Erdelyan – Mosquito olfaction, U of Manitoba (2010)
- Alison Partridge – Mosquito development, U of Manitoba (2010)
- Amanda Martin - Lamprey development, U of Manitoba (2010)
- Jonathon Broughton – Mosquito sex determination, U of Manitoba (2010)
- Heather Collins – Summer NSERC, Mosquito sex determination, U of Manitoba (2009)
- Robert Beattie – Summer NSERC, Mosquito development, U of Manitoba (2009)

**Research Technicians:**

- Alison Partridge – Sterile insect technologies, University of Manitoba (2015-present)
- Aditi Singh – Crop protection technologies, University of Manitoba (2013-present)
- Teresa Moffatt – West Nile virus interactions, University of Manitoba (2008-2010)
- Darcy Childs – Mosquito molecular biology, University of Manitoba (2008-2010)

### Teaching (Graduate Courses – past 6 years)

- 2012 BIOL 7600 Cell Adhesion Molecules
- 2011 BIOL 7600 West Nile virus – molecular mechanisms
- 2011 BIOL 7600 Molecular aspects of developmental biology
- 2010 BIOL 7600 Lamprey developmental biology

### Teaching (Undergraduate Courses –past 6 years)

- 2009-present BIOL 2520 Cell Biology
- 2009-present BIOL 3540 Advanced Cell and Developmental Biology
- 2015 BIOL 4890 Special Topics in Biology: Insects as models for human disease
- 2015 BIOL 4890 Special Topics in Biology: Molecular biology technologies
- 2014 BIOL 4890 Special Topics in Biology: Genetic modification technologies
- 2014 BIOL 4890 Special Topics in Biology: Protein analytical methods
- 2014 BIOL 4890 Special Topics in Biology: RNAi technologies in plants
- 2013 BIOL 4890 Special Topics in Biology: Viral interactions
- 2013 BIOL 4890 Special Topics in Biology: Insect development
- 2013 BIOL 4890 Special Topics in Biology: Crop protection technologies
- 2012 BIOL 4890 Special Topics in Biology: Insects as models for human disease
- 2011 BIOL 4890 Special Topics in Biology: Molecular basis of viral infections
- 2010 BIOL 4890 Special Topics in Biology: Molecular biology of lampreys

### Guest lecturing (University of Manitoba)

- 2009-2014 BIOL 3100 Methods in Biological Sciences
- 2009-present MBIOL 4610 Molecular Genetics of Eukaryotes

### PROFESSIONAL AND ACADEMIC AWARDS – PAST 6 YEARS

- Science Teaching (Undergraduate) Award, University of Manitoba, 2013
- Science Teaching (Undergraduate) Award, University of Manitoba, 2009
- Promotion to Associate Professor, 2009

### REFEREED PUBLICATIONS

McCauley, D., Docker, M., Whyard, S., Li, W. Lampreys as diverse model organisms in the genomics era. *BioScience* (accepted Aug. 2015)

Whyard, S., C. Erdelyan, A. Partridge, A. Singh, N. Beebe, R. Capina (2015) Silencing the buzz: a new approach to population suppression of mosquitoes by feeding larvae double-stranded RNAs. *Parasites and Vectors* 8: 96.

Huwer, J.R., J. Koprivnikar, P.T.J. Johnson, S. Whyard. (2015) Development and application of an eDNA method to detect and quantify a pathogenic parasite in aquatic ecosystems. *Ecological Applications* 25(4): 991-1002.

- Heath, G., D. Childs, M. Docker, D.W. McCauley, and S. Whyard. (2014) RNA interference technology to control pest sea lampreys – a proof-of concept. PLoS ONE 9(2): e88387.
- Spice, E., S. Whyard, M. Docker. (2014) Gene expression during ovarian differentiation in parasitic and non-parasitic lampreys: Implications for fecundity and life history types. General and Comparative Endocrinology 208: 116–125
- Singh, A., S. Wong, C. Ryan, S. Whyard (2013) Oral delivery of double-stranded RNA in larvae of the yellow fever mosquito, *Aedes aegypti*; implications for pest mosquito control. J Insect Science 13:69.
- Desai S, Eu Y-J, Whyard S, Currie R. (2012) Prevention of deformed wing virus infection in larval and adult honeybees (*Apis mellifera* L.) by dsRNA ingestion. Insect Mol Biol 21: 446-455
- Terenius O., *et al.* (2011) RNA interference in Lepidoptera: An overview of successful and unsuccessful studies and implications for experimental design. J Insect Physiol. 57: 231-245.
- Erdelyan C, Mahood T, Bader T, Whyard S (2011) Functional validation of the carbon dioxide receptor genes in *Aedes aegypti* mosquitoes using RNA interference. Insect Mol Biol 21:119-27.
- Singh, A., S. Wong, and S. Whyard (2009) RNA interference in insects following oral delivery of double-stranded RNA in insects. Insect Biochem Mol Biol 39: 824-832.
- Thresher R., R. Dunham, P. Grewe, S. Whyard, J. Patil, C.M. Templeton, A. Chaimongol, C.M. Hardy, and L. Hinds (2009) Development of repressible sterility to prevent the establishment of feral populations of exotic and genetically modified animals. Aquaculture 290: 104-109.
- Yuen J, S. Read, J. Brubacher, A. Singh, and S. Whyard (2008) Biolistics for high-throughput transformation and RNA interference in *Drosophila melanogaster*. Fly 2(5): 247-254.
- Whyard S. RNA interference in *Drosophila*. In: "RNA Interference: Methods for Plant and Animals." CAB International Publications. (2008)
- Grewe PM, Patil J, McGoldrick D, Rothlisberg P, Whyard S, Hinds L, Hardy C, Vignarajan S, Thresher R. (2007) Preventing genetic pollution and the establishment of feral populations: a molecular solution. In: "Ecological and Genetic Implications of Aquaculture Activities." Springer Publications
- Brownlie, J.C., and S. Whyard (2005) Identification of novel non-autonomous *CemaT* transposable elements and evidence of their mobility within the *C. elegans* genome. Genetica 125: 243-251.
- Brownlie, J.C., N.M Johnson, and S. Whyard (2005) The *Caenorhabditis briggsae* genome contains active *CbmaT1* and *Tcb1* transposons. Mol. Genetics Genomics 273: 92-101
- Brownlie, J.C., and S. Whyard (2004) *CemaT1* is an active transposon in the *Caenorhabditis elegans* genome. Gene 338: 55-64.
- Raphael, K.A., S. Whyard, D. Shearman, X. An, and M. Frommer (2004) *Bactrocera tryoni* and closely related pest tephritids – molecular analysis and prospects for transgenic control strategies. Insect Biochem. Mol. Biol. 34: 167-176.

- Claudianos, C., J. Brownlie, R. Russell, J. Oakeshott, and S. Whyard (2002) *maT* – a clade of transposons intermediate between *mariner* and *Tc1*. *Mol. Biol. Evol.* 19: 2101-2109.
- Preston, N.P., V.J. Baule, R. Leopold, J. Henderling, P.W. Atkinson, and S. Whyard (2000) Delivery of DNA to early embryos of the Kuruma prawn, *Penaeus japonicus*. *Aquaculture* 181: 225-234.
- Pinkerton, A.C., S. Whyard, H. Mende, and P.W. Atkinson (1999) The Queensland fruit fly, *Bactrocera tryoni*, contains multiple copies of the *hAT* family of transposable elements. *Insect Molec. Biol.* 8: 423-434.
- Sarkar, A.S., C.J. Coates, S. Whyard, U. Wilhoeft, P.W. Atkinson, and D.A. O'Brochta (1997) The *Hermes* element from *Musca domestica* can transpose in four families of cyclorrhaphan flies. *Genetica* 99: 15-29.
- Whyard, S., A.E.R. Downe, and V. K. Walker (1995) Characterization of a novel esterase conferring insecticide resistance in the mosquito *Culex tarsalis*. *Arch. Insect Biochem. Physiol.* 29: 329-342.
- Walker, V.K., Whyard S., Tittiger C., Russell R., Karotam J. (1994) Biochemical and molecular analysis of malathion resistance in *Culex tarsalis* and *Lucilia cuprina*. In D.J. Beadle, D.H.L. Bishop, L.G. Copping (Eds.), *Opportunities for Molecular Biology in Crop Protection* (SCI Pesticides Group) Cambridge: Farnham Press
- Whyard, S. and V.K. Walker (1994) Characterization of malathion carboxylesterase in the sheep blowfly *Lucilia cuprina*. *Pestic. Biochem. Physiol.* 50: 198-206.
- Whyard, S., C. Tittiger, and V.K. Walker (1994) Purification of triosephosphate isomerase and isolation of its gene from the mosquito *Culex tarsalis*. *Insect Biochem. Molec. Biol.* 24: 1017-1024.
- Whyard, S., A.E.R. Downe, and V.K. Walker (1994) Isolation of an esterase conferring insecticide resistance in the mosquito *Culex tarsalis*. *Insect Biochem. Molec. Biol.* 24: 819-827.
- Walker, V.K., S. Whyard, C. Tittiger, R. Russell, J. Karotam (1994) Biochemical and molecular analysis of malathion resistance in *Culex tarsalis* and *Lucilia cuprina*. *Opportunities for Molecular Biology in Crop Protection* (SCI Pesticides Group) Cambridge, UK.
- Whyard, S., R.J. Russell, and V.K. Walker (1993) Insecticide resistance and malathion carboxylesterase in the sheep blowfly, *Lucilia cuprina*. *Biochem. Genet.* 32: 9-24.
- Tittiger, C., S. Whyard, and V.K. Walker (1993) A novel intron site in the triosephosphate isomerase gene from the mosquito *Culex tarsalis*. *Nature* 361: 470-472.
- Ziegler, R., S. Whyard, A.E.R. Downe, G.R. Wyatt, and V.K. Walker (1987) General esterase, malathion carboxylesterase, and malathion resistance in *Culex tarsalis*. *Pest. Biochem. Physiol.* 28: 279-285.
- Whyard S., G.R. Wyatt, and V.K. Walker (1986) The heat shock response in *Locusta migratoria*. *J. Comp. Physiol. B.* 156: 813-817.

PATENTS

Whyard, S. and Belmonte M. (2015) Plant pathogenic fungus control. Provisional patent # US 62/155,506.

S. Whyard (2015) Insects modified to decrease testis specific gene expression for methods of biological control. Patent # PCT/IB2014/064643.

Whyard, S, F. Cameron, M. Moghaddam, T. Lockett (2011) Delivery of dsRNA to arthropods. US 8263573 B2

Whyard, S. and P. Waterhouse (2003) Insect resistance using inhibition of gene expression. Provisional patent BCS03-2008-US1

Patil, J., P. Grewe, R. Thresher, S. Whyard, L. Hinds, C. Hardy, S. Vignarajan (2000) Repressible sterility of animals. PCT/AU00/01596

RECENT CONFERENCE PRESENTATIONS (LAST 6 YEARS)
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Whyard, S. RNA interference technologies to control pest insects. *Entomological Society of America, North-central Branch Meeting*. Manhattan, KS, USA, June 2015. **Invited symposium speaker.**

Whyard, S. and Docker M. RNA interference technologies to control pest lampreys. *Great lakes Fisheries Commission Annual Meeting*, Lansing, MI, USA. January 2015. **Invited symposium speaker.**

Whyard, S. Designing RNA interference technologies to control pest insects. *CSIRO RNA Interference Technologies Conference*. Canberra, Australia, July 2014. **Invited symposium speaker.**

Whyard, S. Optimal RNAi targets in insects. *CSIRO RNA Interference Technologies Conference*. Canberra, Australia, July 2014. **Invited symposium speaker.**

Whyard, S., A. Singh, S. Wong, C. Ryan, A. Partridge, C. Erdelyan, A. Turko. Developing species-specific insecticides using RNA interference technologies. *American Chemistry Society*, San Francisco, July 2014. **Invited symposium speaker.**

Whyard, S., A. Singh, C. Erdelyan, A. Partridge. RNA interference technologies to control pest insects. *Entomological Society of America*, Portland, OR, November 2014. **Invited symposium speaker.**

Docker, M.F., T.D. Gingera, T.B. Steeves, S. Whyard, and W. Li 2014. Environmental DNA and other genetic tools for lamprey species ID and distribution sampling. *Institute of Fisheries Management Lamprey Conference*, York, UK, May 2014.

Docker, M.F., G. Heath, D. Childs, D.W. McCauley, and S. Whyard. 2014. RNA interference technology in sea lamprey: a proof-of-concept. *International Congress on the Biology of Fish*, Edinburgh, August 2014.

Spice, E.K., M.F. Docker, and S. Whyard. 2014. Gene expression during ovarian differentiation in parasitic and non-parasitic lampreys: implications for fecundity and life history types. *International Congress on the Biology of Fish*, Edinburgh, August 2014.

Whyard, S., S. Read, C. Erdelyan, A. Partridge, T. Mahood, M. Drebot, M. Andonova, R. Lindsay, A. Dibernardo. Identifying host-virus interactions of West Nile virus with different host species. *International Conference on Diseases in Nature Communicable to Man*, Winnipeg, MB, July 2012.

Whyard, S., A. Singh, S. Wong, C. Erdelyan, A. Partridge, A. Turko Developing species-specific RNAi technologies to control pest insects. *International Congress of Entomology*, Daegu, North Korea, August 2012. **Invited symposium speaker.**

Doughty, N., R. Jung, I. Hougen, S. Whyard (2012) Little things can mean a lot – microRNAs involved in protection against oxidative stress. *Entomological Society of Manitoba Annual Conference*, Winnipeg, MB, November, 2012.

Mahood T., and S. Whyard. The innate immunity responses of mosquitoes exposed to bacteria and West Nile virus. *Canadian Entomological Society Annual Conference*, Edmonton AB, December 2012.

Erdelyan, C., and S. Whyard. Identification of the carbon dioxide receptor in the yellow fever mosquito *Aedes aegypti*. *Entomological Society of Manitoba*. Winnipeg, MB, Nov. 2010.

Singh, A., S. Wong, C. Ryan, and S. Whyard. Developing species-specific insecticides using double-stranded RNAs. *Entomological Society of Manitoba*. Winnipeg, MB, Nov. 2009.

#### RESEARCH FUNDING

##### **Grant Funding: (past 6 years only)**

Whyard, S. Development of SIT in *Aedes* mosquitoes. 2015-2017. Google Research Initiatives grant - \$710,000.

Whyard, S. (Principal Investigator), Belmonte, M., Fernando, D. Protection of crops against insect pests. 2015-2017. NSERC Collaborative Research and Development grant - \$582,000.

Beebe, N., S. Whyard (co-applicant), Scott Ritchie, Greg Divine. Release the sterile males: a new direction for mosquito population control technologies. 2015-2019. National Health & Medical Research Council of Australia - \$997,000; S. Whyard share: \$250,000

Whyard, S. (Principal Investigator), M. Belmonte, D. Fernando. Development of RNAi technologies to protect crop plants from insects. 2014-2017. Monsanto R&D Initiatives - \$300,000.

Whyard, S. Proof-of-concept RNAi-based crop protection technologies. 2014. NSERC Engage - \$25,000

Whyard, S. (Principal Investigator), M. Belmonte, D. Fernando. RNAi technologies to protect canola against *Sclerotinia* fungal infections. 2014-2017. Manitoba Agriculture, Food, and Rural Development – Growing Forward 2 program - \$280,000.

Debarro, P., C. Hardy, S. Whyard (co-applicant). Development of the sterile insect technique to control tephritids in Australia. 2014-2016. Horticulture Australia Limited - \$2,490,000 – S. Whyard share: \$270,000

Whyard, S. Development of RNAi technologies to control pests of canola. 2013-2014. URGP - \$7500.

Whyard, S. Developing RNAi technologies in mosquitoes. 2013-2014. CSIRO Collaborative Grant - \$10,000

Pelka, P. and S. Whyard (co-applicant) Instruments for gene expression analyses. 2012. NSERC Equipment Grant - \$55,000

Docker, M. and S. Whyard (co-applicant). Detection of lamprey environmental DNA. 2011-2013. Great Lakes Fishery Commission - \$83,400

Whyard, S. The molecular basis of mosquito sex differentiation. 2010-2015. NSERC Discovery Grant - \$135,000

Whyard, S. Role of microRNAs in neurodegeneration and oxidative stress. 2010-2011. Thorlakson Foundation - \$29,500

Whyard, S. (Principal Investigator), Docker, M. Control of sea lampreys using RNA interference – a proof-of concept. 2009-2010. Great Lakes Fishery Commission (Sea lamprey Control Program). \$93,000

Whyard, S. The molecular basis of West Nile virus transmission. 2007-2009. Manitoba Health Research Council (Operating Grant). \$97,000

Docker, M., & Whyard, S. (co-investigator) Refrigerated benchtop centrifuge. 2009. NSERC (RTI) \$13,886

Whyard, S. The molecular basis of mosquito development. 2005-2010. NSERC (Discovery) \$182,500

**Grant(s) pending decision:**

Whyard, S. Development of double-stranded RNA delivery methods for mosquitoes. 2015. NSERC Engage - \$25,000

Whyard, S. Development of control methods for wood-boring insects. 2015. NSERC Engage - \$25,000

## Curriculum Vitae

**Worley, Anne C**  
Ph.D.

Associate Professor  
Department of Biological Sciences  
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University of Manitoba  
Office: 503 Buller Building  
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### Post-Secondary Education

- Ph.D. Department of Botany, University of Toronto, Toronto, Canada  
(1994-2000) Thesis Title: Flower size-number trade-offs and the evolution of floral display.  
Supervisor: Spencer C.H. Barrett
- M.Sc. Ecology Division, Department of Biological Sciences, University of Calgary,  
(1991-1994) Calgary, Canada  
Calgary, Canada  
Thesis Title: Life-history trade-offs and resource allocation in the common  
butterwort, *Pinguicula vulgaris* L. (Lentibulariaceae).  
Supervisor: Lawrence D. Harder
- B.Sc. Biology Co-op / Environmental Studies, University of Victoria, Victoria,  
(1986-1991) Canada  
Undergraduate Research Project: Morphological and genetic variation in  
disjunct populations of the avalanche lily, *Erythronium*  
*montanum*.  
Supervisor: Geraldine A. Allen.



## **Appointments - University of Manitoba**

2002 – present      Assistant Professor / Associate Professor, Department of Biological Sciences (formerly Botany), Faculty of Science

## **Other Academic and Professional Experience**

2000 – 2002      Post-doctoral Fellow, Department of Botany, University of Washington\*, Faculty of Science

\*My advisor moved to Michigan State University in 2001, so the post-doc was in two locations.

## **Memberships**

Canadian Botanical Association –joined 2004  
Canadian Society for Ecology & Evolution –joined 2006  
Society for the Study of Evolution –joined 1995  
Manitoba Association of Plant Biologists –joined 2005  
American Society of Plant Taxonomists – member 2008-2011

## **Teaching**

### **Courses - University of Manitoba**

#### **Undergraduate**

##### *Instructor*

- BOTN 2460 = BIOL 2500. Genetics I
- BOTN / ZOOL. 3000 = BIOL 3300. Evolutionary Biology
- BIOL 4300. Evolution & Adaptation
- BIOL 4242 (=BOTN 4130). Evolution of Plant Structures & Systems
- ZOOL 4000 (022.400) Principles and Processes in Evolution (similar material to BIOL 3300)
- BOTN 4890. Special Topics in Botany (Plant Hybridization and Evolution)
- ZOOL 4890. Special Topics in Zoology (Evolution of Quantitative Traits)
- BIOL 4890. Special Topics in Biology (Plant Reproductive Evolution)

##### *Marker / Advisor*

BOTN 3570. Directed Studies in Botany  
BIOL 3100. Skills in Biological Sciences  
BIOL 4100. Honours Thesis Course

#### **Graduate**

- BIOL
- BOTN 7410-T01. Special Topics: Evolution of Continuous Traits
- BIOL 7600-T04. Evolutionary Biology
- BIOL 7600-T07. Evolution & Adaptation
- (BIOL 7220. Critical thinking in Biological Sciences – material for 1 discussion)

## Courses - other Post-Secondary Institutions

### University of British Columbia, Department of Botany

#### Undergraduate

Jan – April 2000, Botany 413. Evolutionary Processes in Plants

### Graduate & Honours Student Supervision - University of Manitoba

#### Doctoral

- 2006-2012 Mason Kulbaba, Department of Biological Sciences, *Floral evolution in Polemonium brandegeei (Polemoniaceae)*
- 2009-present Sara Halwas, (Individual Interdisciplinary Program: Biological Sciences & Anthropology), Department of Biological Sciences, *Domesticating Chenopodium: applying genetic techniques & archaeological data to recreate prehistoric plant use.*

#### Master's

- 2004-2006 Mason Kulbaba, Department of Biological Sciences, *Evolution of floral design in Polemonium brandegeei (Polemoniaceae)- transferred to PhD program in 2006.*
- 2010-2012 Melissa Pearn, Department of Biological Sciences, *Pollination and comparative reproductive success of Cypripedium candidum, Cypripedium parviflorum, and their hybrids in southern Manitoba.*
- 2010-present Sarah Semmler, Department of Biological Sciences, *Effects of fire on community diversity and plant-pollinator interactions in the tall grass prairie. Defense scheduled for December 3, 2015*
- 2014-present Dawn Wood, Department of Biological Sciences, *Selection by pollen consumers on floral traits.*
- 2015- present Steven Anderson, Department of Biological Sciences, *Latitudinal variation in prairie communities and the reproductive success of rewardless orchids.*

#### Bachelor Honour's

- 2012-2013 Jessica Guezen, Department of Biological Sciences, *Short-term limitations to the reproductive output of two rewardless orchids.*
- 2013-2014 Jian-fei Shao, Department of Biological Sciences, *Sexual interference in Polemonium brandegeei.*
- 2013-2014 Kaman Choi, Department of Biological Sciences, *The effect of colour and two UV manipulation treatments on the floral longevity and reproductive success of Cypripedium parviflorum and Dasiflora fruticosa.*
- 2014-2015 Steven Anderson, Department of Biological Sciences, *Effective pollinators of two*

*rewardless orchids*, *Cypripedium candidum* and *Cypripedium parviflorum*, and the influence of floral characteristics on reproductive success.

### **Service on Thesis Committees - University of Manitoba**

#### **Doctoral**

- 2007- 2010 Melissa Pink, Department of Biological Sciences, *Variation in temperature and its impact on predator-prey interactions.*
- 2007- 2010 Arvind Hirani, Department of Plant Science, *Regulation of aliphatic glucosinolates biosynthesis in Brassica napus and Brassica rapa by RNAi gene silencing with seed-specific promoters and gene replacement.*
- 2005-2008 Zhixia Niu, Department of Plant Science, *Manipulation of biosynthesis of aliphatic glucosinolates in Brassica crops and Arabidopsis through gene replacement and RNAi gene silencing.*

#### **Master's**

- 2015-present Melanie Lalonde, Department of Biological Sciences. Biogeography and Genetic Population Structure of the Buckeye Butterflies (Genus *Junonia*) in the Western Hemisphere: Patterns of Hybridization, Dispersal, and Speciation.
- 2014-present Bonnie McCullagh, Department of Biological Sciences, Sequence evolution among divergent mitochondrial haplotypes within species of *Junonia* butterflies.
- 2013-present Corey Lees., Department of Plant Science, Heterotic Gene Pool Development for *Brassica napus* L. within the *Ogu*-INRA Cytoplasmic Male Sterility System.
- 2005-2007 Andrea Patenaude, Department of Entomology, *Bee diversity and community structure in mixed grass prairie preserves in Manitoba*
- 2005-2007 Chris Friesen, Department of Biology, University of Winnipeg, *Community & environmental variables and the relationship to pollinator visitation in the endangered western prairie fringed orchid (Plantanthera praeclara).*

#### **Honour's**

- 2014-2015 Paul Fafard, Jared Field, Rachel Donnelly
- 2013-2014 Stacey Collerone, Jennifer Doering, Tera Edkins, Melanie Fetterly, Jenna Millar, Thomas Wood
- 2012-2013 Mike Gaudry, Timothy Gingera, Lilian Weins

### **Supervision of other Research and Academic Personnel**

#### **University of Manitoba Technicians**

- 2010 Dr. Habibollah Ghazvini, Lab work to screen genetic markers and sequence data in *Polemonium* and *Cypripedium*.

2006-2007	Habibollah Ghazvini, Lab work to screen genetic markers and sequence data in <i>Polemonium</i> and <i>Cypripedium</i>
2005-2006	Ms. Deborah Witko, General lab work and genetic analysis of <i>Lithospermum</i> .
2002-2003	Ms. Christina Fetterman, General lab set-up, data entry and analysis, greenhouse work.

### Undergraduate Student Supervision

#### University of Manitoba

Start year – End Year	Student name	Project Title / Activities
2015	Chantel Dubiel*	Chantel assisted MSc student, Dawn Wood, and conducted a small independent research project for her <u>Co-op project</u> , pollinator diversity on (sub)urban & rural <i>Dasiphora</i>
2014 - 2015	Steven Anderson*	Steven collected data for his Honour's Thesis and assisted with other research in my and Dr Ford's lab. Faculty of Science Undergrad. Summer Research Award
2013	Kaman Choi	Kaman collected data for her Honour's Thesis and assisted my graduate students with their research
2012	Janelle Quintana	Greenhouse crossing experiment on <i>Polemonium brandegeei</i> , and field assistant for <i>Cypripedium</i> research. Faculty of Science Undergrad. Summer Research Award
2011	Alex Hare*	Hybridization and Reproductive success in <i>Cypripedium</i> . Alex assisted Melissa Pearn, and conducted a small independent research project, summer student
2011 -2013	Jessica Guezen*	Plant and pollinator diversity in the tall grass prairie. Jessica assisted Sarah Semmler, and conducted a small independent research project, summer student.
2011-2012	David Heinrichs	<u>Co-op term 1</u> : scoring and preliminary analysis of AFLP data from <i>Cypripedium</i> populations in Manitoba and Ontario. <u>Co-op term 2</u> : field and lab assistance for Jessica Guezen and Sara Halwas, as well as herbarium work for Bruce Ford.
2010	David Heinrichs	Hybridization in <i>Cypripedium</i> . David worked as a field and lab assistant for Melissa Hoffer, and sometimes Sarah Semmler, summer student.
2010	Marika Olynyk	Plant and pollinator diversity in the tall grass prairie. Marika worked as a field assistant for Sarah Semmler and compiled an annotated bibliography on pollination networks, summer student.

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2006, 2008-2009	Ameet Bharaj	field & Lab Assistant for work on <i>Lithospermum incisum</i> and <i>Cypripedium</i> , summer student
2008-2009	Joshua Pearlman*	“Pollen viability in two species of lady’s slipper and their hybrids”, NSERC summer student
2009	Jarrold Sumlak	Field surveys of plant and insect diversity, summer student
2009-2010	Melissa Hoffer (Now M. Pearn)*	“Habitat quality, reproductive success and hybridization in Lady’s slipper orchids ( <i>Cypripedium</i> ),” NSERC summer student 2009
2007	Lauren Sawich*	“Morphological & Genetic evidence for Hybridization in a rare and a common ladyslipper orchid”, summer student
2006	Ian MacDonald	Field & Lab Assistant for Mason Kulbaba, summer student
2004-2005	Melissa Sutherland	Assisted Mason Kulbaba and work on mating systems in <i>Lithospermum incisum</i> , NSERC summer student in 2005.
2005	Kaleigh Quinn	Assisted Mason Kulbaba and work on mating systems in <i>Lithospermum incisum.</i> , NSERC summer student.

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\* played an active role in project design, analysis, or interpretation

### **Curriculum Development/Pedagogical Innovation**

#### **New Course Development**

- 2013 – 2014      Prepared and refined lecture materials for Evolution and Adaptation (BIOL 4300). This course is our only 4<sup>th</sup> year course designed specifically to emphasize evolutionary processes and was introduced to expand course options in the “Evolution & Adaptation” theme group
- 2005 - 2006      Prepared and refined lecture materials and computer simulation assignment for Evolutionary Biology (BOTN/ZOOL 3000)
- 2004 – present    Chose reading lists and assigned discussion questions for various Topics courses.

#### **Course Updates**

- 2005-present      Annual updates to assignments, lecture notes and tutorial problems in Evolutionary Biology and Genetics I.
- 2004                New course material for BOTN 4130. Evolution of Plant Structures & Systems, which was previously taught by David Punter.

### **Research, Scholarly Work and Creative Activities**

#### **Keywords**

Evolutionary Biology, Conservation Genetics, Population & Quantitative Genetics, Plant Reproductive Biology, Life-History Evolution

### Research Interests

The tremendous variation in the flowers of animal-pollinated plants suggests adaptation to strong and diverse selection. My research seeks to explain some of this diversity using perspectives from pollination biology and life-history theory. Both perspectives are needed to fully understand floral evolution. First, flowers influence mating opportunities through their effects of pollen dispersal. Second, flowers are life history traits in that they reflect investment in reproduction. Thus, they are subject to the resource constraints limiting all aspects of plant growth and development.

My long-term goals are to understand (1) how resource allocation and pollination biology combine to influence floral display, with an emphasis on flower size and number, (2) how visits by different types of pollinators (e.g., birds versus moths) contribute to variation in floral design and display, and (3) reproductive success and mating patterns when flowers contain no reward for pollinators. Most recently, I have begun to consider (4) how variation in flowering time and floral abundance influences plant-pollinator interactions (pollinator networks) and the quality of pollination services from the plants perspective.

### Most Significant Contributions

- 2012-2014 My PhD student, Mason Kulbaba, and I demonstrated that bird and moth pollinators impose contrasting selection on sex-organ position through female fitness (seed production) in *Polemonium brandegeei*. However, selection through male function (number of seeds sired) was on corolla dimensions, with birds selecting on floral tube length, and moths selecting on tube diameter. The results for male function suggest that efficient pollination may be possible even when pollinators are diverse. Selection was strongest through female function, which contradicts commonly held expectations about the nature of sexual selection.
- 2009 Published first phylogeny of *Polemonium*, a genus of perennial herbs. Knowing the relationships among species will facilitate comparative studies of the evolution of floral display.
- 2008 My PhD student, Mason Kulbaba, and I established that both hummingbirds and hawkmoths pollinate the perennial herb, *Polemonium brandegeei*. We also documented high genetic variation in aspects of floral design related to pollination
- 2003 I published quantitative genetic models to show how variation in resource availability alters the evolution of traits involved in trade-offs.
- 2000-2003 I published field studies, artificial selection, and quantitative genetic analyses to investigate trade-offs between flower size and number, analogous to the widespread trade-offs between offspring size and number
- 1996-1999 I published field experiments to study investment in reproduction versus vegetative growth and clonal propagation. This work also indicated that preformation of flowers in the season preceding flowering reduces the ability of plants to respond to short term changes in resource levels.

## Current Research Projects

- 2004-present *Evolution of Floral Design*. My former Ph.D. student, Mason Kulbaba, quantified natural selection on floral design in *Polemonium brandegeei* under experimental conditions. This species is pollinated by two very different groups of pollinators, hummingbirds and hawkmoths. My current M.Sc. student, Dawn Wood, is working in natural populations to evaluate how seed production and pollen movement caused by these large, nectar foraging visitors compares to the influence of smaller, pollen (and nectar) foraging bees and flies.
- 2007-present *Genetic & Morphologic Consequences of Hybridization*. Hybridization may cause extensive introgression of neutral genes even when differential selection maintains the morphological integrity of species. I am currently investigating causes and consequences of hybridization between species pairs in *Polemonium* and the orchid genus, *Cypripedium*.
- 2009-present *Community Diversity & Reproductive Success in Rewardless Flowers*. “Generalized food mimics” produce no reward for pollinators but have attractive flowers that produce scents similar to those in rewarding flowers. My lab and collaborators are studying how orchid floral morphology combines with the diversity of plants and pollinators to determine reproductive success in lady’s slipper orchids (*Cypripedium*). This work has been in collaboration with Dr. Bruce Ford and several students (Melissa Pearn, MSc; Jessica Guezen, BSc Honours; Kaman Choi, BSc Honours; Steven Anderson, BSc Honours, now MSc candidate).
- 2010-present *Pollinator networks and pollination services in the tall grass prairie*. My MSc student, Sarah Semmler described the short-term effects of fire pollination network structure by examining changes in plant and insect communities. Sarah also investigated how pollination services are affected by the identity and activity of pollinators. Sarah’s work was in Manitoba’s tall grass prairie, a critically endangered ecosystem.

## Grants and Contracts

### Research Grants

- 2014-2018 **Worley A.C. Worley, A.C.** (Principle Investigator). *Natural selection on floral traits, variation in agents and targets..* Natural Sciences and Engineering Research Council of Canada, Discovery Grant Program, \$135,000 over 5 years.
- 2014 **Worley, A.C. Pollen theft and pollen limitation in a perennial herb, *Polemonium brandegeei*.** Field work support program (FWSP), Faculty of Science, University of Manitoba, \$4,424.00 over 1 year.
- 2013 **Worley, A.C.** (Principle Investigator) **and B. Ford. Reproductive biology and long-term monitoring of an endangered orchid.** Field work support program (FWSP), Faculty of Science, University of Manitoba, \$6,468.00 over 1 year.

- 2012 **Worley, A.C.** (Principle Investigator). *Pollination services in the tall grass prairie*. Field work support program (FWSP), Faculty of Science, University of Manitoba, \$3,500.00 over 1 year.
- 2009-2013 **Worley, A.C.** (Principle Investigator). *The evolution of floral design and display in animal-pollinated plants*. Natural Sciences and Engineering Research Council of Canada, Discovery Grant Program, \$105,000 over 5 years.
- 2009-2013 **Kevan, P.** (Principle Investigator) and approximately 50 co-investigators including **Worley, A.C.**. *Canadian Pollination Initiative (CANPOLIN)*. Natural Sciences and Engineering Research Council of Canada, Strategic Network Grant, \$5,000,000 over 5 years.
- Funds awarded to A. Worley (Local Principle Investigator) and R. Westwood:** \$21,000 in 2009; \$29,000 in 2010; \$32,000 in 2011; \$30,000 in 2012 (total of \$112,000).
- 2008-2010 **Worley, A.C.** (Principle Investigator) and Ford, B.A. *Conservation implications of hybridization between the rare small white lady's slipper orchid and the common yellow lady's slipper orchid*. World Wildlife Fund / Environment Canada, Endangered Species Recovery Fund, \$16,809 over 2 years.
- 2008-2010 **Worley, A.C.** (Principle Investigator) and Ford, B.A. *Conservation implications of hybridization between the rare small white lady's slipper orchid and the common yellow lady's slipper orchid*. Manitoba Conservation, Special Conservation and Endangered Species Fund, \$15,811 over 2 years.
- 2006 **Piercey-Normore, M.** (Principle Investigator), Hausner, G., Oresnik, I., Davoren, G., Hann, B., Whyard, S., Valdimarsson, G., Campbell, K., **Worley, A.** (co-investigator) and B. Ford. *Genetic Analyzer*, Natural Sciences and Engineering Research Council of Canada, Research Tools and Instruments, \$124,019 over 1 year.
- 2005-2006 **de Kievit, T.** (Principle Investigator), Piercey-Normore, M., and **Worley, A.** (co-investigator). *Environmental science and diversity laboratory*. Canada Foundation of Innovation – Infrastructure Operating Fund. \$52,000.00 over 2 years
- 2005 **Worley, A.C.** (Principle Investigator). Evolution of Mating Systems in the Perennial Herb, *Lithospermum incisum (fringed puccoon)*. University of Manitoba Research Grants Program. \$7,500 over 1 year.
- 2003-2007 **Worley, A.C.** (Principle Investigator). *The evolution of display in animal-pollinated plants*. Natural Sciences and Engineering Research Council of Canada, Discovery Grant Program, \$125,000 over 5 years.
- 2002-2003 **de Kievit, T.** (Principle Investigator), Piercey-Normore, M., and **Worley, A.** (co-investigator). *Environmental science and diversity laboratory*. Canada Foundation for Innovation – New Opportunities Grant. \$446,596.
- 2002 **Worley, A.C.** (Principle Investigator). *Start-up Funds*, University of Manitoba Research Grants Program. \$60,000.



## Publications, Presentations and Other Works

### 1. Articles in Journals (refereed)

NB: I have indicated my name and the names of my students in bold.

- Kulbaba, M.W.** and **Worley, A.C.** (2014) Patterns of pollen removal and deposition in *Polemonium brandegeei* (Polemoniaceae): the role of floral visitors, floral design and sexual interference. *Plant Biology* 16(6):1087-1095.
- Chamberlain, S.A., R. Cartar, **A.C. Worley**, **S.J. Semmler**, G. Gielens, S. Elwell. M.E. Evans, J. C. Vamosi & E. Elle. (2014) Traits and phylogenetic history contribute to network structure across Canadian plant-pollinator communities. *Oecologia* (Berlin) 176(2): 545-556.
- Kulbaba, M.W. and **Worley, A.C.** (2013) Selection on *Polemonium brandegeei* (Polemoniaceae) flowers under hummingbird pollination: opposing, parallel or independent of selection by hawkmoths? *Evolution* 67:2194-2206.
- Cao, G.-X. and **Worley, A.C.** (2012) Life history trade-offs and evidence for hierarchical resource allocation in two monocarpic perennials. *Plant Biology*. doi: 10.1111/j.1438-8677.2012.00612.x, available on line June 5, 2012
- Kulbaba, M.W.** and **Worley, A.C.** (2012) Selection on floral design in *Polemonium brandegeei*: female and male function under hawkmoth pollination. *Evolution* 66 (5), 1344-1359 doi:10.1111/j.1558-5646.2011.01536.x
- Davila, Y.C., Elle, E. Vamosi, J., Hermanutz, L., Kerr, J.T., Lorie, C.J., A. R. Westwood, T. S. Woodcock and **Worley, A.C.** (2012) Ecosystem services of pollinator diversity: a review of the relationship with pollen limitation of plant reproduction. *Botany*. 90(7): 535-543 doi:10.1139/b2012-017
- Kulbaba, M.W.** and **Worley, A.C.** (2011) Polymorphic microsatellite loci in *Polemonium brandegeei* and *P. viscosum* (section Melliosoma, Polemoniaceae). *American Journal of Botany* 98: e4-e6.
- Worley, A.C., Sawich, L.,** Ghazvini, H. and Ford, B.A. (2009) Hybridization and introgression between a rare and a common lady's slipper orchid, *Cypripedium candidum* and *C. parviflorum*. (Orchidaceae). *Botany* **87**:1054-1065.
- Ford, B.A., **Worley, A.C.,** Naczi, R.F.C. and Ghazvini, H. (2009) Amplified fragment length polymorphism analysis reveals high genetic variation in the Ouachita Mountain endemic *Carex latebracteata* (Cyperaceae). *Botany* **87**:770-779.
- Worley, A.C.,** Ghazvini, H., and Schemske D.W. (2009). A phylogeny of the genus *Polemonium* based on Amplified Fragment Length Polymorphism (AFLP) markers. *Systematic Botany* 34(1):149-161.
- Kulbaba, M.W.** and **Worley, A.C.** (2008). Floral design in *Polemonium brandegeei* (Polemoniaceae): genetic and phenotypic variation under hawkmoth and hummingbird pollination. *International Journal of Plant Sciences* 169(4):509-522.
- Worley, A.C.,** Houle, D. and Barrett, S.C.H. (2003). Consequences of hierarchical allocation for the evolution of life-history traits. *American Naturalist* 161(1):153-167.

- Ellison, A.M., Gotelli, N.J., Brewer, J.S., Cochran-Stafira, D.L., Kneitel, J.M., Miller, T.E., **Worley, A.C.** and Zamora, R. (2003) The evolutionary ecology of carnivorous plants. *Advances in Ecological Research* 33(1):1-74.
- Worley, A.C.** and Barrett, S.C.H. (2001). Evolution of floral display in *Eichhornia paniculata* (Pontederiaceae): genetic correlations between flower size and number. *Journal of Evolutionary Biology* 14(3):469-481.
- Worley, A.C.** and Barrett, S.C.H. (2000). Evolution of floral display in *Eichhornia paniculata* (Pontederiaceae): direct and correlated responses to selection on flower size and number. *Evolution* 54(5):1533-1545.
- Worley, A.C.**, Baker, A.M., Thompson, J.D., and Barrett, S.C.H. (2000). Floral display in *Narcissus*: variation in flower size and number at the species, population, and individual levels. *International Journal of Plant Sciences* 161(1):69-79.
- Worley, A.C.** and Harder, L.D. (1999). Consequences of preformation for dynamic resource allocation by a carnivorous herb, *Pinguicula vulgaris* (Lentibulariaceae). *American Journal of Botany* 86(8):1136-1145.
- Barrett, S.C.H., Harder, L.D. and **Worley, A.C.** (1996). The comparative biology of pollination and mating in flowering plants. *Philosophical Transactions of the Royal Society, Series B* 351(no. 1345):1271-1280.
- Worley, A.C.** and Harder, L.D. (1996). Size-dependent resource allocation and costs of reproduction in *Pinguicula vulgaris* (Lentibulariaceae). *Journal of Ecology* 84(2):195-206.
- Allen, G.A., Antos, J.A., **Worley, A.C.**, Suttill, T.A. and Hebda, R.J. (1996). Morphological and genetic variation in disjunct populations of the avalanche lily, *Erythronium montanum*. *Canadian Journal of Botany* 74:403-412.

## **2. Conference Presentations (non-refereed)**

### *a) Invited Presentations*

#### **\*published abstract or proceedings**

- \*Worley, A.C.** and B. A. Ford. (Feb 27, 2010) Hybridization in prairie orchids: conservation threat or life as usual? Symposium presentation at the 9<sup>th</sup> Prairie Conservation and Endangered Species Conference, Winnipeg, Manitoba. Conference Program pg. 33-34.
- Kulbaba, M.W.** and **A.C. Worley** (October 20, 2009). Selection by hawkmoths on floral design in *Polemonium brandegei*. Symposium on Pollination Biology, presentation by A. Worley, Entomological Societies of Canada and Manitoba, Winnipeg, MB.
- Worley, A.C.** (May 2009) A fine balance: making time for career and family. Symposium for Women Entering Ecology & Evolution Today (SWEEET). *Canadian Society for Ecology & Evolution / Genetics Society of Canada*, Halifax, NS.
- Worley, A.C.** (May 2007) Pollination and evolution of mating systems in flowering plants. *Manitoba Association of Plant Biologists*, Winnipeg, MB.

**Worley, A.C.** (2000) Life history trade-offs and consequences of preformation for dynamic resource allocation. *Ecological Society of America*, Snowbird, Utah August (invited symposium presentation). Symposium entitled “Carnivorous plants as model ecological systems.” *Ecological Society of America Meetings*, Snowbird. August.

*b. Contributed Presentations*

**Worley A.C., Pearn M.A.,** and Ford B.A. (2013) Insect escape routes, reproductive success and hybridization in two North American lady's slipper orchids (*Cypripedium*). *Orchid Symbioses: models for evolutionary ecology*, poster 51, 31st New Phytologist Symposium, Italy, Rende-Cosenza, May 14.

\***Semmler S.J., Worley A.C.** (2013) Network structure and plant-insect dynamics in tall grass prairie, Joint Annual Meeting of the Entomological Societies of Canada & Ontario, Guelph ON, Canada, October 21.  
Sarah was runner up for the President's prize in Ecology.

\***Pearn M.A., Ford B.A., Worley A.C.** (2013) Do floral architecture and pollinator size influence insect visitation rates and reproductive success in lady's slipper orchids (*Cypripedium candidum*, *C. parviflorum*, and their hybrids)? Predating the Nation: A Sesquicentennial Celebration of Entomology in Canada Symposium: Insect Interactions with Orchids, Joint Annual Meeting of the Entomological Societies of Canada & Ontario, Guelph ON, Canada, October 22.

Melissa was invited to speak at this symposium and received a \$1000 honorarium.

**Kulbaba, M.; Worley, A.C.** (July 9, 2012) Selection by hawkmoth and hummingbird pollinators on *Polemonium brandegeei* (Polemoniaceae): compromise phenotypes or floral mosaics? “*Evolution 2012*” (1<sup>st</sup> joint congress American Society of Naturalists, Canadian Society for Ecology and Evolution, European Society for Evolutionary Biology, Society for the Study of Evolution, Society of Systematic Biologists) Ottawa, Ontario July 6-10. (Conference Program pg. 85)

**Worley, A.C.; Ford, B.A.; Pearn, M.A.** (July 8, 2012) Hybridization and reproduction in two rewardless lady's slipper orchids (*Cypripedium*): conservation threat or life as usual? “*Evolution 2012*” Ottawa, Ontario July 6-10. (Conference Program pg. 51)

**Semmler, Sarah J.; Worley, A.C.** (July 7, 2012) Pollinator services in Canada's tall grass prairie: short term responses to fire and climate. “*Evolution 2012*” Ottawa, Ontario July 6-10. (Conference Program pg. 51).

**Semmler, S.J., Worley, A.C.** and Westwood, A.R. (Nov 7, 2011) Effects of fire on community diversity and plant-pollinator interactions in the tall grass prairie. *Entomological Society of Canada and Acadian Entomological Society Joint Annual Meeting*, Halifax, Nova Scotia Nov. 6-9.

**Semmler, S. J., Worley, A.C.** and Westwood, A.R. (May 13, 2011) Effects of fire on pollination networks in the tall grass prairie. *Poster presented at Canadian Society for Ecology and Evolution (CSEE) 6<sup>th</sup> Annual Meeting*, Banff, AB, May 12-15, 2011. (Conference Program pg. 59).

**Kulbaba, M.W., and Worley, A.C.** (May 13, 2011) Floral Evolution in *Polemonium brandegeei* (Polemoniaceae): selection by hawkmoths and hummingbirds. *Canadian Society for Ecology and Evolution (CSEE) 6<sup>th</sup> Annual Meeting*, Banff, AB, May 12-15. (Conference Program pg. 16).

- \*Semmler, S.J., Worley, A.C.** and Westwood, A.R. (Feb. 25 & March 25, 2011) Effects of fire on community diversity and plant-pollinator interactions in the tall grass prairie. *Poster presented at NSERC-CANPOLIN Annual General Meeting, Guelph, Ontario, Feb. 25-26 and Manitoba Forest Research Symposium, Canadian Institute of Forestry, Winnipeg, MB, Mar. 25.*
- Pearn, M.A., Ford, B.A. and Worley, A.C.** (Feb 25, 2011) Pollination and comparative reproductive success of *Cypripedium candidum*, *Cypripedium parviflorum*, and their hybrids in southern Manitoba. *Prairie Universities Biological Symposium (PUBS)*, University of Saskatchewan, Saskatoon, SK (Conference program page 6, 27).
- Kulbaba, M.W., Worley, A.C.** and Ghazvini, H. (June 29, 2010) Maintenance of distinct floral phenotypes despite extensive gene flow between two species of *Polemonium* that differ in their major pollinators. American Society of Naturalists / Society for the Study of Evolution / Society of Systematic Biologists. Annual Meetings, Portland Oregon. (presented by A. Worley)
- Kulbaba, M.W. and A.C. Worley** (June 27, 2010) Comparison of selection by hawkmoths and hummingbirds on the flowers of *Polemonium brandegei*. American Society of Naturalists / Society for the Study of Evolution / Society of Systematic Biologists. Annual Meetings, Portland Oregon.
- Worley, A.C., Kulbaba, M.W.** and Ghazvini, H. (May 16, 2009). Asymmetrical Introgression of neutral (AFLP) markers contrasts with clines in floral traits following hybridization between *Polemonium viscosum* and *P. brandegei*. *Canadian Society for Ecology & Evolution / Genetics Society of Canada*, Halifax, NS.
- Worley, A.C., Ford, B.A., Ghazvini, H. and Sawich, L.** (July 29, 2008). Morphological and genetic evidence for hybridization between a rare and common lady's slipper orchid, *Cypripedium candidum* and *C. parviflorum* (Orchidaceae). *Botany 2008 (Canadian Botanical Association, Botanical Association of America, American Society of Plant Taxonomists and American Fern Society)*, Vancouver B.C.
- Worley, A.C., Ford, B.A., Ghazvini, H. and Sawich, L.** (June 23, 2008). Morphological and genetic evidence for hybridization between a rare and common lady's slipper orchid, *Cypripedium candidum* and *C. parviflorum* (Orchidaceae). *Society for the Study of Evolution*, Milwaukee, WI.
- Kulbaba, M.K. and Worley, A.C.** (June 21, 2008). Pollination and Floral Design in *Polemonium brandegei* (Polemoniaceae). *Society for the Study of Evolution*, Milwaukee, WI.
- Worley, A.C.** (May 15, 2007). An AFLP phylogeny clarifies floral evolution in the genus *Polemonium*. *Canadian Society for Ecology & Evolution*, Toronto, ON.
- Kulbaba, M.W. and Worley, A.C.** (November 2006). Floral Evolution in *Polemonium brandegei* (Polemoniaceae): heritabilities and genetic correlations of Floral Traits. *Manitoba Association of Plant Biologists*, Winnipeg, MB. (poster)  
best student presentation
- Worley, A. C. and Sutherland, M. H.** (April 3, 2006). When advertising just isn't enough: functional significance of cleistogamy in the fringed puccoon, *Lithospermum incisum*. *Canadian Society for Ecology & Evolution*, Montreal, QB (poster).

- Kulbaba, M.K. and Worley, A.C.** (April 3, 2006). A potential pollinator shift in the sub-alpine perennial *Polemonium brandegei* (Polemoniaceae). *Canadian Society of Ecology and Evolution*, Montreal, QB.
- Worley, A.C.** (June 2004). Biotic and abiotic correlates of floral display in the genus *Polemonium* (Polemoniaceae). *Canadian Botanical Association*, Winnipeg, MB.
- Worley, A.C.** (August 2000). Life history trade-offs and consequences of preformation for dynamic resource allocation. *Ecological Society of America*, Snowbird, Utah August (invited symposium presentation). Symposium entitled “Carnivorous plants as model ecological systems.” *Ecological Society of America Meetings*, Snowbird.
- Worley, A.C. and Barrett, S.C.H.** (August 1999). Evolution of floral display in *Eichhornia paniculata* (Pontederiaceae): direct and correlated responses to selection on flower size and number. *International Botanical Congress*, St. Louis.
- Worley, A.C., Houle, D. and Barrett, S.C.H.** (June 1998). Consequences of hierarchical allocation for the evolution of life-history trade-offs. *Society for the Study of Evolution*, Vancouver.
- Worley, A.C. and Barrett, S.C.H.** (June / August 1997). Phenotypic and genetic components of floral display in *Eichhornia paniculata*. *Society for the Study of Evolution*, Vancouver / *American Institute of Botanical Sciences*, Montreal.
- February 1996. Attended the discussion meeting “Plant life histories: ecological correlates and phylogenetic constraints” at which publication #3 was presented. *The Royal Society*, London U.K.
- Worley, A.C. and Harder, L.D.** (May / July 1995). Resource availability and allocation options in a perennial herb, *Pinguicula vulgaris*. *Ontario Ecology and Ethology Colloquium*, Toronto / *Society for the Study of Evolution*, Montreal.
- Worley, A.C. and Harder, L.D.** (July 1994). Limits to reproduction in the common butterwort, *Pinguicula vulgaris*. *Canadian Botanical Association*, Calgary\*, awarded Lionel Cinq-Mars Award for best student presentation
- Worley, A.C. and Harder, L.D.** (February 1993). Resource allocation to reproduction in the common butterwort, *Pinguicula vulgaris*, L. *Prairie Universities Biological Symposium*, Regina.

### 3. Invited Lectures – University Seminars

- Worley, A.C.** (September 2009) Floral evolution: investment, manipulation, and deceit. *Department of Biology, University of Winnipeg*.
- Worley, A.C.** (January 2009) Floral evolution: investment, manipulation, and deceit. *Department of Biological Sciences, University of Manitoba*.
- Worley, A.C.** (October/November 2006) Floral advertising and reproductive investment in animal-pollinated plants, *Departments of Entomology & Plant Science, University of Manitoba*.
- Worley, A.C.** (February 2002) Advertising with Flowers: Comparative and Experimental Studies of Floral Display. *Kellogg Biological Station, Michigan State University*.
- Worley, A.C.** (April/May 2001) Is more always better? Flower size-number trade-offs and the evolution of floral display. *Department of Botany, University of Manitoba and*

*Department of Botany, University of Washington.*

**Worley, A.C.** (September 1999) Is more always better? Flower size-number trade-offs and the evolution of floral display. *Department of Botany, University of British Columbia.*

## **Service**

### **Service - University of Manitoba**

#### **Department of Botany / Biological Sciences**

- 2012-present Honours Thesis Committee, Chair in 2014-2015.
- 2004-present - Greenhouse Committee, Committee member, review procedures, space needs, user fees
- 2006-2011 - Biological Sciences Seminar Committee, Acting Chair starting 2008, Committee member, invite speakers and organize departmental seminars
- 2009-present - Evolution Theme Group for Biological Sciences, committee member, discussed and set undergraduate curriculum requirements
- 2009 - Darwin Committee, committee member, planned and organized Darwin Month celebrations in February 2009.
- 2008 - Adjunct Professor Committee, committee member drafted terms of reference for Adjunct Professors
- 2006 - Committee on Teaching and Research in Evolution in the new Biological Sciences Department, committee member and author for research section, discussed future of evolutionary biology and wrote a 9-page report.
- 2003 - Ad hoc Committee on Evolutionary Studies in Botany, Microbiology and Zoology, committee member, discussed teaching in Evolution and helped to edit chairs report.

#### **Faculty of Science**

- 2006 - Search Committee for Assistant Professor in Evolutionary Biology.
- 2003 - Search Committee for Instructor I in Genetics & Biology.

## **Professional Service**

#### **Reviewing Activities**

##### *Journals:*

- 2014 – present: Associate Editor for *Oecologia*
- 2002 - present: American Journal of Botany, American Naturalist, Annals of Botany, Botanical Journal of the Linnaean Society, Canadian Journal of Botany, Ecology, Evolution, International Journal of Plant Science, Journal of Ecology, Plant Biology, PLoS

*Grants:*

2003-present: grant reviewer for NSERC, Earthwatch International, Kansas State University

**Community Service**

**Regional/Provincial**

- 2011 - conducted show and tell for elementary school students on “plants that dare to be different” featuring carnivorous plants and flowers that deceive and trap their pollinators.
- 2007 - University of Manitoba Information Days, discussed options in Biological Sciences with high school students

**National**

- 2008 - Walpole Island First Nation, training in field techniques for First Nations Summer students, discussion of orchid conservation with Conservation Committee.

**Personal and Professional Development**

- June 6, 2012 - attended a 1 day symposium on New Developments in Molecular Ecology organized by Loren Rieseberg and Tim Vines.
- May 16, 2011 - attended 5 hour workshop on Mathematical Modeling led by Sarah P. Otto at the Canadian Society for Ecology & Evolution Meetings in Banff, AB.
- November 2007 - University Teaching Services (UTS). Workshop on clicker use, University of Manitoba, 1.5 hours
- May 2006 - Pearson Educational Session: Teaching Large classes, University of Manitoba, 2 hours.
- October 5, 2004 - Olympus microscope training session – fluorescence microscopy & image analysis, University of Manitoba, 3 hours.
- September 16, 2004 - URGP workshop & information session, University of Manitoba, 2 hours.
- December 1, 2003 - UTS, New Faculty Workshop. Academic writing, University of Manitoba, 1.5 hours.
- November 28, 2003 - Personal web page with Dreamweaver, University of Manitoba, 3 hours.
- October 28, 2003 - Web CT content tools, University of Manitoba, 2 hour workshop.
- August 27, 2003 - University Teaching Service, New Faculty Workshop. The secrets of how people learn, University of Manitoba, 2 hour workshop.

2/25/16

August 25-27, 2002 - New Faculty Orientation Days, University of Manitoba, 3 days.



## Recent Work at the University of Manitoba

### **Instructor 1 and Greenhouse and Growth Facility Manager, Dept. of Biological Sciences, University of Manitoba (Aug. 2013 – present)**

My position in the Dept. of Biological Sciences, and in the University as a whole, is unique in that I partition my time between managing the greenhouses and growth facilities, and teaching. At present, I instruct BIOL 1030, a large enrollment (>900 student) introductory biology course for students majoring in biology. The course material is delivered via studio-filmed lectures that the students view in several lecture theatres throughout the day, and the information is reinforced by a lab component. My portion of the course covers diversity, function and structure for major life forms on the planet with the exception of animals, which is taught by a co-instructor. Although the lectures are provided by video, I visit each of the >900 students every week in their lab sections to maintain rapport and provide support.

This academic year (2014-2015), I have also served as lab coordinator for two courses that previously did not have a coordinator, BIOL 2240 Non-Flowering Plants, and BIOL 2260 Biology of the Fungi and Lichens. These additional courses required me to determine the role of the lab coordinator in each course and communicate closely with the lecturers for the courses. BIOL 2240 usually has 65 students; BIOL 2260 serves approximately 100 students. Both of these courses required two lab sessions. These are practical labs, requiring the students to use microscopy and drawing skills. These two courses could benefit from lab manuals, which may be developed if I continue to teach/coordinate them.

The other half of my unique position is the plant growth facilities management. This part of my position requires me to manage plant growth facilities (2 greenhouses, growth chambers and portable growing stands) for the purposes of teaching, research and outreach. I am assisted by a half-time greenhouse technician and more than a dozen student volunteers that contribute at least 2 hours per week of their time to the greenhouse.

My tasks include overseeing the greenhouse scheduling so that course material is available on time (seedlings, annual plants), and that the many perennial plants for courses are healthy and in bloom or spore producing when these reproductive structures are needed for particular labs. I am responsible for training staff and volunteers on care and maintenance of a diverse plant collection. I source plant species that will improve the students' contact with the plant taxa mentioned in many of our classes, and that will encourage students to get excited about plants and ask questions. The Buller greenhouse is open to the public and is available to the students as a quiet place to unwind while exploring the diversity of plants in the greenhouse. As the condition of this previously neglected greenhouse improves, we receive more visitors and the amount of informal teaching is

steadily increasing. The Buller Greenhouse offers workshops, free plant events, and plant diversity experiences for groups (such as Evening of Excellence).

During the year, there is a considerable amount of maintenance required to run the greenhouses, particularly for the Buller Greenhouse. It requires much manual temperature and lighting control, especially in the fall and spring seasons, and repairs to this facility are common. Other equipment, for example hoses and spray wands also require frequent repair. Continuing into 2015, we will be replacing old benches, cupboards and cabinets with those sourced from the dismantled CRC greenhouses. There should be some major improvements to the climate control of the Buller Greenhouse with the installation of newer evaporative coolers, fans and ultimately, integration of sensors with motor-driven vent openers.

**NSERC Industrial Research Chair Research Associate (Feb. 2004 – July 2013)** Dept. Plant Science, University of Manitoba, Winnipeg, Manitoba, Canada. Advisor: NSERC Industrial Research Chair, Dr. P. B. E. McVetty.

The objective of this IRC program was to breed superior lines of rapeseed (*Brassica napus*) that produce high concentrations of erucic acid in their seed oils. My challenge, using non-transgenic breeding approaches, was to raise the amount of erucic acid (a valuable biodegradable lubricant and chemical feedstock), beyond the theoretical limit of 66% of the seed oil. The development of doubled haploid plants from early stage pollen grains and mutagenesis were key tools in this research.

I worked on developing new rapeseed germplasm through the hybridization of *Brassica rapa* and *Brassica oleracea*, the progenitor species of *Brassica napus*. Hybrid embryos rarely survive, so they are supported by ovule and embryo rescue techniques until they are strong enough to survive outside of sterile culture. This was an exciting part of the breeding program, because each new *B. napus* line generated is distinct from existing lines, and therefore may confer new traits and heterosis to future crosses.

The first generations of my research plants were grown to seed in the departmental greenhouses, and in a computer-automated greenhouse facility (Crop Technology Centre or CTC) that I managed for about 7 years. I developed expertise in integrated pest management (IPM) so that pesticide use in the CTC greenhouse was minimized. A key part of the IPM strategy for this greenhouse was the use of biocontrol insects and mites.

English is an additional language for many of our students as well as our faculty. As part of my duties, I provided support to many graduate students, and edited the theses of Ph. D. graduate students Ravneet Behla and Arvind Hirani.

**NSERC Postdoctoral Fellow** (Feb. 2002 to Jan 2004) and **Research Associate** (March 2001 to Jan. 2002) Dept. Plant Science, University of Manitoba, Winnipeg, Manitoba, Canada. Advisor: Dr. J. K. Vessey

My projects in this plant physiology lab related to the symbiosis between plants and nitrogen-fixing bacteria. Sugarcane (*Saccharum officinarum*) hosts the nitrogen-fixing bacterium *Gluconacetobacter diazotrophicus*, which provides agriculturally significant amounts of nitrogen to the plant. We were interested in determining how these bacteria protected the enzyme nitrogenase from damage by oxygen, since in this symbiosis nodules or other special structures to house the bacteria are not formed. We used *G. diazotrophicus* lines genetically altered in their abilities to produce two enzymes to examine the nitrogenase-protective role of their colonial mucilage. This research resulted in a publication featured on the cover of the journal Microbiology V148 (2002).

A second project examined the possibility of nitrogen fixing wheat. If wheat, like sugarcane, could fix at least a portion of its own nitrogen requirements through symbiosis, there could be potentially large positive impacts on agriculture and the environment. For this reason, we screened diverse wheat lines to determine which lines might be capable of supporting the nitrogen-fixing bacteria from sugarcane. Although several candidate lines were identified in this research, further modifications of either the plant or the bacteria would likely be necessary for the symbiosis to be fully synthesized.

During this time, I initiated and maintained wheat and sugarcane tissue cultures and co-cultured them with *G. diazotrophicus*. I also supervised undergraduate projects on the isolation (Clay Sawka) and field nitrogenase activity (Alison Sass) of nitrogen-fixing endophytes in native grasses, and on the mycorrhizal status of flax plants for the long-term Glenlea rotation trials (Kevin Penner, in collaboration with Dr. M. Entz). Clay Sawka's and Alison Sass's research was featured in an article in the Farmer's Independent Weekly and a poster for a Canadian Botanical Association conference. Kevin Penner's research was published in the Canadian Journal of Plant Science in 2004.

## Committees/Student Advising

**Biological Collections Committee (2015-)**

**Greenhouse Committee (2013-present)**

**Undergraduate Honours Thesis Committee member, Dept. Biological Sciences (Steven Anderson, 2014-2015)**

**M. Sc. Thesis Committee Member, Dept. Biological Sciences (Steven Anderson, 2015-)**

**Co-Supervisor ECE (Electrical and Computer Engineering ) 4600 Project course (2 teams, 2015)**

**University of Manitoba Space Applications Technology Society – Biology Team Advisor (2013-)**

## Career Objectives

My objective is a long-term career in biology, and a ‘home’ for my broad interests in biology. I would like the opportunity to advance my skills in teaching, interdisciplinary research, mentoring, and plant diversity collection curation.

## Education

**Ph.D. (Plant Anatomy)** 2002, Dept. of Botany (now part of the Dept. Molecular and Cellular Biology), University of Guelph, Guelph, Ontario, Canada. Advisor: Dr. R. L. Peterson. **Thesis: Root-associated organisms of the Cypripedioideae (Orchidaceae).**

**M. Sc. (Mycology)** 1994, Dept. of Botany (now part of the Dept. Biological Sciences), University of Alberta, Edmonton, Alberta, Canada. Advisor: Dr. R. S. Currah. **Thesis: Interactions between northern terrestrial orchids and fungi in nature.**

**B. Sc. (Ecology (honours))** 1987, Depts. of Botany & Zoology (now the Dept. Biological Sciences), University of Manitoba, Winnipeg, Manitoba, Canada. Dean’s Honour List.

## Additional Courses/Training

**Advanced Plant Breeding PLNT 7170** (not registered but participated in lectures and labs) 2009. Dept. Plant Science, University of Manitoba Winnipeg, MB. Professor: Dr. P. B. E. McVetty.

**Argus software (computerized greenhouse control application)**, Argus, Inc. 2007. Winnipeg, MB.

**Plant Genomics PLNT 4310** (not registered but participated in lectures and labs) 2007. Dept. Plant Science, University of Manitoba, Winnipeg, MB. Professor: Dr. G. Li.

**Photoshop 1** (use of creative image software Photoshop CS2) 2006. Information and Technology Services, University of Manitoba, Winnipeg, MB.

**Digital Photography Workshop** 2005. A 2 day workshop held at the University of Manitoba Delta Marsh Research Station, Delta, MB. X-Lab Interactive. Instructor: A. Morisson

**Pagemaker** (desktop publishing software) 1990. Continuing Education, University of Manitoba, Winnipeg, MB

**Magazine Publishing** 1988. Banff School of Fine Arts, Banff, AB

## Previous Teaching Experience (prior to current position)

### Full Courses (Lectures and Laboratories)

**Urban Agriculture PLNT 1000.** 2013 (winter term). Dept. of Plant Science, University of Manitoba, Winnipeg, MB. Covering a sabbatical leave for the developer of the course (Dr. Anita Brule-Babel). This is the second time this new course has been offered.

**Identifying Insects in your yard and garden AGRC-0163.** 2011-2015, Master Gardener Program. Assiniboine Community College, Brandon, MB. Adapted and illustrated course and lab materials based on existing print materials developed at the University of Saskatchewan.

**Landscape Horticulture PLNT 0790,** 2007 to 2012, Dept. of Plant Science, University of Manitoba, Winnipeg, MB. Restructured lab and lecture course.

**Plant Mutualisms (Co-instructor, Graduate Course).** 2000. Dept. of Botany, University of Guelph, ON. Developed and presented course material.

**Taxonomic Botany BOTA 2380.** 1993. Northern Alberta Institute of Technology (NAIT), Edmonton, AB. Developed course and lab materials, initiated herbarium collection.

### Laboratories Taught (by University and Year)

#### Dept. of Plant Science, University of Manitoba (2001-2002):

Plant Physiology (2 terms)

#### Dept. of Botany, University of Guelph (1997-2000):

Plants and Human Use

Plant Diversity

Plant Anatomy

Plant Biology (2 terms)

Introduction to Mycology

#### Dept. of Botany, University of Alberta (1991-1993):

Wetland Ecology

Plant Biology (5 terms)

Field Botany

Non-vascular Plants

Field Ecology

### Guest Lectures for University Courses

- 2011, 2010 & 2009. **Doubled haploid plant production.** Advanced Plant Breeding PLNT 7170, University of Manitoba, Winnipeg, Manitoba.
2001. **Mycorrhizas.** Plant Physiology PLNT 3500. University of Manitoba, Winnipeg, MB.
- 1996, 1995 & 1993. **Orchid mycorrhizas.** Introduction to the Fungi Bot306. University of Alberta, Edmonton, Alberta.
1994. **Morphological features used in the identification of vascular plants.** Vascular Plant Systematics (Bot 220). University of Alberta, Edmonton, Alberta.
1994. **The use of pollen morphology in the classification of flowering plants.** Field Botany (Bot304). University of Alberta, Edmonton, Alberta.

### Publications

#### Book Chapters

- M. Tahir, C. D. Zelmer and B. P. E. McVetty. 2012. **Oilseed Brassicas.** Chapter in Handbook of Bioenergy Crop Plants. C. Kole, C. P. Joshi, and D. R. Shonnard, eds. CRC Press. 847 pp.
- McVetty, P. B. E., W. G. D. Fernando, G. Li, M. Tahir and C. D. Zelmer. 2009. **High erucic acid, low glucosinolate rapeseed (HEAR) cultivar development in Canada.** Chapter in Biocatalysis and agricultural biotechnology, eds. Hou, C. T. and J-F. Shaw. Taylor and Francis, Boca Raton, FL USA.
- Zelmer, C. D. and P. B. E. McVetty 2009. **Industrial Products.** Chapter 17 in Rapeseed Breeding, ed. S. K Gupta. Taylor and Francis Boca Raton FL USA.
- McVetty, P. B. E. and C. D. Zelmer. 2007. **Breeding herbicide tolerant oilseed rape cultivars** pp. 233-270 in Gupta, S. K. (ed.) Advances in Botanical Research, V. 45. Rapeseed Breeding, Academic Press, Elsevier, 584 pp.
- Currah, R. S., C. D. Zelmer, S. Hambleton and K. A. Richardson. 1998. **Fungi from orchid mycorrhizas.** pp. 117-170 in J. Arditti and A. Pridgeon (Eds.) Orchid biology, reviews and perspectives, Vol. 7. Kluwer Academic Publishers, Lancaster.

#### Journal Articles/Proceedings

- Behla, Ravneet, Arvind Hirani, Carla D. Zelmer, Fengqun Yu, W. G. Dilantha Fernando, Peter B. E. McVetty, Genyi Li. **Identification of common QTL for resistance to Sclerotinia sclerotiorum in three doubled haploid populations of Brassica napus (L.).** Submitted to Euphytica Sept. 2015.
- Hirani, Arvind, Jianfeng Geng, Jiefu Zheng Carla Zelmer, Peter McVetty, Fouad Daayf and Genyi Li. 2015. **QTL mapping and candidate gene identification for seed glucosinolates in Brassica rapa.** Crop Sci. doi: 10.2135/cropsci2014.12.0837
- Hirani, Arvind H., Carla D. Zelmer, Peter B.E. McVetty, Fouad Daayf, Genyi Li. 2012. **Homoeologous GSL-ELONG gene replacement for manipulation of aliphatic glucosinolates in Brassica rapa L. by marker assisted selection.** Front. Plant Sci. Vol 4:55

- McVetty, P. B. E., Duncan, R. W., Fernando, W. G. D., Li, G. and Zelmer, C. D. 2012. **Red River 1861 Roundup Ready™ high erucic acid, low glucosinolate summer rape**. Can. J. Plant Sci. 92: 1407-1409.
- Arvind H. Hirani, Genyi Li, Carla D. Zelmer, Peter B.E. McVetty, M. Asif and Aakash Goyal 2012. **Molecular Genetics of Glucosinolate Biosynthesis in Brassicas: Genetic Manipulation and Application Aspects**, Crop Plant, Aakash Goyal (Ed.), ISBN: 978-953-51-0527-5, InTech, DOI: 10.5772/45646. Available from: <http://www.intechopen.com/books/crop-plant/molecular-genetics-of-glucosinolate-biosynthesis-in-brassicas>
- McVetty, P. B. E., Fernando, W. G. D., Li, G., Tahir, M. and Zelmer, C. D. 2010. **Red River 1997 Roundup Ready™ high erucic acid, low glucosinolate summer rape**. Can. J. Plant Sci. 90: 711-713.
- Entz, M. H., K. R. Penner, J. K. Vessey, C. D. Zelmer and J. R. Thiessen Martens. 2004. **Mycorrhizal colonization of flax under long-term organic and conventional management**. Can. J. Plant Sci. 84:1097-1099.
- Dong, Z., C.D. Zelmer, M.J. Canny, M.E. McCully, B. Luit, B. Pan, R.S. Faustino, G.N. Pierce, and J. K. Vessey. 2002. **Evidence for protection of nitrogenase from O<sub>2</sub> by colony structure in the aerobic diazotroph, *Gluconacetobacter diazotrophicus***. Microbiology 148: 2293-2298. Article featured on issue cover.
- Zelmer, C. D., R. L. Peterson and J. F. Gerrath. 2002. **Unflasking orchids: do sterile plants benefit from inoculation with “helper” organisms?** pp. 252-257 in J. Clark, W. M. Elliott, G. Tingley and J. Biro (Eds.) Proceedings of the 16<sup>th</sup> World Orchid Congress, Vancouver Orchid Society, Vancouver, BC. 504 pp.
- Sen, R., A. Hietala and C. D. Zelmer. 1999. **Common anastomosis and internal transcribed spacer RFLP groupings in binucleate *Rhizoctonia* isolates representing root endophytes of *Pinus sylvestris*, *Ceratorhiza* spp. from orchid mycorrhizas and a phytopathogenic anastomosis group**. New Phytologist 144 (2): 331-341.
- Peterson, R. L., Y. Uetake and C. D. Zelmer. 1998. **Fungal symbiosis with orchid protocorms**. Symbiosis 25 (1-3): 29-55.
- Zelmer, C. D. and R. S. Currah. 1997. **Symbiotic germination of *Spiranthes lacera* (Orchidaceae) with a naturally occurring endophyte**. Lindleyana 12(3): 142-148.
- Zelmer, C. D., L. Cuthbertson and R. S. Currah. 1996. **Fungi associated with terrestrial orchid mycorrhizas, seeds and protocorms**. Mycoscience 37(4): 439-448.
- Zelmer, C. D. and R. S. Currah. 1995. ***Ceratorhiza pernacatena* and *Epulorhiza calendulina* spp. nov.: Mycorrhizal fungi of terrestrial orchids**. Can. J. Bot. 73: 1981-1985.
- Zelmer, C. D. and R. S. Currah. 1995. **Evidence for a fungal liaison between *Corallorhiza trifida* (Orchidaceae) and *Pinus contorta* (Pinaceae)**. Can. J. Bot. 73: 862-866.
- Currah, R. S. and C. Zelmer. 1992. **A key and notes for the genera of fungi mycorrhizal with orchids and a new species in the genus *Epulorhiza***. Reports of the Tottori Mycological Institute 30: 43-59.



## Presentations

### Invited Conference Papers

- Zelmer, C. D. 2005. **Symbiosis and orchid mycorrhizal associations**. Native Orchid Conference, Inc., Winnipeg, Manitoba, July 11-13, 2005.
- Zelmer, C. D. 2002. **Orchid mycorrhizas – learning from the exceptions**. Joint meeting Botany 2002 / Canadian Botanical Association, Madison Wisconsin, Aug. 4-7, 2002.
- Zelmer, C. D., R. L. Peterson and J. F. Gerath. 1999. **Unflasking orchids: do sterile plants benefit from inoculation with ‘helper’ organisms?** Canadian Orchid Congress sponsored lecture for the World Orchid Congress, Vancouver, British Columbia, April 30, 1999.
- Zelmer, C. D., S. Hambleton and R. S. Currah. 1996. **Getting to the root of the matter: mycoheterotrophy in the Orchidaceae and Ericaceae from a fungal perspective**. 1<sup>st</sup> International Conference on Mycorrhizae (ICOM 1), University of California at Berkeley, Aug. 4-9, 1996.
- Zelmer, C.D. 1996. **Orchids of Alberta**. Alberta Native Plant Council Workshop, University of Calgary, AB.

### Contributed Papers/Posters

- McVetty, P. B. E., D. Fernando, G. Li, M. Tahir, and C. Zelmer. 2007. **High erucic acid rapeseed (HEAR) development in Canada**. 3<sup>rd</sup> International Symposium on Brassica Biotechnology, Nov. 2007, Taiwan.
- Zelmer, C. D. 2006. **Plants from pollen grains**. Advanced Plant Science Seminar Series, University of Manitoba. Winnipeg, MB.
- Zelmer, C. D., A. Sass and J. K. Vessey. 2004. **Evidence for biological nitrogen fixation associated with native prairie grasses in Manitoba**. Canadian Botanical Association Conference. University of Manitoba, Winnipeg, MB. June 2004.
- Zelmer, C. D. 2004. **The effect of inoculation with root-associated microorganisms on phosphorous uptake and growth of sterile-raised *Cypripedium reginae* (Orchidaceae) seedlings**. International Orchid Conservation Congress, Selby Botanical Gardens, Sarasota, FL, USA.
- Vessey, J. K., K. Parveen, C. D. Zelmer and L. Gracia-Hernandez. 2003. **Design and management of the O<sub>2</sub> environment in the N-fixing endophyte of sugarcane, *Gluconacetobacter diazotrophicus***. 4<sup>th</sup> International Symbiosis Society Congress, Halifax, Nova Scotia, Aug 17-23, 2003.
- Melville, L., C. D. Zelmer and R. L. Peterson. 2001. **Mycorrhizas of the ladyslipper orchids (*Cypripedium*, Orchidaceae)**. 3<sup>rd</sup> International Conference on Mycorrhizae (ICOM 3). Adelaide, Australia, July 8-13, 2001.
- Zelmer, C. D. and R. L. Peterson. 2001. **Root associated organisms of *Paphiopedilum* and *Phragmipedium* (Cypripedium, Orchidaceae): The velaminous root as a habitat**. Canadian Botanical Association Conference, Kelowna, British Columbia, June, 2001.



- Sen, R., A. Hietala and C. Zelmer. 1998. **Growth promoting *Rhizoctonia* root endophytes of scots pine and their affinity to isolates of *Ceratorhiza goodyerae-repentis* from the mycorrhizas of orchids.** 2<sup>nd</sup> International Conference on Mycorrhizae (ICOM 2). Uppsala, Sweden, July 5-10, 1998.
- Zelmer, C.D. and R. S. Currah. 1995. **Assessing biodiversity of ectomycorrhizal fungi in a boreal mixedwood forest.** Sustainable Forests: global challenges and local solutions. Saskatoon, SK.
- Zelmer, C. D., G. Kernaghan and R. S. Currah. 1994. **The tripartite mycorrhizal system of *Corallorhiza trifida* (Orchidaceae).** 5<sup>th</sup> International Mycological Congress, University of British Columbia, Vancouver, BC.
- Zelmer, C. D. and R. S. Currah. 1994. **A mycorrhizal link between *Corallorhiza trifida* (Orchidaceae) and *Pinus contorta* (Pinaceae).** Canadian Botanical Association, University of Calgary, AB.
- Zelmer, C. D. and R. S. Currah. 1993. **Preliminary observations on the interactions of terrestrial orchid seeds and fungi in nature.** 9<sup>th</sup> North American Conference on Mycorrhizae, University of Guelph, Guelph, ON.

### Interpretive Publications

- Zelmer, C. D. 2013. **Sprekelia – a story of love and loss.** pp. 24-25, in The Prairie Garden 2013, 74<sup>th</sup> Edition.
- Zelmer, C. D. 2011. **Its OK to be a lazy gardener.** pp. , in The Prairie Garden 2011, 72<sup>nd</sup> Edition.
- Zelmer, C. D. 2010. **The miracle and suspense of seeds.** pp. 5-10, in The Prairie Garden 2010, 71<sup>th</sup> Edition.
- Zelmer, C. D. 2007. **Element(s) of surprise: mushrooms** pp. 119-124, photos pp. 100-101 in The Prairie Garden 2007, 68<sup>th</sup> Edition.
- Zelmer, C. D. and A. Sass. 2003. **On the trail of wheat that provides its own nitrogen fertilizer.** Farmer's Independent Weekly 3(12): 25.
- Zelmer, C. D. 1996. **Alberta's native orchids: plants with a taste for fungi.** The Alberta Naturalist 24: 21-23.

### Photography Published

- Peterson, R. L., H. B. Massicotte, L. Melville and F. Phillips. 2006. Several images in **Mycorrhizas: anatomy and cell biology images.** NRC Research Press.
- Peterson, R. L., H. B. Massicotte and L. Melville. 2004. Several images in **Mycorrhizas: anatomy and cell biology.** CD format. NRC Research Press.
- Prairie Fire, A Canadian Magazine of New Writing. 1991. Vol. 12, No. 1. Front and back covers.

### Article about my Research

- Vowles, A. 1999. Orchid studies aim to prevent poaching in the wild. @Guelph. University of Guelph, Guelph, ON.

## Research/Work Experience

**In addition to the Post-Doctoral and Research Associate experience outlined under education, I have also held the following positions:**

**Natural History Consultant**, October 2009. The Boreality Project, an interdisciplinary arts project of Prairie Fire Press, Inc., Winnipeg, MB.

**Nursery Worker**, (part time) 1999-2000. Maintenance and sales of trees, shrubs and perennials for a large commercial nursery. Hortico, Inc. Waterdown, ON.

**Botanist**, (contract) 1999-2000. Capture of historic herbarium data from the University of Guelph Herbarium for the Waterloo Regional Ecological Database (WRED). Regional Municipality of Waterloo, Kitchener, ON.

**Mycologist**, (consultant) 1998-2000. Identification of fungi in environmental samples for an air quality consulting company. Integrated Explorations (Al Melkic), Guelph, ON.

**Mycologist**, 1994-1996. Isolation and identification of fungi associated with conifer wood decay. Canadian Forest Service, Northern Forestry Centre, Edmonton, AB.

**Mycorrhizal Researcher**, 1994-1996. University of Alberta, Edmonton, AB. Project: Ectomycorrhizal fungi diversity in boreal mixed wood stands of Prince Albert Model Forest and region, Prince Albert, SK.

**Co-owner**, Wolfwillow Native Plant Nursery. 1992-1994. Edmonton, Alberta.

**Research Assistant**, 1991. Tall Grass Prairie Conservation Project, Dept. of Natural Resources, Winnipeg, MB.

**Biological Technician**, 1990. Prairie Habitats Native Plant Nursery Inc., Argyle, MB.

**Research Assistant**, 1989. Marsh Ecology Research Project, Delta Waterfowl and Wetlands Research Station, Portage la Prairie, MB.

**Operations Manager**, 1987-1989 and **Computer Consultant** 1990. Prairie Fire Press, Inc., Winnipeg, MB.

**Research Assistant**, Work Study Program, 1986. Dept. of Botany, University of Manitoba, Winnipeg, MB. Advisor: Dr. Gordon Robinson.

**Research Assistant**, Work Study Program, 1985. Dept. of Zoology, University of Manitoba, Winnipeg, MB. Advisor: Dr. H. E. Welch.

## Fellowships Grants and awards

2001-2003 **NSERC Post-doctoral Fellowship**, University of Manitoba, Winnipeg, MB.

1999-2000 **Ontario Government Science and Technology Award**, University of Guelph, ON.

1999 & 1998 **Advancement Fund Travel Award**, College of Biological Sciences Guelph, University of Guelph, ON.

1997-1998 **University of Guelph Graduate Scholarship**, Guelph, ON.

1997-1998 **NSERC PGS B Graduate Scholarship**, University of Guelph, ON.

1997 **R. Larry Peterson Award**, University of Guelph Guelph, ON.

1993 **John and Patricia Schlosser Environmental Award**, University of Alberta, Edmonton, AB.

1992 **Canadian Circumpolar Institute Boreal Alberta Research (BAR) Grant**, University of Alberta, Edmonton, AB.

1992 **Endangered Species Recovery Fund (World Wildlife Fund) Research Grant**, University of Alberta, Edmonton, AB.

### Conference Involvement

**Judge** for oral presentations at the 22nd Annual Plant Sciences Graduate Student Symposium, University of Manitoba, Winnipeg, MB. 2006

**Graduate representative** for Microscopical Society of Canada Conference ‘ Eye on Imaging’, University of Guelph, Guelph, ON. 1999.

**Session Co-Chair**, 33<sup>rd</sup> Plant Development Workshop, University of Guelph, Guelph, ON 1999.

### Volunteer Work

2011-present **The Prairie Garden** editorial committee member

2007- 2009 **Carnivorous Plant Collection**, Assiniboine Park Conservatory, Winnipeg, MB (donated a large collection of photographic images of carnivorous plants).

2005- 2009 **Co-organizer and judge** of the East Kildonan Garden Club Photography Contest, Winnipeg, MB.

1997-1999 **Newsletter Co-editor**, Canadian Wildflower Society, Waterloo-Wellington (Dogtooth) Chapter, Guelph, ON.

1998 **Dog-walker** for the Guelph Humane Society, Guelph, ON.

### Hobbies/Interests

Photography, including photomicrography, gardening, landscaping, horticulture, native plants, seed collecting, outdoor activities (hiking, cycling, snowshoeing), food security, public outreach, aquarium fish breeding, entomology (esp. moth and butterfly culture), music.

### Affiliations/Memberships

International Carnivorous Plant Society, member

Wilderness Committee, member

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