

Curriculum Vitae



David G. Barber. *Ph.D. CRC, D.P.*

Work history

Canada Research Chair Tier I: Full Time (2008 -2015)
Arctic System Science.

Associate Dean (Research): Full Time (2004 - present)
Faculty of Environment

Canada Research Chair Tier II: Full Time (2002 -2008)
Arctic System Science.

Director, Centre for Earth Observation Science (CEOS): (1993 – 2013)
Faculty of Environment, University of Manitoba, MB.

Full Professor: Full Time (1999 - present)
University of Manitoba, Winnipeg, MB.

Associate Professor: Full Time (1995 - 1999)
University of Manitoba, Winnipeg, MB.

Assistant Professor: Full Time (1993 - 1995)
University of Manitoba, Winnipeg, MB.

Research Manager, Global Change Program: Full Time (1992 - 1993)
Earth Observations Lab, Department of Geography, University of Waterloo, ON

Research Scientist, Marine Cryosphere Project: Full Time (1988 - 1992)
Earth Observations Lab, Department of Geography, University of Waterloo, ON

Contract Scientist, GIS and Remote Sensing Specialist: Part Time (1986 - 1989)
Clients: Ice Centre, Environment Canada; Manitoba Natural Resources Department;
Manitoba Hydro; Fisheries and Oceans Canada, Winnipeg; Inland Waters Directorate,
Environment Canada, Winnipeg, MB

Contract Scientist, Arctic Fisheries and Marine Mammals: Part Time (1984 - 1986)
Fisheries and Oceans Canada, Winnipeg, MB.

Research Technician, Arctic Fisheries Management: Full Time (1981 - 1984)
Fisheries and Oceans Canada, Winnipeg, MB.

Education History

Doctorate (1988 - 1992)

Faculty of Environmental Studies,
Department of Geography, University of Waterloo, Ont.
Dissertation Title: "Assessment of the Interaction of Solar Radiation (0.3 to 3.0 μm)
with a Seasonally Dynamic Sea Ice Volume, from Microwave (2.0
to 5.0 cm) Scattering".
Supervisor: Dr. E.F. LeDrew

Masters (1985 - 1988)

Natural Resources Institute, University of Manitoba, Winnipeg, MB
Major: Wildlife Habitat
Minor: Statistical Ecology
Thesis Title: "Narwhal (*Monodon monoceros*) at Sea Surface Temperature Fronts
in the Eastern Canadian Arctic: An indication of preferred habitat?".
Supervisor: Dr. M. Kingsley

Bachelors (1978 - 1982)

Faculty of Physical Education and Recreation Studies,
University of Manitoba, Winnipeg, MB
Major: Human Physiology
Minor: Biology

Graduate Student Supervision

I have supervised to completion: 6 honours theses; 20 MSc theses; 18 PhD dissertations and 16 postdoctoral fellows/Research Associates. Twenty of my previous students have University positions and 30 work in research, consulting or government. I currently supervise 11 MSc students; 7 PhD students, 15 Post Doctoral Fellows / Research Associates, making a research group of 33; one of the largest sea ice focused research groups in the world.

| Name | Years Supervised | Degree (date) | Research Title (<i>current status</i>) |
|-------------------|-------------------------|----------------------|---------------------------------------------------------|
| Current | | | |
| Rong, M. | 2014-2018 | PhD (2018) | Modelling sea ice |
| Jafarikhasragh, S | 2014-2018 | PhD (2018) | Energy and gas exchanges over snow covered sea ice |
| Kaur, S. | 2013-2017 | PhD (2017) | Climate forcing of hemispheric sea ice motion |
| Firoozy, N. | 2013-2017 | PhD (2017) | Integration of C and L band SAR scattering from sea ice |
| Landy, J. | 2011-2015 | PhD (2015) | LiDAR investigations of sea ice morphology |
| Komarov, A. | 2010-2014 | PhD (2014) | Dynamical properties of sea ice |

| | | | |
|------------------|-----------|----------------------|---------------------------------------------------------------------------------------------------------|
| Gupta, M. | 2007-2014 | PhD (2014) | Atmospheric forcing of ocean surface roughness in the marginal ice zone. |
| Leonard, D. | 2014-2016 | MSc (2016) | Bowhead whale habitats |
| Tyler Tiedet | 2014-2016 | MSc (2016) | Innovative in situ RF surface contact sensors |
| Eastwood, A. | 2014-2016 | MSc (2016) | Freshwater-marine coupling |
| Kenyon, K. | 2014-2016 | MSc (2016) | Arctic marine mammal habitats |
| Shimnowski, O | 2013-2016 | MSc (2016) | Arctic marine transportation |
| Hornby, C | 2013-2015 | MSc (2015) | Beluga habitat preference |
| Stark, H. | 2012-2014 | MSc (2014) | Sea ice ablation processes in the North Water Polynya |
| Shields, M. | 2012-2014 | MSc (2014) | Microwave scattering from rough ice |
| Stammers, C. | 2011-2014 | MSc (2014) | Energy balance of the marginal ice zone |
| Babb, D | 2010-2014 | MSc (2014) | Sea Ice motion studies |
| Gunn, G. | 2009-2014 | MSc (2014) | Optical remote sensing of case 2 waters |
| Hu, Y. | 2014- | Post Doc | Biogeochemistry of sea ice. |
| Asselin, N | 2013- | Research Associate | Arctic Marine Mammal Habitats |
| Warner, K. | 2012- | Research Associate | Microwave remote sensing of sea ice |
| Ogi, M. | 2013- | Research Associate | Climate forcing of northern hemisphere sea ice dynamics |
| Pučko, M. | 2011- | Research Associate | Contaminants in sea ice |
| Horton, B. | 2011- | Research Associate | Arctic-Temperate climate teleconnections |
| Candlish, L. | 2011- | Research Associate | Arctic Meteorology |
| Stainton, E | 2009- | Research Associate | Freshwater marine coupling |
| Barber, L. | 2009- | Research Associate | Environmental Education and Arctic System Science |
| Raddatz, R. | 2008- | Research Associate | Boundary layer meteorology over sea ice |
| McCullough, G | 2006- | Research Associate | Estuary Optics and sediment fluxes |
| Lukovich, J. | 2003- | Research Associate | Atmospheric Forcing of Sea Ice |
| Dmitrenko, I | 2012- | Research Associate | Arctic Oceanography |
| Liu, Z. | 2012- | Research Associate | Ocean-Ice-Atmosphere coupled models |
| Chan, W. | 2005- | Research Associate | Numerical analysis of sea ice processes |
| <hr/> | | | |
| Completed | | | |
| Asplin, M. | 2007-2013 | PhD (2013) completed | Cyclone forcing of sea ice in the marginal ice zone (<i>Research Scientist, Arctic Sciences Ltd.</i>) |

| | | | |
|----------------|------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Isleifson, D | 2005-2011 | PhD (2011) completed | <i>British Columbia</i> Seasonal evolution of active microwave scattering over first-year sea ice. (<i>Research Scientist, Magellan Aerospace</i>) |
| Pucko, M. | 2007-2011 | PhD (2011) complete | Sea ice and contaminants (<i>Research Associate, University of Manitoba</i>) |
| Li, T. | 2008-2011 | PhD (2011) completed | Radiative Transfer in Sea Ice. Ocean University of China (<i>Assistant Professor, Key lab for polar oceanography and climate change, Qingdao, China</i>) |
| Iacozza, J | 2003-2010 | PhD (2010) (complete) | Sea ice as polar bear habitat (<i>Lecturer II, U of Manitoba, Winnipeg, Canada</i>) |
| Scharian, R. | 2005-2009 | PhD (2010) (complete) | Microwave Scattering of Melt Ponds (<i>Post doc, University of Manitoba, Winnipeg, Canada</i>) |
| Galley, R. | 2002-20010 | PhD (2009) (complete) | Dynamic vs. thermodynamic processes in sea ice (<i>Research Assoc., U of Manitoba, Winnipeg, Canada</i>) |
| Ehn, J. | 2003-2008 | PhD (2008) (complete) | Bio-optical modelling in marginal ice zones. (<i>Assistant Professor, U of Manitoba</i>) |
| Langlois, A. | 2003-2007 | PhD (2007) (complete) | Snow on sea ice; dynamic and thermodynamic processes. (<i>Assistant Professor, U of Sherbrooke, Canada</i>) |
| Hwang, B.J. | 2002-2007 | PhD (2007) (complete) | Remote sensing of the thermodynamic processes of snow on sea ice. (<i>Research Scientist, Scottish Association of Marine Science, Oban, Scotland</i>) |
| Mundy, C.J. | 2001-2007 | PhD (2007) (complete) | Sub-ice primary production; radiative exchange and microwave scattering over snow covered sea ice. (<i>Assistant Professor, U of Manitoba</i>) |
| April, A. | 2001-2006 | PhD (2006) (complete) | Ocean heat flux modelling in the NOW polynya (U of Quebec) (<i>Research Scientist, Canadian Ice Service, Ottawa, Canada</i>) |
| McCullough, G. | 1998-2005 | PhD (2005) (complete) | Estimating suspended sediment concentrations using optical scattering and transmission. (<i>Post doc, Manitoba Hydro, Winnipeg, Canada</i>) |
| Cooley, P. | 1997-2003 | PhD (2004) (complete) | Development of a GIS based biodiversity atlas for Lake Malawi, Africa. (<i>Research Scientist, North-South Consulting, Winnipeg, Canada</i>) |
| Hochheim, K. | 1995-2003 | PhD (2003) (complete) | Microwave and optical remote sensing of agricultural surfaces (<i>deceased</i>) |
| Mkanda, F. | 1997-2001 | PhD (2001) (complete) | Soil erosion modelling within a geographical information system (<i>World Bank, Africa</i>) |
| Yackel, J. | 1995-2001 | PhD (2001) (complete) | Estimation of icebreaker navigability based on the time series microwave scattering coefficient (σ°). (<i>Full professor, Geography, U of Calgary, Calgary, Canada</i>) |
| Hanesiak, J | 1996-2001 | PhD (2001) | Integration of remote sensing data within |

| | | | |
|------------------|------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | (complete) | numerical models of ocean-sea ice-atmosphere processes. (<i>Full professor, Geography, U of Manitoba, Winnipeg, Canada</i>) |
| Pind, M. | 2011-2013 | MSc (2013) complete | Arctic ocean surface CO ₂ fluxes |
| Warner, K. | 2009-2012 | MSc. (2011) complete | Microwave remote sensing of multiyear sea ice (<i>Research Associate, U of Manitoba</i>) |
| Campbell, K. | 2010-2012 | MSc (2012) complete | Radiative transfer in sea ice (<i>PhD student, University of Manitoba.</i>) |
| Rosnagel, A. | 2006-2010 | MSc (2011) complete | Physical processes in the MIZ (<i>Manager, Dillon Consulting, Winnipeg, MB</i>) |
| Candlish, L. | 2008-2010 | MSc. (2011) (complete) | Remote Sensing of Arctic Clouds (<i>Research Associate, CEOS, U of Manitoba</i>) |
| Asselin, N. | 2007-2011 | MSc (2011) (complete) | Beluga use of the circumpolar flaw lead (<i>Biologist, Parks Canada, Churchill, MB</i>) |
| Larter, J. | 2006-20010 | MSc (2010) (complete) | Peat islands in the Nelson River system. (<i>Consultant, North-South consulting, Winnipeg, MB</i>) |
| Stainton, E. | 2006-2009 | MSc (2009) (complete) | Cold region estuary gas exchange (<i>Manager, field programs, CEOS, U of Manitoba</i>) |
| Blouw, C. | 2004-2007 | MSc. (2007) (complete) | Snow catchment, sea ice roughness and higher trophic habitats (<i>Veterinarian, Winnipeg, MB</i>) |
| Tranchenberg, M. | 2005-2008 | MSc (2007) (complete) | Ground penetrating radar studies of Sea Ice (<i>Consulting Engineer, Winnipeg, MB, Canada</i>) |
| Kirk, R. | 2001-2003 | MSc. (2004) (complete) | Melt ponds on sea ice (<i>Consultant, Calgary, Calgary, Canada</i>) |
| Harouche, I | 1999-2001 | MSc (complete) | Microwave emission over snow covered sea ice (<i>current position unavailable</i>) |
| Mundy, C.J. | 1997-1999 | MSc (complete) | Sea Ice fluxes and the North Water Polynya (<i>Assistant Professor, U of Manitoba, Winnipeg, Canada</i>) |
| Wilson, K. | 1998-2000 | MSc. (complete) | Ice motion dynamics in the 1998 NOW polynya season. Co-supervised with D. King at Carleton University. (<i>Canadian Ice Service, Ottawa, Canada</i>) |
| Pegado, A | 1998-2000 | MSc (complete) | Cloud cover over the Lake Malawi Watershed. (<i>Research Scientist, Mozambique, Africa</i>) |
| Nichols, T. | 1994-1997 | MSc (complete) | Development of a ringed seal habitat suitability index based on synthetic aperture radar images of sea ice. (<i>DFO research associate, Calgary, Canada</i>) |
| McCullough, G. | 1996-1998 | MSc (complete) | Estimating suspended sediment concentrations using optical scattering and transmission. (<i>Research Scientist, U of Manitoba, Winnipeg, Canada</i>) |
| Thomas, A. | 1993-1996 | MSc (complete) | Estimation of climatological albedo over snow covered sea ice based on the time series evolution of the microwave scattering |

| | | | |
|-----------------|-----------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | coefficient (σ°). (<i>GIS consultant, Edmonton, Canada.</i>) |
| Iacoza, J. | 1994-1997 | MSc (complete) | Estimation of snow catchment hydrology for snow on sea ice based on Variogram modelling. (<i>Lecturer II, U of Manitoba, Winnipeg, Canada</i>) |
| Drobot, S. | 1995-1997 | MSc (complete) | Development of a snow water equivalence algorithm for snow covered sea ice based on SSM/I data. (<i>Associate Professor, University of Colorado, USA</i>) |
| Drobot, S. | 1994-95 | Honours (complete) | Processes of snow grain metamorphism. (<i>Associate Professor, University of Colorado, USA</i>) |
| Kula, R. | 1995-96 | Honours (complete) | Fisheries habitat remote sensing in Malawi Africa (<i>Habitat for Humanity, Canada</i>) |
| Banais, O. | 1997-98 | Honours (complete) | Statistical Characterization of melt ponds on sea ice (<i>Manager, Fisheries and Oceans Canada</i>) |
| Scharien, R. | 2000 | Honours (complete) | Comparison of SSM/I and Radarsat-1 derived ice concentration in the NOW polynya. |
| Hay, J. | 2001-2002 | Honours (complete) | Melt ponds on sea ice (<i>current position unavailable</i>) |
| Cole Moszynski | 2009-2010 | Honours (complete) | Sea Ice physical-biological coupling (<i>Scientist, Environmental Consulting, Ottawa, Ontario</i>) |
| Scharian, R. | 2010-2014 | Post Doc (complete) | Microwave scattering of melt ponds |
| Isleifson, D | 2011-2013 | Post Doc (complete) | Microwave scattering over sea ice. |
| Wang, R. | 2010-2012 | Post Doc (complete) | Sea Ice modelling (<i>Sea Ice Scientist, Ausenco Ltd., Environmental Engineers, Calgary AB</i>) |
| Chung, Y.C. | 2010-2011 | Post Doc (complete) | Snow on sea ice (<i>Scientist, Environmental Consulting, Calgary, AB</i>) |
| McCullough, G | 2007-2009 | Post Doc (complete) | Freshwater-marine coupling (<i>Research Scientist, CEOS, U of Manitoba</i>) |
| Granskog, M. | 2005-2007 | Post Doc (complete) | Sea Ice Geophysics (<i>Research Scientist, Norwegian Polar Institute, Tromso, Norway</i>) |
| Walker, R | 2006-2007 | Post Doc (complete) | Sea Ice modelling (<i>Research Scientist, New York State University, USA</i>) |
| Woo, W. | 2005-2006 | Post Doc (complete) | Hudson Bay Sea Ice. (<i>Biologist, Parks Canada, Wapusk National Park</i>) |
| Walker, D. | 2002-2004 | Post doc (complete) | Forest ecosystem modelling (<i>Assistant Professor, Environment and Geography, University of Manitoba</i>) |
| Fortier, M. | 2001-2003 | Post Doc (complete) | Physical-biological coupling of the snow/sea ice system (<i>ArcticNet Executive Director, U Laval, Quebec, Canada</i>) |
| Papakyriakou, T | 1998 | Post doc (complete) | Examination of the surface energy balance of the NOW polynya (<i>Full Prof, U of Manitoba, Winnipeg, Canada</i>) |

| | | | |
|---------------|-----------|--------------------|-------------------------------------------------------------------------------|
| Hare, A. | 2011- | Research Associate | Brine processes and contaminants in sea ice |
| Leitch, D. | 2006-2011 | Research Associate | Environmental Engineering (<i>manager, KGS group, consulting engineers</i>) |
| Galley, R | 2009-2012 | Research Associate | Dynamic and thermodynamic processes in sea ice |
| Hochheim, K | 2006-2013 | Research Associate | Marginal Ice Zones |
| Isleifson, D. | 2011-2013 | Research Associate | Microwave scattering models of sea ice |

Publication Record

1) Significant Research Contributions

My research team has made significant and groundbreaking contributions in the field of sea ice and climate change. I summarize these accomplishments into five areas: a) macroscale process studies, b) microscale process studies; c) technological innovation, d) physical-biological-geochemical coupling, and e) team building/outreach. My group's literature is denoted as [#].

a) *Macroscale processes*: My group has shown a widespread reduction of sea ice in the Southern Beaufort Sea and Amundsen Gulf [117,126,153]. My team recently discovered a significant change in the operation of the Beaufort Sea Ice Gyre. Previous research assumed that the sea ice gyre reversed in the summer due to development of a low-pressure system over the Southern Beaufort Sea (SBS). We found that the gyre has begun to reverse more often throughout the annual cycle with significantly more reversals occurring in the decades of 1990s and 2000s relative to the 70s and 80s [67,112]. The reversal of the gyre is linked with troposphere to stratosphere coupling [89,108] and increases the overall reduction of the summer sea ice minimum of sea ice in the Pacific sector of the Arctic [112,126,155]. We showed that this reduction was due to increasing cyclone periodicity in the SBS region and a positive ice albedo feedback in the fall [112]. We also discovered that the atmosphere can trigger upwelling at the shelf-slope break enhancing the flaw lead formation in this area [99,155]. Very recently this work led to the discovery that, rather counter intuitively, there is now an increase in sea ice hazards in the Southern Beaufort Sea due to the fact that the ice is much more mobile [165,186]. The ice hazards include very thick first-year ridges and rubble zones, unusually thick multiyear sea ice and the increased occurrence of marine glacial ice (tabular icebergs and ice islands). This discovery is a key threat to the current development of oil and gas resources in the Southern Beaufort Sea. It forms the basis of ongoing work done in collaboration with Imperial Oil, Exxon, and BP. Similar macroscale process studies in Hudson Bay have shown that the shipping season to the Port of Churchill is on average 4 weeks longer [121], that this change in sea ice condition occurs mostly in the fall [181] and that teleconnections to the Northern Annular Mode (NAM) explain a significant amount of variance in the Hudson Bay ice climatology [127]. Despite a longer ice-free season, operators are unable to extend their operations due to the regulations of the Arctic Shipping Pollution Prevention Act. Operators in the region are strongly interested in generating new knowledge to support improved seasonal forecasting and a more adaptive regulatory system. Our studies of freshwater marine coupling have shown that hydroelectric regulation can play an important role in the distribution of freshwater around Hudson Bay [87,114] and that

estuaries play an important role in fluxes of organic and inorganic nutrients to the marine system [134,157]. Recent work has shown that at the hemispheric scale open water fraction has increased in both the Pacific and Atlantic sectors of the Arctic Ocean, commensurate with increased irradiance to the ocean surface mixed layer [R5]. Processes driving this reduction show the Pacific sector is affected by a strong atmospheric heat flux from summer to fall and the Atlantic sector by a strong ocean to ice heat flux in winter [R5].

b) *Microscale Processes*: My team has been particularly interested in the seasonal evolution of the snow/sea ice system because of the impact these surface types have on sea ice thermodynamic, dynamic, radiative exchange, and biogeochemical transfer processes. My group was one of the first to quantify snow grain metamorphism over first-year sea ice [20] and to provide observed rates and magnitudes of grain size distributions in all four dimensions (x, y, z and t) [65] over a complete annual cycle. Geostatistical modeling has clarified the aeolian transport mechanisms [120] of snow on sea ice under various climate forcings [100]. Recent work with a terrestrial LiDAR has shows that the snow distribution predicts the melt pond distribution on sea ice [191]. Results from microscale processes show the importance of brine distribution within the sea ice and the role of frost flowers, bubble inclusions, and brine skim on both thermodynamic and radiative transfer processes [162,180]. Frost flowers have increased in both spatial and temporal extent as the Arctic multiyear sea ice is replaced with first-year sea ice [180]. This young ice form is very high in brine and thus plays a very important role in chemical and energy exchange across the ocean-sea ice-atmosphere (OSA) interface. As part of our Canada Excellence Research Chair (CERC) program we have been investigating the role of this ice form in cycling of carbon through the OSA [161,169]. We have shown that sea ice does not form an impermeable barrier (as previously thought), but rather is involved in pumping CO₂ across the OSA through the role that lkaite has on the carbon chemistry system [162,171]. These processes are an ongoing interest of my group as they have significant implications on the overall chemical exchange across the OSA, with similar physical processes affecting bromine [151] and mercury [132] exchange. My team also examines microscale processes controlling energy exchange across the OSA interface. We have discovered that the increased presence of open water has a significant influence on the development of the planetary boundary layer [166,167] and results in baroclinic instabilities in the boundary layer even in winter [153,154]. Moisture fluxes play a key role in the development of the boundary layer in winter [174] and storms control much of the exchanges in both mass and energy exchange at the microscale [187] and through feedbacks to the sea ice growth, decay and distribution [158].

c) *Technological Innovations*: My group has been one of the few units internationally to integrate both forward and inverse active microwave scattering models of snow-covered sea ice [125,149,180,185]. The work is both innovative (providing quantitative information of microwave interaction theory) and practical (providing better tools for remote sensing of both the geophysical and thermodynamic state of seasonally variable snow-covered sea ice). My group was the first to discover the brine-temperature-dielectric relationship on snow covered first-year sea ice [65]. The quantification of this relationship opened an entirely new avenue of microwave remote sensing research. The theoretical underpinning of this relationship allows estimation of the thermodynamic state of the snow-sea ice system using microwave emission/scattering [93,94]. This is a significant improvement over traditional microwave remote sensing, as previous research was only able to infer geophysical characteristics of the surface (e.g., ice type/concentration). Based on this discovery we are now able to infer various thermodynamically-related states such as presence of melt [129], rate of melt [142],

percent cover of melt ponds [129], inference of the surface climatological albedo [80], melt flux to the ocean surface mixed layer [83], and surface roughness [164] of the marginal ice zone. My group has explored the rapidly expanding ramifications of this innovation. The theory provides a framework for estimating snow water equivalent (SWE) on sea ice from both passive [105] and active [82] microwave remote sensing and detection of frost flowers on sea ice [180]. The theory also provides a means of estimating the strength of sea ice from time series measurements of microwave scattering/emission. Ice strength estimates have been ‘operationalized’ by the Canadian Ice Service (CIS) as a new series of products including estimates of ice breakup and a pilot of breakup forecasting in the Eastern Canadian Arctic. The European Space Agency (ESA) has used this theory (and observations) to create a new tool for scientists and managers in anticipation of future Copernicus SAR constellation missions.

d) *Physical-biological-geochemical coupling*: My team collaborates with a number of biologists and chemists where our expertise focuses on the role of sea ice as a habitat at various trophic levels, or as a conduit for sources and pathways for contaminant exchange across the OSA. We have shown that beluga and bowhead whale habitat is highly reliant on the timing and location of ice edges [136,145]. We have also worked on sea ice as habitat for ringed seals and polar bears [120] — work that was recognized by an invited presentation on polar bear management by the Government of Canada and the Fisheries Joint Management Committee (FJMC). We have also detailed how sea ice dynamical processes and a changing climate affect biological productivity at the regional scale due to upwelling [139,141]. We have shown that snow thermodynamic modeling and electromagnetic (EM) scattering can be combined with optical transmission modeling to make sub-ice primary production estimates [78]. Snow dominates the transmission of light through this system and as such, is critical to overall estimates of sub-ice biomass [85]. We have also recently discovered that the microscale habitat of sea ice algae is created by brine drainage channels at the bottom of the sea ice [188] and that thermodynamic changes to the ice (due to climate forcing) dictates the suitability of microalgae habitat [190]. My team has also done extensive work on sea ice as a medium and pathway for contaminants. Results show that the brine-temperature relationship described above also controls the exchange of various POPS, PAHs and α -hexachlorocyclohexane (α -HCH) pathways across the OSA [160,178]. Similarly, the thermal evolution of the sea ice surface controls the early deposition of mercury onto the ice surface [132] and melt pond enrichment of α -HCH [163].

e) *Team building/outreach*: I established the Centre for Earth Observation Science (CEOS) in 1994. In 2002 I received a CRC Tier 2 and was instructed by our VP (Research) to build a team of scientists focused around my CRC in ‘Arctic System Science’. Over the next 7 years CEOS grew slowly until I was awarded a CRC Tier 1 in 2008. Since then CEOS has experienced a remarkable growth trajectory; evolving from a staff of 1.5 full time equivalent (FTE) and 2 graduate students at its inception in 1994, to 77 FTE staff and 50 graduate students in 2014. CEOS has attracted world-class researchers and HQP including 14 tenure track faculty, 21 research and adjunct faculty, 27 Research Associates (post-PhD), 15 technical and support staff and 50 graduate students; representing one of the largest ‘Arctic System Science’-focused research groups in the world. I have also taken a leadership role in building CEOS as part of a national network of Arctic marine scientists, through NSERC-funded networks such as NOW, CASES, and the ArcticNet Networks of Centres of Excellence (NCE). Due to the high cost of Arctic science and the need for major infrastructure (icebreakers, aircraft, and ice camps) it was also necessary to establish international networks. Significant international collaboration began with my leadership of

the International Polar Year (IPY) project known as the Circumpolar Flaw Lead (CFL) system study (2007-2011). The IPY-CFL project evolved into collaborations with several international Arctic networks including: SEARCH (USA), ARCTOS (Norway), DEFROST (Europe), IAPP (pan-Arctic), and our own Arctic Science partnership (ASP). My team has also demonstrated a strong commitment to community engagement and outreach of science. We have been instrumental in developing the ‘Community Based Monitoring’ and ‘Schools on Board’ programs that are both extension projects of CASES, ArcticNet and CFL. During the CFL project we contributed significantly to the global IPY Education Outreach and Communication (EOC) agenda by integrating Artists on Board, International Schools on Board, and an international media competition with the World Federation on Science Journalists, into an active research agenda. We interact extensively with local, national, and international media (TV, radio and print), with policymakers, Inuit co-management organizations, Senate committee hearings, policy workshops, Canadian Arctic Sovereignty, ADM committees, and industry (oil companies, hydroelectric utilities, mining companies and marine transportation). My team also works extensively with Inuit research collaborators, including publication of a book entitled *Two Ways of Knowing: Merging Science and Traditional Knowledge During the Fourth International Polar Year*.

2) Refereed Publications (Peer reviewed)

Refereed Journal Publications

I have contributed 191 peer-reviewed papers (published and in press) since I began my career in 1992; 110 of these have been published in the past 7 years. My research program is coordinated around three interconnected themes. Those concerned with: 1) the causes of change in both dynamic and thermodynamic processes of sea ice due to climate forcing; 2) the consequences of these changes on biological and geochemical systems; and 3) techniques required to improve our ability to assess both the causes and consequences of these changes (indicated by column T below). I select the top impact journals within each theme for my research output. My students/staff are underlined to highlight my contributions to HQP. My work is also highly cited by other scientists as evidenced by an H-index of 33 and over 3700 citations to date.

| # | T | Title |
|-------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [194] | 1 | Candlish, L.M., J. Iacozza, J.V. Lukovich, B. Horton, and D. G Barber. (2014). Sea Ice Climatology in the Canadian Western Arctic: Thermodynamic versus Dynamic Controls. International Journal of Climatology. In Press. |
| [193] | 1 | Lukovich, J.V., C. Bélanger, D.G. Barber and Y. Gratton (2014). On coherent drift features in the Southern Beaufort Sea. Deep-Sea Research Part 1. In press. |
| [192] | 2 | Else, B.G.T., Papakyriakou, T.N., <u>Raddatz</u> , R., Galley, R.J., Mundy, C.-J., Barber, D.G., Sywstun, K., and S. Rysgaard (2014). Surface energy budget of landfast sea ice during the transitions from winter to snowmelt and melt pond onset: The importance of net long wave radiation and cyclone forcings. Journal of Geophysical Research, In Press. |
| [191] | 2 | <u>Landy</u> , J.C., J. Ehn, M. <u>Shields</u> , and D. G. Barber (2014). Surface and melt pond evolution on landfast first-year sea ice in the Canadian Arctic |

| | | |
|-------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | Archipelago. <i>Journal of Geophysical Research (Oceans)</i> . In Press. |
| [190] | 2 | <u>Campbell</u> , K., C.J. Mundy, D. G. Barber, M. Gosselin (2014). Characterizing the sea ice algae chlorophyll <i>a</i> -snow depth relationship over Arctic spring melt using transmitted irradiance. <i>Journal of Marine Systems</i> . In Press. |
| [189] | 3 | <u>Gupta</u> , M., R. Scharien and D. G. Barber (2014). Passive and active microwave scattering from ocean surface waves in the southern Beaufort Sea. <i>International Journal of Oceanography</i> . In Press. |
| [188] | 2 | <u>Campbell</u> , K., C.J. Mundy, D.G. Barber, and M. Gosselin (2014). Response of Remotely Estimated Ice Algae Biomass to the Environmental Conditions during Spring Melt. <i>Arctic</i> . In Press. |
| [187] | 1 | <u>Raddatz</u> , R.L, R. J. <u>Galley</u> , B. G. Else, T. N. Papakyriakou, M. G. <u>Asplin</u> , L. M. <u>Candlish</u> and D. G. Barber (2014). Western Arctic Cyclones and Atmosphere Boundary Layer-Ocean/Sea Ice Equilibrium. <i>Atmosphere-Ocean</i> . In Press. |
| [186] | 2 | <u>Barber</u> , D.G., G. <u>McCullough</u> , D. <u>Babb</u> , A.S. <u>Komarov</u> , L.M. <u>Candlish</u> , J.V. <u>Lukovich</u> , M. <u>Asplin</u> , S. Prinsenber, I. <u>Dmitrenko</u> and S. Rysgaard (2014). Climate change and ice hazards in the Beaufort Sea. <i>Elementa-Oceans. Elem. Sci. Anth.</i> 2: 000025 doi: 10.12952/journal.elementa.000025. |
| [185] | 3 | <u>Komarov</u> , A., L. Shafai, and D. G. Barber (2014). Electromagnetic wave scattering from rough boundaries interfacing inhomogeneous media and application to snow covered sea ice. <i>Progress in Electromagnetics Research (PIER)</i> . In press. |
| [184] | 2 | <u>Heikkila</u> , M., V. Pospelova, K.P. <u>Hochheim</u> , Z.Z. Kuzyk. G. A. Stern, D.G. Barber and R. W. Macdonald (2014). Surface sediment dinoflagellate cysts from the Hudson Bay system and their relation to freshwater and nutrient cycling, <i>Mar. Micropaleontol.</i> (2014), http://dx.doi.org/10.1016/j.marmicro.2013.12.002 |
| [183] | 2 | <u>Hare</u> , A.A, Z. A., Kuzyk, R.W. Macdonald, H. Sanei, D.G., Barber, G.A. Stern, and F. Wang (2014). Characterization of Sedimentary Organic Matter in Recent Marine Sediments from Hudson Bay, Canada, by Rock-Eval Pyrolysis. <i>Organic Geochemistry</i> . 68 (2014) 52–60. dx.doi.org/10.1016/j.orggeochem.2014.01.007 . |
| [182] | 2 | <u>Asplin</u> , M.G., <u>Scharien</u> , R., Else, B.G.T., Barber, D.G., Papakyriakou, T., Howell, S., and Prinsenber, S., (2014). Implications of Fractured Arctic Perennial Ice Cover on Thermodynamic and Dynamic Sea Ice Processes. <i>J. Geophys. Res. (Oceans)</i> . 119, doi:10.1002/2013JC009557. |
| [181] | 1 | <u>Hochheim</u> , K.P and D. G. Barber (2014). An update on the ice climatology of the Hudson Bay System. <i>Arctic, Antarctic and Alpine Research</i> . In Press. |
| [180] | 2 | <u>Isleifson</u> , R. J. Galley, D. G. Barber, J. Landy, A. Komarov, L. Shafai (2014). A Study on the C-band Polarimetric Scattering and Physical Characteristics of Frost Flowers on Experimental Sea Ice. <i>IEEE Trans. Geosci. and Remote Sensing</i> . vol.52, no.3, pp.1787,1798, doi: 10.1109/TGRS.2013.2255060 |
| [179] | 3 | <u>Komarov</u> , A. and D. G. Barber (2014). Sea Ice motion tracking from Sequential Dual-polarized Radarsat-2 images. <i>IEEE Transactions on Geoscience and Remote Sensing</i> . vol. 52, no. 1, pp. 121-136. |
| [178] | 2 | <u>Pučko</u> , M., Walkusz, W., Macdonald, R.W., Barber, D.G., Fuchs, C., and Stern, G.A. (2013). Importance of Arctic zooplankton seasonal migrations for α -hexachlorocyclohexane (α -HCH) bioaccumulation dynamics. <i>Environmental</i> |

| | | |
|-------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <i>Science and Technology</i> , 47: 4155-4163. |
| [177] | 2 | Mundy, C.J., M. Gosselin, Y. Gratton, V. Galindo, K. Brown, K. <u>Campbell</u> , M. Lavoisier, D.G. Barber, and T. Papakyriakou (2013). The role of environmental factors on under-ice phytoplankton bloom initiation: a case study on landfast sea ice in Resolute Passage, <i>Canada Marine Ecology Progress Series</i> . 10.3354/meps10587.. |
| [176] | 1 | <u>Babb</u> , D., M.G. <u>Asplin</u> , R.J. <u>Galley</u> , K. <u>Hochheim</u> , J.V. <u>Lukovich</u> and D.G. Barber (2013). Multiyear sea ice export through Bering Strait during winter 2011/12. <i>Journal of Geophysical Research (Oceans)</i> . Vol. 118, 1–15, doi:10.1002/jgrc.20383. |
| [175] | 3 | <u>Komarov</u> , A.S., V. Zabeline, and D. G. Barber (2013). Ocean surface wind speed retrieval from C-band SAR images without input of wind direction. <i>IEEE Trans. Geosci. and Remote Sensing</i> . Doi: 10.1109/TGRS.2013.2246171. |
| [174] | 2 | <u>Raddatz</u> , R.L., R.J. <u>Galley</u> , L.M. <u>Candlish</u> , M.G. <u>Asplin</u> , and D.G. Barber (2013). Integral profile estimates of Latent heat flux under clear skies at an unconsolidated sea ice surface. <i>Atmosphere-Ocean</i> . 2013 1-10. doi.org/10.1080/07055900.2013.785383. |
| [173] | 3 | <u>Gupta</u> , M., <u>Scharien</u> , R.K., and Barber, D.G. (2013). C-band polarimetric coherences and ratios for discriminating sea ice roughness, <i>International Journal of Oceanography</i> . In Press. |
| [172] | 2 | <u>Bailey</u> , J. R.W Macdonald, H. Sanei, P.M. Outridge, S.C. Johannessen, K. <u>Hochheim</u> , D. Barber and G.A. Stern (2013). Change at the margin of the North Water Polynya, Baffin Bay, inferred from organic matter records in dated sediment cores. <i>Marine Geology</i> . 341:1-13. |
| [171] | 2 | Rysgaard, S., D.H. Sjøgaard, M. Cooper, M. <u>Pučko</u> , K. Lennert, T.N. Papakyriakou, F. Wang, N.X. Geilfus, R.N. Glud, J. Ehn, D.F. McGinnis, K. Attard, J. Sievers, J. Deming, D.G. Barber (2013). Ikaite crystal distribution in Arctic winter sea ice and its implications for CO ₂ system dynamics. <i>Cryosphere</i> .7,707-718. doi:10.5194/tc-7-707-2013. |
| [170] | 2 | <u>Hare</u> , A.A., F. Wang, D. Barber, N.X. Geilfus, R. <u>Galley</u> , and S. Rysgaard (2013). pH Evolution in Sea Ice Grown at an Outdoor Experimental Facility. <i>Marine Chemistry</i> . 154 (2013) 46–54. |
| [169] | 2 | Else, B.G.T., <u>Galley</u> , R.J., Lansard, B., Barber, D.G., Brown, K., Miller, L.A., Mucci, A., Papakyriakou, T.N., Tremblay, J.-É., and S. Rysgaard (2013). Further observations of a decreasing atmospheric CO ₂ uptake capacity in the Canada Basin (Arctic Ocean) due to sea ice loss. Accepted to <i>Geophysical Research Letters</i> , 40, 1132–1137, doi:10.1002/grl.50268. |
| [168] | 2 | Else, B.T., T.N. Papakyriakou, M.G. <u>Asplin</u> , D. G. Barber, R.J. <u>Galley</u> , L.A. Miller, and A. Mucci (2013). Annual and Interannual Variability of Air-Sea CO ₂ Exchange in an Arctic Polynya Region. <i>Global Biogeochemical Cycles</i> . In press. |
| [167] | 2 | <u>Raddatz</u> , R.L., M.G. <u>Asplin</u> , L.M. <u>Candlish</u> , T. Papakyriakou, R. <u>Galley</u> , B. Else and D.G. Barber (2013). All sky downwelling longwave radiation and atmospheric-column water vapour and temperature over the western maritime Arctic. <i>Atmosphere-Ocean</i> doi.org/10.1080/07055900.2012.760441 |
| [166] | 2 | <u>Raddatz</u> , R.L., R.J. <u>Galley</u> , L.M. <u>Candlish</u> , M.G. <u>Asplin</u> , and D.G. Barber (2013). Integral profile estimates of meso-scale sensible heat flux from the |

| | | |
|-------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | unconsolidated sea-ice surface of Amundsen Gulf. <i>Atmosphere-Ocean</i> . 2013 1-10. doi.org/10.1080/07055900.2012.759900. |
| [165] | 1 | <u>Galley</u> , R.J. B.G. T. Else, S.J. Prinsenberg and D. G. Barber (2013). Sea ice concentration, extent, age, motion and thickness in regions of proposed offshore oil and gas development near the Mackenzie Delta - Canadian Beaufort Sea. <i>Arctic</i> . 66(1): 105-116. |
| [164] | 3 | <u>Gupta</u> , M., Barber, D.G., <u>Scharien</u> R.K., and <u>Isleifson</u> , D. (2012). Detection and classification of surface roughness in an Arctic marginal sea ice zone, <i>Hydrological Processes</i> , doi: 10.1002/hyp.9593. |
| [163] | 2 | <u>Pučko</u> , M., G.A. Stern, L.M. Jantunen, T.F. Biedleman, F. Wong, D.G. Barber, and R.W. Macdonald (2012). Mechanisms and implications of a-HCH enrichment in melt pond water on Arctic sea ice. <i>Environmental Science and Technology</i> . dx.doi.org/10.1021/es303039f, 46, 11862–11869 |
| [162] | 2 | <u>Rysgaard</u> , S., R.N. Glud, K. Lennert, N. Halden, R. Leakey, F.C. Hawthorne and D. G. Barber (2012). Ikaite crystals in melting sea ice – implications for pCO ₂ and pH levels in Arctic surface waters. <i>Cryosphere</i> . 6, 901-908. doi:10.5194/tc-6-901-2012. |
| [161] | 2 | Else, B. R. <u>Galley</u> , T. Papakyriakou, L.A. Miller, A. Mucci and D. G. Barber (2012). Sea Surface pCO ₂ Cycles and CO ₂ Fluxes at Landfast Sea Ice Edges in Amundsen Gulf, Canada. <i>J. Geophys. Res. (Oceans)</i> . 117, C09010, doi:10.1029/2012JC007901 |
| [160] | 2 | <u>Pučko</u> , M., R. W. Macdonald, D. G. Barber, B. Rosenberg, Y. Gratton and G. A. Stern (2012). α-HCH enantiomer ratio (ER) – a novel approach to calculate the ventilation age of water in the Arctic Ocean (2012). <i>Geophysical Research Letters</i> . vol. 117, C08038, doi:10.1029/2012JC008130. |
| [159] | 1 | <u>St. Laurent</u> , P., F. Straneo, and D. G. Barber (2012). A conceptual model of an Arctic sea. <i>J. Geophys. Res.(Oceans)</i> , 117(C6), doi: 10.1029/2011JC007652. |
| [158] | 1 | <u>Asplin</u> , M.G., R. <u>Galley</u> , D.G. Barber, and S. Prinsenberg (2012). Fracture of Summer Perennial Sea ice by Ocean Swell as a result of Arctic Storms. <i>J. Geophys. Res. (Oceans)</i> . C06025, doi:10.1029/2011JC007221. |
| [157] | 2 | <u>Wang</u> , R., G. K. <u>McCullough</u> , G. <u>Gunn</u> , K.P. <u>Hochheim</u> , A. Dorostkar, K. Sydor and D. G. Barber (2012). An observational study of sea ice effects on Nelson River estuarine variability, Hudson Bay, Canada. <i>Continental Shelf Research</i> . In press. |
| [156] | 2 | Barber, D.G., T. Tjaden, D. <u>Leitch</u> , L. Barber and W. <u>Chan</u> (Eds.) (2012). On the Edge. The International Polar Year (IPY) Circumpolar Flaw Lead (CFL) system study. University of Manitoba Press. ISBN:978-0-9813265-1-1. 476 |
| [155] | 2 | Barber, D.G., M. G. <u>Asplin</u> , T. Papakyriakou, L. Miller, B. Else, J. Iacozza, C.J. Mundy, M. Gosslin, N. <u>Asselin</u> , S. Ferguson, J. <u>Lukovich</u> , G. Stern, A. Gaden, M. <u>Pučko</u> , N.-X. Geilfus and F. Wang (2012). Consequences of change and variability in sea ice on marine ecosystem and biogeochemical processes during the 2007-2008 Canadian International Polar Year Program. <i>Climatic Change</i> . doi:10.1007/s10584-012-0482-9. |
| [154] | 1 | <u>Raddatz</u> , R.L., R. J. <u>Galley</u> , L. M. <u>Candlish</u> , M. G. <u>Asplin</u> , and D. G. Barber (2012). Annual Water Vapour Cycle over the southern Beaufort Sea: total column, intrusions and surface inversions. <i>International Journal of Climatology</i> . DOI: 10.1002/joc.3524. |

| | | |
|-------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [153] | 1 | Barber, D.G., M. G. <u>Asplin</u> , R. <u>Raddatz</u> , L. <u>Candlish</u> , S. Nickels, S. Meakin, K. <u>Hochheim</u> , J. V. <u>Lukovich</u> , R. <u>Galley</u> and S. Prinsenberg (2012). Change and variability in sea ice during the 2007-2009 Canadian International Polar Year Program. <i>Climatic Change</i> . doi:10.1007/s10584-012-0477-6. |
| [152] | 2 | <u>McCullough</u> , G.K., S. J. Page, R. H. Hesslein, M.P. Stainton, J.J. Kling, A. G. Salki and D. G. Barber (2012). Hydrological forcing of a recent trophic surge in Lake Winnipeg. <i>Journal of Great Lakes Research</i> . doi:10.1016/j.jglr.2011.12.012 |
| [151] | 2 | Nghiem, S. V. V., I. G. G. Rigor, A. Richter, J. P. P. Burrows, P. B. B. Shepson, J. W. Bottenheim, D. G. G. Barber, A. Steffen, J. R. Latonas, F. Wang, G. A. Stern, P. Clemente-Colon, S. Martin, D. K. K. Hall, L. Kaleschke, P. J. Tackett, G. Neumann, and M. G. <u>Asplin</u> (2012). Field and satellite observations of the formation and distribution of Arctic atmospheric bromine above a rejuvenated sea ice cover. <i>J. Geophys. Res.</i> , doi:10.1029/2011JD016268. |
| [150] | 3 | <u>Candlish</u> , L. M., R. <u>Raddatz</u> , M. <u>Asplin</u> , and D. G. Barber (2012), Atmospheric temperature and absolute humidity profiles over the Beaufort Sea and Amundsen Gulf from a microwave radiometer. <i>J. of Atmos. and Oceanic Techn.</i> , 29 (9), 1182-1201. DOI:10.1175/JTECH-D-10-05050.1 |
| [149] | 3 | <u>Isleifson</u> , D., Jeffrey, I., Shafai, L., LoVetri, J., Barber, D. G., (2012). A Monte Carlo Method for Simulating Scattering from Sea Ice using FVTD, <i>IEEE Transactions on Geoscience and Remote Sensing</i> , vol. 50, no. 7, pp. 2658-2668. |
| [148] | 2 | <u>Pučko</u> M., Stern G.A., Macdonald R.W., Barber D.G., Rosenberg B. and Walkusz W. (2011). When will α -HCH disappear from the western Arctic Ocean?, <i>Journal of Marine Systems</i> , doi:10.1016/j.jmarsys.2011.09.007. |
| [147] | 1 | Barber, D.G. and J.V. Lukovich, (2011) Sea Ice in Canada, in Hugh French and Olav Slaymaker, Eds., <i>Changing Cold Environments – A Canadian Perspective</i> , Wiley-Blackwell, New York, 340 pp. |
| [146] | 1 | <u>Galley</u> , R.J., S. E. Howell. J.V. <u>Lukovich</u> and D. G. Barber (2011). Landfast Sea Ice Conditions in the Canadian Arctic: 1983–2009. 65(2):133-144 |
| [145] | 2 | Asselin, N.C., D. G. Barber, P. R. Richard and S. H. Ferguson (2011). Occurrence, distribution and behaviour of beluga (<i>Delphinapterus leucas</i>) and bowhead (<i>Balaena mysticetus</i>) whales at the Franklin Bay ice edge in June 2008. <i>Arctic</i> . 65(2):121-132. |
| [144] | 2 | <u>Raddatz</u> , R.L., R. J. <u>Galley</u> and D. G. Barber (2011). Linking the atmospheric boundary layer to the Amundsen Gulf sea ice cover: a mesoscale to synoptic-scale perspective from winter to summer 2008. <i>Boundary Layer Meteorology</i> . Doi:10.1007/s10546-011-9669-2. |
| [143] | 2 | <u>Lukovich</u> , J.V., D. <u>Babb</u> , and D.G. Barber (2011). On the scaling laws derived from ice beacon trajectories in the Southern Beaufort Sea during the IPY-CFL study, 2007-2008, <i>J. Geophys. Res.</i> , doi:10.1029/2011JC007049. |
| [142] | 3 | <u>Scharien</u> , R.K., J.J. Yackel, D.G. Barber, M.G. <u>Asplin</u> , M. <u>Gupta</u> , and D. <u>Isleifson</u> (2012). Geophysical controls on C band polarimetric backscatter from melt pond covered Arctic first-year sea ice: Assessment using high-resolution scatterometry, <i>J. Geophys. Res. (Oceans)</i> , vol. 117, C00G18, doi:10.1029/2011JC007353. |
| [141] | 2 | Tremblay, J.E., S. Bélanger, D.G. Barber, M. <u>Asplin</u> , J. Martin, G. Darnis, L. |

| | | |
|-------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | Fortier, Y. Gratton, H. Link, P. Archambault, A. Sallon, C. Michel, W. G. Williams, B. Philippe and M. Gosselin (2011). Climate forcing multiplies biological productivity in the coastal Arctic Ocean, <i>Geophys. Res. Lett.</i> , vol 38. L18604, doi:10.1029/2011GL048825 |
| [140] | 2 | Seabrook, J., J.A. Whiteway, R.M. Staebler, J. Bottenheim, L. Komguem, L.H. Gray, D. Barber, and M.G. <u>Asplin</u> (2011). LIDAR measurements of Arctic Boundary Layer Ozone Depletion Events Over the Frozen Arctic Ocean, <i>J. Geophys. Res.</i> , doi:10.1029/2011JD016335. |
| [139] | 2 | Palmer M, K.R. Arrigo, C.J. <u>Mundy</u> , J.K. <u>Ehn</u> . M. Gosselin, D.G. Barber, J. Martin, E. Alou, S. Roy, and J.É. Tremblay. (2011). Spatial and temporal variation of photosynthetic parameters in natural phytoplankton assemblages in the Beaufort Sea, Canadian Arctic, <i>Polar Biol.</i> , doi:10.1007/s00300-011-1050-x. |
| [138] | 3 | <u>St-Laurent</u> , P. F., Straneo, J.F., Dumais, and D. G. Barber (2011). What is the fate of the river waters of Hudson Bay? <i>J. Mar. Syst.</i> , 88(3), 352-361, doi:10.1016/j.jmarsys.2011.02.004. |
| [137] | 2 | <u>Mundy</u> . C.J., M. Gosselin, J. K. Ehn, C. Belzile, M. Poulin, E. Alou, S. Roy, H. Hop, S. Lessard, T.N. Papakyriakou, D. G. Barber, and J. Stewart (2011). Characteristics of two distinct high-light acclimated microbial communities during advanced stages of sea ice melt, <i>Polar Biol.</i> , doi:10.1007/s00300-011-0998-x. |
| [136] | 2 | <u>Asselin</u> , N.C., D.G. Barber, I. Stirling, S.H. Ferguson, and P.R. Richard (2011). Beluga (<i>Delphinapterus leucas</i>) habitat selection in the eastern Beaufort Sea in spring, 1975 to 1979, <i>Polar Biol.</i> , doi:10.1007/s00300-011-0990-5. |
| [135] | 2 | <u>Ehn</u> , J.K., C. J. <u>Mundy</u> , D. G. Barber, H. Hop, A. Rossnagel, and J. Stewart (2011). Impact of horizontal spreading on light propagation in melt pond covered seasonal sea ice in the Canadian Arctic, <i>J. Geophys. Res.</i> , 116, C00G02, doi:10.1029/2010JC006908. |
| [134] | 2 | Gueguen, C., M. <u>Granskog</u> , G. <u>McCullough</u> , and D.G. Barber (2011). Characterization of colored dissolved organic matter in Hudson Bay and Hudson Strait using parallel factor analysis, <i>J. Mar. Syst.</i> , 88(3), 423-433, doi:10.1016/j.jmarsys.2011.12.001 |
| [133] | 2 | Hop, H., C.J. <u>Mundy</u> , M. Gosselin, A. <u>Rossnagel</u> and D.G. Barber (2011). Zooplankton boom and ice amphipod bust below melting sea ice in the Amundsen Gulf, Arctic Canada, <i>Polar Biol.</i> , doi:10.1007/s00300-011-0991-4. |
| [132] | 2 | <u>Chaulk</u> , A., G.A. Stern, D. Armstrong, D.G. Barber, and F. Wang (2011). Mercury Distribution and Transport across the Ocean-Sea Ice-Atmosphere Interface in the Western Arctic Ocean, <i>Environ. Sci. Technol.</i> , 45, 1866–1872, doi:10.1021/es103434c |
| [131] | 2 | <u>Pučko</u> , M., G.A. Stern, R.W. Macdonald, B. Rosenberg, and D.G. Barber (2011). The influence of the atmosphere-snow-ice-ocean interactions on the levels of hexachlorocyclohexanes (HCHs) in the Arctic cryosphere, <i>J. Geophys. Res.</i> , 116, C02035, doi:10.1029/2010JC006614 |
| [130] | 2 | <u>Pučko</u> , M., G.A. Stern, R.W. Macdonald, D.G. Barber (2010). α - and γ -hexachlorocyclohexane (HCH) measurements in the brine fraction of sea ice in the Canadian High Arctic using a sump-hole technique, <i>Environ. Sci. Technol.</i> , 44(24), 9258–926, doi:10.1021/es102275b. |

| | | |
|-------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [129] | 3 | Scharien, R.K., T. Geldsetzer, D.G. Barber, J.J. Yackel, and A. Langlois (2010). Physical, dielectric, and C band microwave scattering properties of first-year sea ice during advanced melt, <i>J. Geophys. Res.</i> , 115, C12026, doi:10.1029/2010JC006257. |
| [128] | 1 | Stewart, B. and D.G. Barber (2010). The Ocean-Sea Ice-Atmosphere System of the Hudson Bay Complex, in <i>A Little Less Arctic: Top Predators in the World's Largest Inland Sea, Hudson Bay</i> . Edited by Stewart, S., L. Loseto, and M. Mallory, pp. 1-38, Springer Verlag Press, New York, NY. |
| [127] | 1 | Hochheim, K., D.G. Barber, and J.V. Lukovich (2010). Changing Sea Ice Conditions in Hudson Bay, 1979-2005, in <i>A Little Less Arctic: Top Predators in the World's Largest Inland Sea, Hudson Bay</i> , Edited by Stewart, S., L. Loseto, and M. Mallory, pp. 39-52, Springer Verlag Press, New York, NY. |
| [126] | 1 | Barber, D. G., M. Asplin, Y. Gratton, J. Lukovich, R. Galley, R. Raddatz, and D. Leitch (2010). The International Polar Year (IPY) Circumpolar Flaw Lead (CFL) System Study: Introduction and Physical System, <i>Atmos. Ocean</i> , 48 (4), 225–243, doi:10.3137/OC317.2010. |
| [125] | 3 | Isleifson, D., B. Hwang, D.G. Barber, R.K. Scharien, and L. Shafai. (2010). C-Band Polarimetric Backscattering Signatures of Newly Formed Sea Ice During Fall Freeze-Up, <i>IEEE Trans. Geosci. Remote Sens.</i> , 48(8), 3256 -3267, doi:10.1109/TGRS.2010.2043954. |
| [124] | 1 | Zhao, J., T. Li, D.G. Barber, J. Ren, M. Pućko, S. Li, and X. Li (2010). Attenuation of lateral propagating light in sea ice measured with an artificial lamp in winter, <i>Cold Reg. Sci. Technol.</i> , 61(1), 6-12, doi:10.1016/j.coldregions.2009.12.00. |
| [123] | 1 | Pućko, M., G. Stern, D. G. Barber, R.W. Macdonald, B. Rosenberg (2010). The International Polar Year (IPY) Circumpolar Flaw Lead (CFL) System Study: The importance of brine processes for α - and γ -hexachlorocyclohexane (HCH) accumulation/rejection in sea ice, <i>Atmos. Ocean</i> , 48(4), 244-262, doi:10.3137/OC318.2010. |
| [122] | 1 | Partington, K, J.D. Flach, D. Barber, D. Isleifson, P. Meadows and P. Verlaan (2010). Dual-Polarization C-Band Radar Observations of Sea Ice in the Amundsen Gulf, <i>IEEE Trans. Geosci. Remote Sens.</i> , 48(6), 2685-2691, doi:10.1109/TGRS.2009.2039577 |
| [121] | 1 | Hochheim, K.P., and D.G. Barber (2010). Atmospheric forcing of sea ice in Hudson Bay during the fall period, 1980–2005, <i>J. Geophys. Res.</i> , 115, C05009, doi:10.1029/2009JC005334. |
| [120] | 1 | Iacozza, J. and D. G. Barber (2010), An examination of snow redistribution over smooth land-fast sea ice, <i>Hydrol. Processes</i> , 24(7), 850-865, doi:10.1002/hyp.7526. |
| [119] | 1 | Hanesiak, J., R. Stewart, P. Taylor, K. Moore, D. Barber, G. McBean, W. Strapp, M. Wolde, D. Hudak, J. Scott, G. Liu, J. Gilligan, S. Biswas, R. Dyck, S. Fargey, R. Field, G. Gascon, M. Gordon, H. Greene, C. Hay, W. Henson, K. Hochheim, A. Laplante, M. Albarrañ Melzer, and S. Zhang (2010). Storm Studies in the Arctic (STAR), The Meteorological Field Project, <i>Bull. Am. Meteorol. Soc.</i> , 91(1), 47-68, doi:10.1175/2009BAMS2693.1. |
| [118] | 2 | Barber, D.G., and D. Barber (2009). <i>Two Ways of Knowing: Merging Science and Traditional Knowledge During the Fourth International Polar Year</i> , |

| | | |
|-------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | University of Manitoba Press. ISBN. 978-0-9813265-0-4. 287 pp. |
| [117] | 1 | Barber, D.G., R. Galley, M.G. Asplin, R. De Abreu, K. Warner, M. Pućko, M. Gupta, S. Prinsenberg, and S. Julien (2009). Perennial pack ice in the southern Beaufort Sea was not as it appeared in the summer of 2009, <i>Geophys. Res. Lett.</i> , 36, L24501, doi:10.1029/2009GL041434. |
| [116] | 2 | Lalande, C., A. Forest, D.G. Barber, Y. Gratton, and L. Fortier (2009). Variability in the annual cycle of vertical particulate organic carbon export on Arctic shelves: Contrasting the Laptev Sea, Northern Baffin Bay and the Beaufort Sea, <i>Cont. Shelf Res.</i> , 29(17), 2157-2165 doi:10.1016/j.csr.2009.08.009 |
| [115] | 1 | Mundy, C.J., M. Gosselin, J.K. Ehn, Y. Gratton, A. Rossnagel, D.G. Barber, J. Martin, J-É. Tremblay, M. Palmer, K. Arrigo, G. Darnis, L. Fortier, B. Else and T. Papakyriakou (2009). Contribution of under-ice primary production to an ice-edge upwelling phytoplankton bloom in the Canadian Beaufort Sea, <i>Geophys. Res. Lett.</i> , 36, L17601, doi:10.1029/2009GL038837. |
| [114] | 1 | Granskog, M.A., R.W. Macdonald, Z.Z.A. Kuzyk, S. Senneville, C.J. Mundy, D.G. Barber, G.A. Stern, and F. Saucier (2009). Coastal conduit in southwestern Hudson Bay (Canada) in summer: Rapid transit of freshwater and significant loss of colored dissolved organic matter, <i>J. Geophys. Res.</i> , 114, C08012, doi:10.1029/2009JC005270. |
| [113] | 1 | Proshutinsky, A., R. Krishfield, and D.G. Barber (2009). Preface to the special section on the Beaufort Gyre Climate System Exploration Study: Documenting key parameters to understand environmental variability, <i>J. Geophys. Res.</i> , 114, C00A08, doi:10.1029/2008JC005162. |
| [112] | 1 | Asplin, M.G., J.V. Lukovich, and D. G. Barber (2009). Atmospheric forcing of the Beaufort Sea Ice Gyre: Surface pressure climatology and sea ice motion, <i>J. Geophys. Res.</i> , 114, C00A06, doi:10.1029/2008JC005127. |
| [111] | 3 | Galley, R.J., M. Trachtenberg, A. Langlois, D. G. Barber and L. Shafai (2009). Observations of geophysical and dielectric properties and ground penetrating radar signatures for discrimination of snow, sea ice and freshwater ice thickness, <i>Cold Reg. Sci. Technol.</i> , 57(1), 29-38, doi:10.1016/j.coldregions.2009.01.003. |
| [110] | 1 | Lukovich, J.V., and D.G. Barber (2009). On horizontal wind gradient variability from the stratosphere to the lower troposphere in the Arctic, <i>J. Geophys. Res.</i> , 114, D02104, doi:10.1029/2007JD009552. |
| [109] | 3 | Isleifson, D., A. Langlois, D.G. Barber, and L. Shafai (2009). C-Band Scatterometer Measurements of Multiyear Sea Ice Before Fall Freeze-Up in the Canadian Arctic, <i>IEEE Trans. Geosci. Remote Sens.</i> , 47(6), 1651-1661, doi:10.1109/TGRS.2008.2006566. |
| [108] | 1 | Lukovich, J. V., M.G. Asplin, and D.G. Barber (2009). Atmospheric forcing of the Beaufort Sea ice gyre: Surface-stratosphere coupling, <i>J. Geophys. Res.</i> , 114, C00A03, doi:10.1029/2008JC004849. |
| [107] | 2 | Fortier, L. and D.G. Barber (2008). An Introduction to the Canadian Arctic Shelf Exchange Study, in <i>On thin ice: a synthesis of the Canadian Arctic Shelf Exchange Study (CASES)</i> , edited by Fortier, L., D.G. Barber, and J. Michaud, pp 1-12, Aboriginal Issues Press, University of Manitoba, ISBN 978-0-9738342-6-0. |

| | | |
|-------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [106] | 2 | Barber, D.G., B.J. Hwang, J. Ehn, J. Iacozza, R. Galley, J. Hanesiak, T. Papakyriakou, and J.V. Lukovich (2008). Chapter 3. The Ocean-Sea Ice-Atmosphere (OSA) interface in the Southern Beaufort Sea, in <i>On Thin Ice – A synthesis of the Canadian Arctic Shelf Exchange Study (CASES)</i> , Edited by Fortier, L., D.G. Barber, and J. Michaud, pp 37-67, Aboriginal Issues Press, University of Manitoba, ISBN 978-0-9738342-6-0. |
| [105] | 3 | Langlois, A, R. Scharien, T. Geldsetzer, J Iacozza, D.G., Barber, and J. Yackel (2008). Estimation of Snow Water Equivalent over First-Year Sea Ice using AMSR and Surface Observations, <i>Remote Sens. Environ.</i> , 112(9), 3656-3667, doi:10.1016/j.rse.2008.05.004. |
| [104] | 2 | Barber, D.G., J.V. Lukovich, J. Keogak, S. Baryluk, L. Fortier, and G. Henry (2008). The Changing Climate of the Arctic, <i>Arctic</i> , 61(suppl. 1), 7-26. |
| [103] | 2 | Forest, A., M. Sampei, R. Makabe, H. Sasaki, D. G. Barber, Y. Gratton, P. Wassmann, and L. Fortier (2008). The annual cycle of particulate organic carbon export in Franklin Bay (Canadian Arctic): Environmental control and food web implications, <i>J. Geophys. Res.</i> , 113, C03S05, doi:10.1029/2007JC004262. |
| [102] | 1 | Galley, R., B.J. Hwang, D. Barber, E. Key, and J.K. Ehn (2008). Spatial and Temporal variability of Sea Ice in the CASES Study Region: 1980 – 2004, <i>J. Geophys. Res.</i> , 113, C05S95, doi:10.1029/2007JC004553. |
| [101] | 1 | Ehn, J.K., T.N. Papakyriakou, and D.G. Barber (2008). Inference of optical properties from radiation profiles within melting sea ice, <i>J. Geophys. Res.</i> , 113, C09024, doi:10.1029/2007JC004656. |
| [100] | 1 | Langlois, A., T. Fisco, D.G. Barber, and T.N. Papakyriakou (2008). The response of snow thermophysical processes to the passage of a polar low-pressure system and its impact on in situ passive microwave radiometry: A case study, <i>J. Geophys. Res.</i> , 113, C03S04, doi:10.1029/2007JC004197. |
| [99] | 1 | Tremblay, J.E., K. Simpson, J. Martin, L. Miller, Y. Gratton, D. Barber and N. Price (2008). Vertical stability and the annual dynamics of nutrients and chlorophyll fluorescence in the coastal, southeast Beaufort Sea, <i>J. Geophys. Res.</i> , 113, C07S90, doi:10.1029/2007JC004547. |
| [98] | 3 | Hwang, B.J., and D.G. Barber (2008). On the impact of ice emissivity on ice temperature retrieval using passive microwave radiance data, <i>IEEE Geosci. Remote Sens. Lett.</i> , 5(3), doi:10.1109/LGRS.2008.917266. |
| [97] | 3 | Langlois, A., and D. G. Barber (2008). Passive Microwave Remote Sensing of Seasonal Snow Covered Sea Ice, <i>Prog. Phys. Geog.</i> , 31(6), 539-573, doi:10.1177/0309133307087082 |
| [96] | 2 | Darnis, G., D.G. Barber, and L. Fortier (2008). Sea ice and the onshore-offshore gradient in pre-winter zooplankton assemblages in southeast Beaufort Sea, <i>J. Mar. Syst.</i> , 74(3-4), 994-1011, doi:10.1016/j.jmarsys.2007.09.003. |
| [95] | 1 | Ehn, J., C.J. Mundy, D.G. Barber (2008). Bio-optical and structural properties inferred from irradiance measurements within the bottommost layers in an Arctic landfast sea ice cover, <i>J. Geophys. Res.</i> , 113, C03S03, doi:10.1029/2007JC004194. |
| [94] | 3 | Langlois, A., and D. G. Barber (2008). Advances in seasonal Snow Water Equivalent (SWE) retrieval using in-situ passive microwave measurements over first-year sea ice, <i>Int. J. Remote Sens.</i> , 29(16), 4781-4802, |

| | | |
|------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | doi:10.1080/01431160801908145. |
| [93] | 1 | Hwang, B.J., J.K. Ehn, and D.G. Barber (2008). Impact of ice temperature on microwave emissivity of newly formed sea ice, <i>J. Geophys. Res.</i> , 113, C02021, doi:10.1029/2006JC003930 |
| [92] | 1 | Jin, X., J. Hanesiak, and D. Barber (2007). Time series of daily-averaged cloud fractions over landfast first year sea ice from multiple data sources. <i>J. Appl. Meteorol. and Climatol.</i> , 46, 1818-1827, doi:10.1175/2007JAMC1472.1. |
| [91] | 2 | Kuzyk, Z.A., R.W. Macdonald, M.A. Granskog, R.K. Scharien, R.J. Galley, C. Michel, D. Barber, and G. Stern (2007). Sea ice, hydrological, and biological processes in the Churchill River estuary region, Hudson Bay, <i>Estuar. Coast. Shelf Sci.</i> , 77(3), doi:10.1016/j.ecss.2007.09.030. |
| [90] | 2 | Smith, W.O., and D.G. Barber (2007). Polynyas and Climate Change. A view to the future, in <i>Polynyas: Windows to the World</i> , edited by W.O. Smith and D. G. Barber, Elsevier Oceanography Series, 74, 411-419. |
| [89] | 1 | Lukovich, J.V., and D.G. Barber (2007). On the spatiotemporal variability of sea ice concentration (SIC) anomalies in the northern hemisphere, <i>J. Geophys. Res.</i> , 112, D13117, doi:10.1029/2006JD007836. |
| [88] | 1 | McCullough, G., and D.G. Barber (2007). The effect of suspended solids loading from the Linthipe River on light in Lake Malawi, <i>J. Great Lakes Res.</i> , 33(2), 466-482, doi:10.3394/0380-1330(2007)33[466:TEOSSL]2.0.CO;2. |
| [87] | 1 | Granskog, M., R.W. MacDonald, C.J. Mundy, and D. G. Barber (2007). Distribution, Characteristics and Potential Impacts of Chromophoric Dissolved Organic Matter (CDOM) in Hudson Strait and Hudson Bay, Canada, <i>Cont. Shelf Res.</i> , 27(15): 2032-2050, doi:10.1016/j.csr.2007.05.001. |
| [86] | 1 | McCullough, G., D.G. Barber, and P.M. Cooley (2007). The vertical distribution of runoff and its suspended load in Lake Malawi. <i>J. Great Lakes Res.</i> , 22(2), 449-465, doi:10.3394/0380-1330(2007)33[449:TVDORA]2.0.CO;2. |
| [85] | 2 | Mundy, C.J., D.G. Barber, C.M. Michel, and R.F. Marsden (2007). Linking ice microstructure and microscale variability of algal biomass in Arctic first-year sea ice using an <i>in situ</i> microphotographic technique, <i>Polar Biol.</i> , 9, 1099-1114, doi:10.1007/s00300-007-0267-1 |
| [84] | 1 | Ehn, J, B.J. Hwang, R. Galley, and D.G. Barber (2007). Investigations of newly formed sea ice in the Cape Bathurst polynya: Part 1. Structural, physical and optical properties, <i>J. Geophys. Res.</i> , 112, C05002, doi:10.1029/2006JC003702. |
| [83] | 3 | Galley, R., D.G. Barber, and J. Yackel (2007). On the link between spring sea ice melt and development of the summer ocean mixed layer in the North Water Polynya, <i>Int. J. Remote Sens.</i> , 28(18): 3979-3994, doi:10.1080/01431160601105900. |
| [82] | 3 | Yackel, J., and D.G. Barber (2007). Observations of snow Water Equivalent Change on Landfast First-Year Sea ice in Winter using Synthetic Aperture Radar Data, <i>IEEE Trans Geosci Remote Sens.</i> , 45(4), 1005-1015, doi:10.1109/TGRS.2006.890418. |
| [81] | 1 | Barber, D.G., and R.A. Massom (2007). The role of sea ice in Arctic and Antarctic Polynyas, in <i>Polynyas: Windows to the World</i> , edited by Smith, W.O., and D.G. Barber, 74, 1-54, Elsevier Oceanography Series, doi:10.1016/S0422-9894(06)74001-6. |

| | | |
|------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [80] | 3 | Hwang, B.J., J.K. Ehn, D.G. Barber, R. Galley, and T.C. Grenfell (2006), Investigation of newly formed sea ice in the Cape Bathurst polynya: Part 2 Microwave emissions, <i>J. Geophys. Res.</i> , 112, C05003, doi:10.1029/2006JC003703. |
| [79] | 3 | Hwang, B. J., A. Langlois, D. G. Barber, and T. N. Papakyriakou (2006), On the detection of the thermophysical state of landfast first-year sea ice using in-situ microwave emission during spring melt, <i>Remote Sens. Environ.</i> , 111(2-3): 148-159, doi:10.1016/j.rse.2007.02.033. |
| [78] | 1 | Mundy, C.J., J. Ehn, D.G. Barber, and C. Michel (2006), Influence of snow cover and algae on the spectral dependence of transmitted irradiance through Arctic landfast first-year sea ice, <i>J. Geophys. Res.</i> , 112, C03007, doi:10.1029/2006JC003683. |
| [77] | 3 | Hwang, B.J., Jens K. Ehn, and David G. Barber. 2006. Relationships Between Sea Ice Albedo and Microwave Emissions During Fall Freeze-up: An in-situ study, <i>Geophysical Research Letters</i> . 33, L17503, doi:10.1029/2006GL027300 |
| [76] | 1 | Jin, X., D. Barber, and T. Papakyriakou (2006), A new clear-sky downward longwave radiative flux parameterization for Arctic areas based on rawinsonde data, <i>J. Geophys. Res.</i> , 111, D24104, doi:10.1029/2005JD007039. |
| [75] | 3 | Langlois, A., D.G., Barber, and J.J. Hwang (2006), Development of a winter snow water equivalent algorithm using in situ passive microwave radiometry over snow covered first-year sea ice, <i>Remote Sens. Environ.</i> , 106(1), 75-88, doi:10.1016/j.rse.2006.07.018. |
| [74] | 1 | Jin, X., J. Hanesiak, and D. Barber (2006), Detecting cloud vertical structures from radiosondes and MODIS over Arctic first-year sea ice, <i>Atmos. Res.</i> , 83(2007), 64-76, doi:10.1016/j.atmosres.2006.03.003. |
| [73] | 1 | Ehn, J.K., M.A. Granskog, T. Papakyriakou, R. Galley, and D.G. Barber (2006), Surface albedo observations of Hudson Bay landfast sea ice during melt onset, <i>Ann. Glaciol.</i> , 44, 23-29. |
| [72] | 2 | Barber, D.G., L. Fortier, and M. Byers (2005), The Incredible Shrinking Sea Ice, <i>Policy Options</i> , 27(1), 66-71. |
| [71] | 1 | Langlois, A., C.J. Mundy and D.G. Barber (2006), On the winter evolution of snow thermophysical properties over landfast first-year sea ice, <i>Hydrol. Processes</i> , 21(6), 705-716, doi:10.1002/hyp.6407. |
| [70] | 2 | Carmack, E., D. Barber, J. Christensen, R. Macdonald, B. Rudels, and E. Sakshaug (2006), Climate Variability and Physical Forcing of the Food Webs and the Carbon Budget on Panarctic Shelves, <i>Prog. Oceanogr.</i> , 71(2-4): 145-181, doi:10.1016/j.pocean.2006.10.005. |
| [69] | 2 | Fortier, L., P. Sirois, J. Michaud, and D.G. Barber (2006), Sea surface temperature, sea ice concentration and the survival of Arctic cod larvae (<i>Boreogadus saida</i>) in the Northeast Water polynya (Greenland Sea), <i>Can. J. Fish. Aquat. Sci.</i> , 63(7): 1608-1616. |
| [68] | 3 | Yackel, J.J., D.G. Barber, T.N. Papakyriakou, and C. Breneman, (2006), First-year sea ice spring melt transitions in the Canadian Arctic Archipelago from time series SAR data, 1992-2002, <i>Hydrol. Processes</i> , 21, 253-265, doi:10.1002/hyp.6240. |
| [67] | 1 | Lukovich, J., and D. Barber (2006), Atmospheric controls on sea ice motion in the Southern Beaufort Sea, <i>J. Geophys. Res.</i> , 111, D18103, doi:10.1029/2005JD006408. |
| [66] | 1 | Lukovich, J. and D. Barber (2005), On Sea Ice Concentration Anomaly Coherence in the Southern Beaufort Sea, <i>Geophys. Res. Lett.</i> , 32, L10705, doi:10.1029/2005GL022737. |
| [65] | 3 | Barber, D.G. (2005), Microwave Remote Sensing, Sea Ice and Arctic Climate Processes, <i>Physics in Canada</i> , Sept/Oct. 105-111. |
| [64] | 2 | Mundy, C.J., D. Barber, and C. Michel (2005), On the scale dependent variability of thermophysical, optical and sub-ice microalgae properties in spring season landfast first-year sea ice, <i>J. Mar. Syst.</i> , 58, 107-120. |

| | | |
|------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [63] | 3 | Hwang, B., and D.G. Barber (2006), Pixel-scale evaluation of the SSM/I sea ice algorithms in the marginal ice zone during early fall freeze-up, <i>Hydrol. Processes</i> , 20, 1909-1927. |
| [62] | 1 | Barber, D.G., and J. Hanesiak (2004), Meteorological forcing of sea ice concentrations in the Southern Beaufort Sea over the period 1978 to 2001, <i>J. Geophys. Res.</i> , 109, C06014, doi:10.1029/2003JC002027. |
| [61] | 2 | Barber, D.G., and J. Iacozza (2004), Historical analysis of sea ice conditions in M'Clintock Channel and Gulf of Boothia, Nunavut; Implications for Ringed Seal and Polar Bear Habitat, <i>Arctic</i> , 57(1), 1-14. |
| [60] | 3 | DeAbreu, R.A., J. Yackel, D. Barber, and M. Arkett (2003), Operational Satellite Sensing of Arctic First Year Sea Ice Melt, <i>Can. J. Remote Sens.</i> , 24, 487-501. |
| [59] | 3 | Barber, D., J. Iacozza, and A. Walker (2003), The Estimation of Snow Water Equivalent (SWE) using microwave Radiometry over Arctic First-Year Sea Ice, <i>Hydrol. Processes</i> , 17(17), 3503-3517, doi:10.1002/hyp.1305. |
| [58] | 3 | Cooley, P., and D.G. Barber (2003), Remote Sensing of the Coastal Zone of Tropical Lakes using Synthetic Aperture Radar and Optical Data, <i>J. Great Lakes Res.</i> , 29(2), 62-75. |
| [57] | 1 | Ingram, G., J. Bacle, D. Barber, Y. Gratton, and H. Melling (2001), An Overview of Physical Processes in the North Water, <i>Deep Sea Res. Part II</i> , 49(22-23), 4893-4906. |
| [56] | 3 | Wilson, K., D.G., Barber, and D. King (2001), A Case Study in Tracking 1998 Spring Ice Dynamics in the Smith Sound, North Water Polynya Region using RADARSAT-1, <i>Ann. Glaciol.</i> , 33, 413-418. |
| [55] | 3 | Harouche, I., and D.G. Barber (2001), Seasonal Characterization of Microwave Emissions Over Snow-Covered First-Year Sea Ice, <i>Hydrol. Processes</i> , 15, 3571-3583. |
| [54] | 1 | Iacozza, J., and D.G. Barber (2001), Ablation patterns of snow cover over smooth first-year sea ice in the Canadian Arctic, <i>Hydrol. Processes</i> , 15, 3359-3569. |
| [53] | 2 | Fortier, L., M. Fortier, M. Fukuchi, D. Barber, Y. Gratton, L. Legendre, T. Odate, and B. Hargrave (2001), The International North Water Polynya Study (NOW): A progress report, <i>Memoirs of the national Institute of Polar Research, Special Issue 54</i> , 343-348. |
| [52] | 1 | Mundy, C.J., and D.G. Barber (2001), On the relationship between spatial patterns of sea ice type and the mechanisms which create and maintain the North Water (NOW) polynya, <i>Atmos. Ocean</i> , 39(3), 327-341. |
| [51] | 1 | Barber, D.G., J. Hanesiak, W. Chan, and J. Piwowar (2001), Sea Ice and Meteorological Conditions in Northern Baffin Bay and the North Water Polynya between 1979 and 1996, <i>Atmos. Ocean</i> , 39(3), 343-359. |
| [50] | 3 | Hanesiak, J., J. Yackel, and D. Barber (2001), Effect of Melt Ponds on First-Year Sea Ice Ablation-Integration of RADARSAT-1 and Thermodynamic Modeling, <i>Can. J. Remote Sens.</i> , 27(5), 433-442. |
| [49] | 3 | Yackel, J., D.G. Barber, and T.N. Papakyriakou (2001), On the estimation of spring melt in the North Water polynya using RADARSAT-1, <i>Atmos. Ocean</i> , 39(3), 195-208, doi:10.1080/07055900.2001.9649676. |
| [48] | 3 | Wilson, K, D.G., Barber, and D. King (2001), Validation and Production of RADARSAT-1 Derived Ice Motion Maps in the North Water Polynya (NOW), January-December 1998. <i>Atmos. Ocean</i> , 39(3), 257-278, 10.1080/07055900.2001.9649680. |
| [47] | 1 | Hanesiak, J.M., D.G. Barber, T.N. Papakyriakou, and, P.J. Minnett (2001), Parameterization Schemes of Incident Radiation in the North Water Polynya, <i>Atmos. Ocean</i> , 39(3), 223-238. |
| [46] | 1 | Barber, D., R. Marsden, P. Minnett, G. Ingram, and L. Fortier (2001), Physical processes within the North Water (NOW) Polynya, <i>Atmos. Ocean</i> , 39(3), 163-166, 10.1080/07055900.2001.9649673. |

| | | |
|------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [45] | 2 | Barber, D.G., E. Saczuk, and P. Richard (2001), Examination of beluga-habitat relationships through the use of Telemetry and GIS, <i>Arctic</i> , 54(3), 305-316. |
| [44] | 1 | Hanesiak, J.M., D.G. Barber, R. De Abreu, and J.J. Yackel (2001), Local and regional albedo. Observations of arctic first-year sea ice during melt ponding, <i>J. Geophys. Res.</i> , 106(C1), 1005-1016. |
| [43] | 3 | Barber, D.G., J. Yackel, and J. Hanesiak (2000), Perspectives on Sea Ice, RadarSat-1, and Arctic Climate Processes, <i>Can. J. Remote Sens.</i> , 27(1), 51-61. |
| [42] | 3 | Yackel, J., and D.G. Barber (2000), Melt ponds on sea ice in the Canadian Arctic Archipelago 2. On the use of RADARSAT-1 synthetic aperture radar for geophysical inversion, <i>J. Geophys. Res.</i> , 105(C9), 22,061-22,070, doi:10.1029/2000JC900076. |
| [41] | 1 | Yackel, J., J. Hanesiak, and D.G. Barber (2000), Melt ponds on sea ice in the Canadian Arctic Archipelago 1. Variability in morphology radiative properties, <i>J. Geophys. Res.</i> , 105(C9), 22,049-22,060, doi:10.1029/2000JC900075. |
| [40] | 2 | Yackel, J., and D.G. Barber (2000), Arctic Climate Change. A Case of Mounting Evidence, in <i>Pushing the Margins: Native and Northern Studies</i> , edited by Oakes, J., R. Riewe, M. Bennett, and B. Chisholm, Native Studies Press, University of Manitoba. 422 pp. (ISBN 0-9686138-1-0). |
| [39] | 2 | Mundy, C.J., and D.G. Barber (2000), The North Water Polynya: Physical and Biological Aspects. in <i>Pushing the Margins: Native and Northern Studies</i> , edited by Oakes, J., R. Riewe, M. Bennett, and B. Chisholm, Native Studies Press, University of Manitoba. 422 pp. (ISBN 0-9686138-1-0). |
| [38] | 3 | Iacoza, J., and D.G. Barber (1999), An examination of the distribution of snow on sea-ice, <i>Atmos. Ocean</i> , 37(1), 21-51. |
| [37] | 1 | Hanesiak, J.M., D.G. Barber, and G.M. Flato (1999), The role of diurnal processes in the seasonal evolution of sea ice and its snow cover, <i>J. Geophys. Res.</i> , 104(C6), 13593-13604, doi:10.1109/IGARSS.1998.702257. |
| [36] | 3 | Barber, D.G., and S.V. Nghiem (1999), The role of snow on the thermal dependence of backscatter over sea ice, <i>J. Geophys. Res.</i> , 104(C11), 25,789-25,803, doi:10.1029/1999JC900181. |
| [35] | 3 | Barber, D.G., and Yackel, J. (1999), The physical, radiative and microwave scattering characteristics of melt ponds on sea ice, <i>Int. J. Remote Sens.</i> , 20(10), 2069-2090. |
| [34] | 3 | Perovich, D.K., D. Barber, G. Cota, A.J. Gow, T.C. Grenfell, A.J. Hunt, R.A. Maffione, C.D. Mobley, R.O. Onstott, W.W. Pegau, and C.S. Roesler (1998), Field observations of the electromagnetic properties of first-year sea ice, <i>IEEE Trans. Geosci. Remote Sens.</i> , 36(5), 1705-1715, doi:10.1109/36.718639. |
| [33] | 3 | Kwok, R., S.V. Nghiem, S. Martin, D.P. Winebrenner, A.J. Gow, D.K. Perovich, C.T. Swift, D.G., Barber, K.M. Golden, and E. Knapp (1998), Laboratory measurements of sea ice: connections to microwave remote sensing, <i>IEEE Trans Geosci. Remote Sens.</i> , 36(5), 1716-1730, doi:10.1109/36.718640. |
| [32] | 3 | Grenfell, T.C., D.G. Barber, A.K. Fung, A.J. Gow, K.C. Jezek, E.J., Knapp, S.V. Nghiem, R.G. Onstott, D.K. Perovich, C.S. Roesler, C.T. Swift, and F. Tanis (1998), Evolution of Electromagnetic-Signatures of Sea Ice From Initial Formation Through the Establishment of Thick First-Year Ice, <i>IEEE Trans. Geosci. Remote Sens.</i> , 36(5), 1642-1654, doi:10.1109/36.718636. |
| [31] | 3 | Barber, D.G., A.K. Fung, T.C. Grenfell, S.V. Nghiem, R.G. Onstott, V. Lytle, D.K. Perovich, and A.J. Gow, (1998), The role of snow on microwave emission and scattering over first-year sea ice, <i>IEEE Trans. Geosci. Remote Sens.</i> , 36(5), 1750-1763, doi:10.1109/36.718643. |
| [30] | 3 | Jezek, K.C., D. Perovich, K.M. Golden, C. Luther, D.G. Barber, P. Gogineni, T. Grenfell, A. Jordan, C. Mobley, S. Nghiem, and R. Onstott (1998), A broad spectral, interdisciplinary investigation of the electromagnetic properties of sea ice, <i>IEEE Trans.</i> |

| | | |
|------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <i>Geosci. Remote Sens.</i> , 36(5), 1633-1641, doi:10.1109/36.718635. |
| [29] | 2 | Barber, D.G., J. Yackel, R. Wolfe, and W. Lumsden (1998), Estimating the thermodynamic state of snow covered sea ice using time series synthetic aperture radar (SAR) data, <i>Proceedings of the 8th International Offshore and Polar Engineering Conference</i> , 3, 50-54. |
| [28] | 3 | Hochheim, K.P., and D.G. Barber (1998), Spring wheat yield estimation for Western Canada using NOAA NDVI data. <i>Can. J. Remote Sens.</i> , 24(1), 17-27. |
| [27] | 3 | Drobot, S., and D.G. Barber (1998), Towards development of a snow water equivalence (SWE) algorithm using microwave radiometry over snow covered first-year sea ice, <i>Photogramm. Eng. Remote Sens.</i> , 64(5), 415-423. |
| [26] | 3 | Thomas, A., and D.G. Barber (1998), On the use of multi-year ERS-1 as a proxy indicator of melt period sea ice albedo, <i>Int. J. Remote Sens.</i> , 19(14), 2807-2821. |
| [25] | 1 | Barber, D.G., and A. Thomas (1998), The influence of cloud on the radiation balance, physical properties and microwave scattering of first year and multi-year sea ice, <i>IEEE Trans. Geosci. Remote Sens.</i> , 36(1), 38-50. |
| [24] | 1 | Barber, D.G., A. Thomas, and T. Papakyriakou, 1998, The role of synthetic aperture radar (SAR) in surface energy flux measurements over sea ice, in <i>Synthetic Aperture Radar Remote Sensing of Sea ice</i> , edited by Tsatsoulis, C. and R. Kwok, John Wiley and Sons, pp 35-67. Hoboken, New Jersey. |
| [23] | 2 | Barber, D.G., K.P. Hochheim, R. Dixon, D.R. Moss crop, and M.J. McMullan (1996), The role of earth observation technologies in flood mapping; A Manitoba case study, <i>Can. J. Remote Sens.</i> , 22(1), 137-143. |
| [22] | 1 | De Abreu, R.A., D.G. Barber, K. Misurak, and E.F. LeDrew (1996), The spectral reflectance of first-year and multiyear sea ice during the spring transition period, <i>Ann. Glaciol.</i> , 21, 337-342. |
| [21] | 3 | Barber, D.G., T.N. Papakyriakou, E.F. LeDrew, and S. Shokr (1995b), An examination of the relationship between the spring period evolution of the scattering coefficient (σ°) and energy fluxes over landfast sea ice, <i>Int. J. Remote Sens.</i> , 16(17), 3343-3363. |
| [20] | 1 | Barber, D.G., S.P. Reddan, and E.F. LeDrew (1995a) Statistical characterization of the geophysical and electrical properties of snow on landfast first-year sea ice, <i>J. Geophys. Res.</i> 100(C2), 2673-2686. |
| [19] | 1 | Barber, D.G., T.N. Papakyriakou, and E.F. LeDrew (1994), On the relationship between energy fluxes, dielectric properties, and microwave scattering over snow covered first-year sea ice during the spring transition period, <i>J. Geophys. Res.</i> 99(C11), 22,401-22,411. |
| [18] | 2 | LeDrew. E.F., and D.G. Barber (1994), The SIMMS Program: A study of change and variability within the marine cryosphere, <i>Arctic</i> , 47(3), 256-264. |
| [17] | 3 | Barber, D.G., and E.F. LeDrew (1994), On the links between microwave and solar wavelength interactions within a seasonally dynamic snow covered sea ice volume, <i>Arctic</i> , 47(3), 298-309. |
| [16] | 2 | Richard, P., P. Weaver, L. Dueck, and D. Barber (1994), Distribution and numbers of Canadian High Arctic narwhals, <i>Monodon monoceros</i> , in August 1984, in <i>Studies on White Whales (Delphinapterus leucas) and Narwhals (Monodon monoceros) in the NW and NE Atlantic Arctic</i> , edited by Born, E., R. Dietz and R. Reeves, Meddelelser om Grønland, <i>Bioscience</i> , 39, 41-50. |
| [15] | 3 | Barber, D.G., and E.F. LeDrew (1994), Modeling synthetic aperture radar (SAR) scattering from a seasonally varying snow covered sea ice volume at 5.3 and 9.25 GHz, <i>Polar Res.</i> , 13(1), 35-54, doi:10.1111/j.1751-8369.1994.tb00435.x. |
| [14] | 3 | Shokr, M., and D.G. Barber (1994), Regional variation in geophysical properties of a seasonally varying snow covered sea ice surface: Implications for operational remote sensing algorithm development, <i>J. Glaciol.</i> , 40(134), 16-30. |

| | | |
|------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [13] | 3 | Ramsay, B., T. Hirose, M. Manore, J. Falkingham, R. Gale, D. Barber, M. Shokr, B. Danielowicz, B. Gorman, and C. Livingstone (1993), Potential of RADARSAT for sea ice applications, <i>Can. J. Remote Sens.</i> , 19(4), 352-362. |
| [12] | 3 | Gogineni, S.P., R.K. Moore, T.C. Grenfell, D.G. Barber, S. Digby, and M. Drinkwater (1993), The effects of freeze-up and melt processes on microwave signatures, in <i>Microwave Remote Sensing of Sea Ice</i> , edited by Carsey F., pp. 329-341, American Geophysical Union, Geophysical Monograph #68, 462 pp. |
| [11] | 3 | Barber, D.G., M. Shokr, E. Soulis, R. Fernandes, D. Flett, and E.F. LeDrew (1993), A comparison of second order texture classifiers for SAR sea ice discrimination, <i>Photogramm. Eng. Remote Sens.</i> , 59(9), 1397-1408. |
| [10] | 3 | Barber, D.G., D.G. Flett, R.A. De Abreu, and E.F. LeDrew (1992), Spatial and temporal variations in sea ice geophysical properties and microwave remote sensing observations: The SIMS '90 experiment, <i>Arctic</i> , 45(3), 233-251. |
| [9] | 3 | Barber, D.G., E.F. LeDrew, D.G. Flett, M. Shokr, and J. Falkingham (1992), Seasonal and diurnal variations in SAR signatures of sea ice, <i>IEEE Trans. Geosci. Remote Sens.</i> 30(3), 638-642. |
| [8] | 1 | LeDrew, E.F., and D.G. Barber (1992), Snow, Sea Ice and Climate: A Study of scales, in <i>Arctic Environment: Past, Present and Future</i> , edited by Woo, M.K. and D.J. Gregor. McMaster University Publication, Department of Geography, 164 pp. |
| [7] | 3 | LeDrew, E.F., D.G. Barber, J.D. Dunlop, and T. Agnew (1992), Canadian Sea Ice Atlas from Microwave Remotely Sensed Imagery, July 1987 to June 1990, Atmospheric Environment Service, Environment Canada, Climatological Studies #4. U.D.C. 551.311.18. 80 pp. |
| [6] | 3 | Barber, D.G., P.R. Richard, K.P. Hochheim, and J.R. Orr (1991), Calibration of aerial thermal infrared imagery for population assessment of walrus in the Canadian arctic, <i>Arctic</i> , 44, 58-65. |
| [5] | 3 | Barber, D.G., D. Johnson, and E.F. LeDrew (1991), Measuring climatic state variables from SAR images of sea ice: The SIMS SAR validation site in Lancaster Sound, <i>Arctic</i> , 44, 108-121. |
| [4] | 2 | Barber, D.G., and P.R. Richard (1991), AVHRR for assessment of arctic marine mammal habitat preference, <i>Int. J. Remote Sens.</i> , 13(2), 167-175. |
| [3] | 3 | Barber, D.G., and E. F. LeDrew (1991), SAR sea ice discrimination using texture statistics: A multivariate approach, <i>Photogramm. Eng. Remote Sens.</i> , 57(4), 385-395. |
| [2] | 2 | Richard, P.R., J.R. Orr, and D.G. Barber (1990), The distribution and abundance of beluga, <i>Delphinapterus leucas</i> , in eastern Canadian waters: A review and update, <i>Can. Bull. Fish. Aquat. Sci.</i> , 224, 23-38. |
| [1] | 3 | Barber D.G., K. Hochheim, V. Chorney, and J.P. Roy (1987), Remote sensing imagery catalogue, with applications to environmental monitoring in Northern Manitoba, <i>Ecological Report Series</i> , Northern Flood Agreement, Environment Canada. Manitoba. 554 pp. + colour plates. |
| | | |

Type 1: Causes – n=63

Type 2: Consequences – n=69

Type 3: Techniques – n=62

Total: 194

H-index = 33

Total citations = 3735 (as of June 1, 2014)

3) Papers in review

| | |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Komarov, A., D. G. Barber, D. Isleifson and L. Shafi. (2014). Modelling and Measurement of C-band Radar Backscatter from Snow-Covered First-Year sea ice. <i>IEEE Trans. Geosci. Remote Sensing</i> . In review. |
| 2 | Ogi, M. B. Taguchi, M. Honda, D. G. Barber and S. Rysgaard. (2014). Sea ice in the Arctic Ocean and Okhotsk Sea are interconnected and controlled by atmospheric circulation. <i>Journal of Climate</i> . In review. |
| 3 | Barber, D G., J. K. Ehn, M. Pucko, S. Rysgaard, J. W. Deming, J. S. Bowman, T. Papakyriakou, R Galley, and DH. Soegaard. (2014). Frost flowers on young Arctic sea ice: The climatic, chemical and microbial significance of an emerging ice type. <i>Journal of Geophysical Research (atmospheres)</i> . In review. |
| 4 | Asplin., M.A., L. Candlish, B.G. Else, R.J Galley, R. L. Raddatz, T.N. Papakyriakou, D. G. Barber. (2014). Synoptic Atmospheric Circulation Changes and Sea Ice Lead Formation in the Southern Beaufort Sea . <i>International Journal of Climatology</i> (in review) |
| 5 | Barber, D.G., H. Hop. C. J. Mundy, B. Else, I.A. Dmitrenko, J.E Tremblay, J. Ehn, P. Assmy. M. Saase, L.M. Candlish. and S. Rygaard. (2014). Selected physical, biological and biogeochemical implication of a rapidly changing Arctic margin ice zone. <i>Progress in Oceanography</i> . In review. |
| 6 | Firoozy, N. P. Mojabi, and D. G. Barber. (2014). Nonlinear inversion of Microwave Scattering Data for Snow-Covered Sea Ice Dielectric Profile Reconstruction.. <i>IEEE Trans. Geosci and Remote Sensing Letters</i> . In review. |
| 7 | Scharien, R.K., J. Landy, and D. G. Barber. (2014). Sea ice melt pond fraction estimation from dual-polarization SAR, Part 2. Scaling in situ to Radarsat-2. <i>Cryosphere</i> . In review |
| 8 | Scharien, R.K., J. Landy, and D. G. Barber. (2014). Sea ice melt pond fraction estimation from dual-polarization SAR, Part 1. In Situ Observations. <i>Cryosphere</i> . In review |
| 9 | Iacozza, J. and D. G. Barber. (2014) Annual and Seasonal Climatology of snow and sea ice in the Western Canadian Arctic: Implications for ice adapted marine mammal habitats. <i>Arctic</i> . In review. |
| 10 | Dmitrenko, I.A., S.A. Kirillov, N. Serra, N. V. Koldunov, V. V. Ivanov, U. Schauer, I. V. Polyakov, D.G. Barber, M. Janout, V. S. Lien, M. Makhotin, and Y. Aksenov (2013). Heat loss from the Atlantic water layer in the St. Anna Trough (northern Kara Seas): Causes and consequences. <i>Earth and Planetary Science Letters (EPSL)</i> . In review. |
| 11 | Pučko, M , A. Burt, W. Walkusz, F. Wang, R. W. Macdonald, S. Rysgaard, D. G. Barber, J.-É. Tremblay, and G. A. Stern. (2013). Transformation of mercury at the bottom of the Arctic food web: an overlooked puzzle in the mercury toxicity narrative. <i>Environmental Science and Technology</i> . In review. |
| 12 | Warner, K., R.K. Scharien, D. Isleifson, A. Komarov, J. Landy, and D.G. Barber (2014). Diurnal measurements of C-band backscatter from multiyear sea ice during advanced melt. <i>International Journal of Remote Sensing</i> . In review. |
| 13 | Raddatz RL, Galley RJ, Else, BG, Papakyriakou TN, Candlish LM, Asplin MG and Barber DG, (2014). Downwelling Longwave Radiation and Atmospheric Winter States in the Western Maritime Arctic, <i>Int'l. J. Climatology</i> , In Review |
| 14 | Landy, J.C. D. Isleifson, A.S. Komarov and D. G. Barber. (2014). Parameterization of Centimeter-Scale Sea Ice Surface Roughness using Terrestrial LiDAR. <i>IEEE Trans. GeoSci and Remote Sensing</i> . In review. |
| 15 | Pučko, M., G. A. Stern, R. W. Macdonald, L. M. Jantunen, T. F. Bidleman, F. Wong, D. G. Barber, and S. Rysgaard (2014). The delivery of contaminants to the Arctic food web: why sea ice matters. <i>Environmental Science and Technology</i> . In review. |
| 16 | Raddatz, R., B.G. Els, T.N. Papakyriakou ¹ , K. Swystun ² , D. G. Barber. (2014). A Simple |

| | |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Scheme for Estimating Turbulent Heat Flux over Landfast Arctic Sea Ice from Dry Snow to Advanced Melt. <i>Boundary Layer Meteorology</i> . In review. |
| 17 | Asplin, M.G., D. Fissel, T.N. Papakyriakou, D. G. Barber (2014). Synoptic climatology of the Southern Beaufort Sea troposphere with comparisons to surface winds. <i>Journal of Geophysical Research</i> . In review. |
| 18 | Ogi, M. D. G. Barber and S. Rysgaard. On the relationship between Arctic warming and the cold continental mid latitude winter of 2013-14. <i>Monthly Weather Review</i> . In Review. |

..... *Awards/Distinctions*

Distinguished Professor – Competitive selection (2012) of the top 20 faculty members at the University of Manitoba (<http://umanitoba.ca/admin/governance/879.html>); Lifetime achievement award.

Canada Research Chair (Tier I) in Arctic System Science (2008-2015) (<http://www.chairs-chaires.gc.ca/chairholders-titulaires/profile-eng.aspx?profileId=2464>)

Canada Research Chair (Tier II) in Arctic System Science (2007-2012)

Canada Research Chair (Tier II) in Arctic System Science (2002-2007)

The RH Award. Award for distinction in research in a University of Manitoba wide competition (1994). Certificate and \$2500 was awarded for distinction in the category of Physical Sciences. (http://umanitoba.ca/research/media/Rh_Awards_Nominations_2012.pdf)

Elected as a fellow; Royal Canadian Geographical Society (<http://www.rcgs.org/about/fellows/>); Lifetime achievement award

..... *Grantsmanship*

| Principal Investigator | Grant Description | Amount |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Barber, D.G. | President’s NSERC fund. This grant provided funds to purchase two micro-computers for the CEOS laboratory within the Department of Geography, University of Manitoba. | \$26,000 |
| Barber, D.G. | Faculty of Arts Start-Up Grant. This grant provided funds to purchase a personal computer for my teaching and research responsibilities. | \$21,000 |
| Barber, D.G. | Office of Naval Research, U.S.A. Research Grant to participate, analyse and report on the effect of snow grain size and shape on interactions of visible, thermal and microwave energy, for artificial snow covered sea ice grown at CRRELEX’94. This grant allowed me to participate in a unique international experiment where I can relate my field observations to controlled sea ice growth conditions. | \$19,000 |

| | | |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Barber, D.G. | European Space Agency ESA Research Support Grant - This grant provided in-kind research support through access to ERS-1 Synthetic Aperture Radar (SAR) imagery for my Sea Ice Research. The grant was for 2 years (1993 and 1994). | \$54,000 |
| Barber, D.G. | Sustainable Development Innovations Fund, Province of Manitoba. This grant was used to purchase 3 P.C. machines used in the CEOS laboratory within the Department of Geography, University of Manitoba. | \$25,000 |
| Barber, D.G. | University Research Grants Program. This grant provided general research support and travel in the Winter of 1994. | \$4,400 |
| Barber, D.G. | Northern Studies Trust Fund for Support of one of my masters students to travel to the Canadian Arctic. | \$3,300 |
| Barber, D.G. | SIMMS'93 - Polar Continental Shelf Project, Energy Mines and Resources. This is a grant of in-kind support for helicopter, twin otter and snow machine rental; room and board; field equipment and logistical field support for both the Spring and Fall SIMMS'93 experiments. | \$50,000 |
| Barber, D.G. | NSERC Operating Grant - This is a four-year grant for general research support from the Natural Sciences and Engineering Research Council. | \$68,000 |
| Barber, D.G. | Northern Studies Trust Fund for Support of 2 graduate students in the SIMMS'94 program | \$5,000 |
| Barber, D.G. | SIMMS'94 - Polar Continental Shelf Project, Energy Mines and Resources. This is a grant of in-kind support for helicopter, twin otter and snow machine rental; room and board; field equipment and logistical field support for the Spring SIMMS'94 experiment. | \$60,000 |
| Barber, D.G. | University of Manitoba Research Development Program - This is a grant for 1 year to support the purchase of climate equipment and a Global Positioning System. | \$16,500 |
| Barber, D.G. | European Space Agency ESA Research Support Grant - This grant provided in-kind research support through access to ERS-1 and ERS-2 Synthetic Aperture Radar (SAR) imagery for my Sea Ice Research. The grant was for 1 year (1994/95). | \$32,000 |
| Barber, D.G. | Canadian Wheat Board - This is a 3 year grant to examine the integration of synthetic aperture radar (SAR) and NOAA AVHRR data in crop species differentiation and yield estimation. | \$58,500 |
| Barber, D.G. | AES Subvention Grant - This is a grant for 1 year support of my microwave remote sensing research. | \$10,000 |
| Barber, D.G. | Canada Centre for Remote Sensing. Department of Natural Resources, Ottawa, Ont. Travel Grant to represent Canada at the RADARSAT GPS meeting in Seattle Washington. | \$1,800 |
| Barber, D.G. | Atmospheric Environment Service, Downsview, ON. Travel Grant for Climate Research Network Application Development | \$1,200 |
| Barber, D.G. | Canada Centre for Remote Sensing, Ottawa, ON. Travel Grant to attend the RADARSAT GPS meeting in Boulder, CO. | \$1,700 |
| Barber, D.G. | Atmospheric Environment Service, Downsview, ON. Travel Grant for a second Climate Research Network meeting | \$1,200 |

| | | |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Barber, D.G. | National Aeronautics and Space Administration (NASA) Washington, D.C. This grant provided in-kind research support through access to Synthetic Aperture Radar (SAR) imagery for my Sea Ice Research. The grant is for 2 years (1994/96) | \$328,000 |
| Barber, D.G. | Office of Naval Research, U.S.A. Research Grant to participate, analyze and report on the effect of snow grain size and shape on interactions of visible, thermal and microwave energy, for artificial snow covered sea ice grown at CRRELEX. This grant allowed me to participate in a unique international experiment where I can relate my field observations to controlled sea ice growth conditions. | \$40,000 |
| Barber, D.G. | SIMMS'95 - Polar Continental Shelf Project, Energy Mines and Resources. This is a grant of in-kind support for helicopter, twin otter and snow machine rental; room and board; field equipment and logistical field support for the Spring SIMMS'95 experiment. | \$75,000 |
| Barber, D.G. | Canadian Space Agency and Canada Centre for Remote Sensing. Research Grant for flying hours on the Convair 580 SAR aircraft for sea ice research during SIMMS'95 (30 hours of flying time @ 3K/hour in April and May of 1995) | \$90,000 |
| Barber, D.G. | Ice Centre, Environment Canada - This is a 3 year grant to examine the relationship between the scattering coefficient at C-band (HH pol) and the navigability of ice breaking vessels within first year sea ice. | \$58,500 |
| Barber, D.G. | Canada Centre for Remote Sensing, Natural Resources Canada - This is a 1 year grant to examine the feasibility of inverting geophysical information from remote sensing data for use in agrometeorological models. | \$15,000 |
| Barber, D.G. | Canada Centre for Remote Sensing, Ottawa, Ont. Travel Grant to present a seminar on the design of RADARSAT III to CSA and CCRS in Ottawa, Ont. | \$1,700 |
| Barber, D.G. | Canada Space Agency, Ottawa, Ont. Travel Grant to participate as a 'Expert' reviewer for an international research announcement of opportunity for RADARSAT | \$2,000 |
| Barber, D.G. | Northern Studies Trust Fund for Support of 4 graduate students in the SIMMS'95 program | \$9,000 |
| Barber, D.G. | Canadian Space Agency and Canada Centre for Remote Sensing. Research Grant for flying hours on the Convair 580 SAR aircraft for experiments in agriculture relating to the design of RADARSAT III (40 hours of flying time @ 3K/hour in July and August of 1995) | \$120,000 |
| Barber, D.G. | Canadian Space Agency and Canada Centre for Remote Sensing. Research Grant for flying hours on the Convair 580 SAR aircraft for Flood Mapping in the Assiniboine River Valley (20 hours of flying time @ 3K/hour in April of 1995) | \$60,000 |
| Barber, D.G. | The RH Institute Award. A Research Excellence Award for outstanding scholarly contributions in Physical Science | \$2,500 |
| Barber, D.G. | Canada Centre for Remote Sensing, Ottawa, Ont. Travel Grant to present a seminar on the design of RADARSAT III to CSA and CCRS in Ottawa, Ont. | \$1,600 |
| Barber, D.G. | Canadian Climate Centre, Atmospheric Environment Service. Research Grant to investigate the relationship between snow water equivalence and SSM/I brightness temperatures. | \$20,000 |

| | | |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Barber, D.G. | Canadian Climate Centre, Atmospheric Environment Service. Research Grant to investigate the relationship between physical, electrical and microwave scattering characteristics over snow covered sea ice. | \$15,000 |
| Barber, D.G. | Ice Centre Environment Canada, Grant in support of the purchase of a surface based scatterometer | \$15,000 |
| Barber, D.G. | Canada Centre for Remote Sensing - Radar Data Development Programme (RDDP). Grant in support of the purchase of a surface based scatterometer | \$25,000 |
| Barber, D.G. | Office of Naval Research, U.S.A. Research Grant to participate in the Snow/Sea Ice Electromagnetics Accelerated Research Initiative (ARI). | \$33,500 |
| Barber, D.G. | Ice Centre, Environment Canada. Grant to support Arctic Sea Ice Research | \$35,000 |
| Barber, D.G. | Canadian Space Agency ADRO research grant to support research into agricultural remote sensing with RADARSAT (3 year grant) | \$44,000 |
| Barber, D.G. | Canadian Climate Centre, Toronto, Ont. Travel Grant to present a seminar on research results of CRYSYS research projects. | \$1,500 |
| Barber, D.G. | Canadian Space Agency ADRO research grant to support research into sea ice remote sensing with RADARSAT (3 year grant) | \$17,000 |
| Barber, D.G. | C-ICE'96 - Polar Continental Shelf Project, Energy Mines and Resources. This is a grant of in-kind support for helicopter, twin otter and snow machine rental; room and board; field equipment and logistical field support for the Spring SIMMS'96 experiment. | \$75,000 |
| Barber, D.G. | Canadian Space Agency. Research support grant for access to RADARSAT satellite data (both sea ice and agricultural projects = 45 scenes@1000/scene) | \$45,000 |
| Barber, D.G. | World Bank and CIDA grant to support research work on the Lake Malawi Biodiversity Conservation Project, Malawi Africa. (4 year grant) | \$278,500 |
| Barber, D.G. | Province of Manitoba. Research support grant for access to RADARSAT satellite data (22 scenes@1000/scene) | \$22,000 |
| Barber, D.G. | Geomatics Canada, Ottawa, Ont. Travel Grant to participate in the National Advisory Council to the Canada Centre for Remote Sensing (May'96) | \$1,800 |
| Barber, D.G. | National Aeronautics and Space Administration (NASA) Washington, D.C. This grant provided in-kind research support through access to Synthetic Aperture Radar (SAR) imagery for my Sea Ice Research. The grant is for 2 years (1996/98) | \$200,000 |
| Barber, D.G. | Northern Studies Trust Fund for Support of 4 graduate students in the C-ICE'96 program | \$8,600 |
| Barber, D.G. | Canadian Space Agency and Canada Centre for Remote Sensing. Research Grant for flying hours using the Itres Inc. Compact Airborne Spectral Imager (CASI) - [10 hours of flying time @ 2K/hour in July of 1996] | \$20,000 |
| Barber, D.G. | Program Development Fund of the Faculty of Arts. Grant to help support the purchase of a large format colour plotter | \$10,000 |
| Barber, D.G. | Ice Centre, Environment Canada. Grant to support analysis of passive microwave | \$15,000 |

| | | |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| | signature of sea ice from the C-ICE'96 experiment | |
| Barber, D.G. | Office of Naval Research, U.S.A. Research Grant to participate in the Snow/Sea Ice Electromagnetics Accelerated Research Initiative (ARI). | \$26,259 |
| Barber, D.G. | Canadian Ice Services. Support for the C-ICE'97 experiment | \$45,000 |
| Barber, D.G. | Canadian Climate Centre, Atmospheric Environment Service. Research Grant to develop a technique for estimation SWE over snow covered sea ice. | \$20,000 |
| Barber, D.G. | Canadian Climate Centre, Atmospheric Environment Service. Research Grant to investigate approaches available for linking remote sensing data within numerical climate process models | \$15,000 |
| Barber, D.G. | Travel grant to participate in the NSERC site visit for the NOW experiment | \$1,700 |
| Barber, D.G. | Northern Studies Training Program to support the C-ICE'97 experiment | \$10,400 |
| Barber, D.G. | C-ICE'97 - Polar Continental Shelf Project, Energy Mines and Resources. This is a grant of in-kind support for helicopter, twin otter and snow machine rental; room and board; field equipment and logistical field support for the Spring C-ICE'97 experiment. | \$60,000 |
| Barber, D.G. | Research support grant from CIS for C-ICE'97 for support of field logistical costs and student support. | \$55,000 |
| Barber, D.G. | Support from the Department of Fisheries and Oceans for training of two graduate students (1 PhD and 1 masters) as part of the Lake Malawi Biodiversity Conservation Program | \$90,000 |
| Barber, D.G. | Support in kind for equipment rental, staff salaries and Radarsat data from the Canadian Ice Services in support of the C-ICE-97 experiment | \$20,000 |
| Barber, D.G. | Sea Ice/Climate Dynamics subgroup of the North Water Polynya Study (NOW). Research grant from NSERC for a National Network. | \$120,000 |
| Barber, D.G. | Sea Ice/Climate Dynamics subgroup of the North Water Polynya Study (NOW). Research grant from NSERC for a National Network. | \$250,000 |
| Barber, D.G. | Canadian Climate Centre, Atmospheric Environment Service. Research Grant to develop a technique for estimation SWE over snow covered sea ice. | \$18,000 |
| Barber, D.G. | Canadian Climate Centre, Atmospheric Environment Service. Research Grant to investigate approaches available for linking remote sensing data within numerical climate process models | \$16,000 |
| Barber, D.G. | Canadian Ice Services, Environment Canada, Research Grant to support analysis of C-ICE'97 radiometer data | \$12,000 |
| Barber, D.G. | Canadian Ice Services, Environment Canada, Support in Kind for the North Water Polynya Study (NOW). | \$75,000 |
| Barber, D.G. | Canadian Ice Services, Environment Canada, Research Grant to support the North Water Polynya Study (NOW). | \$25,000 |

| | | |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Barber, D.G. | National Aeronautics and Space Administration (NASA) Washington, D.C. This grant provided in-kind research support through access to Synthetic Aperture Radar (SAR) imagery for my Sea Ice Research. The grant is for 2 years (1999-2001) | \$200,000 |
| Barber, D.G. | Arctic Ice Regime Shipping System research project supported by Transport Canada and Canadian Ice Services | \$100,000 |
| Barber, D.G. | National Ice Services, Washington, DC. Research Grant to support the North Water Polynya Study (NOW). | \$30,000 |
| Barber, D.G. | Arctic Ice Regime Shipping System research project supported by Canadian Ice Services | \$25,000 |
| Barber, D.G. | Development of the Disaster Information Research Centre (DIRC). Canadian Space Agency and the Government of Manitoba | \$30,000 |
| Barber, D.G. | Support for the CFI proposal for DIRC from the Western Economic Diversification fund. | \$20,000 |
| Barber, D.G. | C-ICE'98 (NOW) - Polar Continental Shelf Project, Energy Mines and Resources. This is a grant of in-kind support for helicopter, twin otter and snow machine rental; room and board; field equipment and logistical field support for the Spring C-ICE'98 experiment. | \$100,000 |
| Barber, D.G. | Northern Studies Training Program to support the C-ICE'98/NOW experiment | \$12,000 |
| Barber, D.G. | Arctic Ice Regime Shipping System (Phase 2 and 3) research project supported by Transport Canada and Canadian Ice Services | \$75,000 |
| Barber, D.G. | NSERC Operating Grant - This is a 4 year grant for general research support from the Natural Sciences and Engineering Research Council. | \$111,804 |
| Barber, D.G. | NSERC Equipment Grant – This is an equipment grant to purchase an Analytical Spectral Devices (ASD) spectrometer. | \$35,000 |
| Barber, D.G. | NOW sea ice collaborative research with the Canadian Ice Services | \$25,000 |
| Barber, D.G. | Joint Ocean-Ice Study (JOIS'98). Support from the Canadian Coast Guard and the Department of Fisheries and Oceans for the Canadian Ice Breaker Louis St. Laurent and helicopter support for the Fall C-ICE'98 experiment. | \$150,000 |
| Barber, D.G. | Purchase of a ceilometer for climate change research from the Faculty of Arts and Research Administration. | \$10,000 |
| Barber, D.G. | Globesar projects for collaborative research work in Argentina, Brazil and Peru. Funds are provided by CCRS for travel between labs, per diem support and collaboration on field research. | \$80,000 |
| Barber, D.G. | Support for microwave radiometry project as part of C-ICE'98 from the Canadian Ice Services | \$10,000 |
| Barber, D.G. | C-ICE'99 - Polar Continental Shelf Project, Energy Mines and Resources. This is a grant of in-kind support for helicopter, twin otter and snow machine rental; room and board; field equipment and logistical field support. | \$70,000 |

| | | |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Barber, D.G. | Support for thermodynamic-microwave scattering research into ice decay from the Canadian Ice Services | \$25,000 |
| Barber, D.G. | Sponsorship from the Gordon Research Conference on Polar Marine Science to participate as an invited speaker and to support the travel of one graduate student and post doctoral fellow from my lab. | \$5,000 |
| Barber, D.G. | Northern Studies Training Program to support the C-ICE'99 experiment | \$3,000 |
| Barber, D.G. | Collaborative research grant from the Centre for International Forest Research (CIFOR) in Indonesia | \$111,000 |
| Barber, D.G. | CRYSYS – Canadian CRYSYS project grant to support research into high latitude climate change. | \$38,000 |
| Barber, D.G. | Parks Canada support for research into the application of NDVI time series data from the GEOCOMP system in arctic parks (with N. Kenkel, Botany) | \$90,000 |
| Barber, D.G. | Support for NOW research programme from the Canadian Ice Service | \$25,000 |
| Barber, D.G. | Support for the C-ICE'00 and '01 field experiments from the Canadian Ice Service | \$60,000 |
| Barber, D.G. | C-ICE'00 - Polar Continental Shelf Project, Energy Mines and Resources. This is a grant of in-kind support for helicopter, twin otter and snow machine rental; room and board; field equipment and logistical field support. | \$70,000 |
| Barber, D.G. | CFI equipment infrastructure grant to outfit a Canadian Ice Breaker for Marine Science Applications (\$980,000 total grant). Joint with U of Laval. | \$57,968 |
| Barber, D.G. | Manitoba Hydro Supported Project to examine the utility of passive microwave remote sensing for SWE estimation. | \$5,000 |
| Barber, D.G., | Fisheries and Oceans support for establishment of a Centre for Northern Studies at the University of Manitoba | \$25,000 |
| Barber, D.G., | Manitoba Conservation support for establishment of a Centre for Northern Studies at the University of Manitoba | \$10,000 |
| Barber, D.G. | Northern Studies Training Program to support the C-ICE'00 experiment | \$7,000 |
| Barber, D.G., | Prepare and deliver a national workshop on the role of Earth Observations in climate change (PARC) | \$15,000 |
| Barber, D.G., | Supplemental funding for CRYSYS'99 funding from the Meteorological Survey of Canada. | \$15,000 |
| Barber, D.G. | NSERC Equipment Grant – This is an equipment grant to purchase a UNIX workstation for numerical modelling | \$25,000 |
| Barber, D.G. | Meteorological Services of Canada. Research Grant to examine the role of clouds in microwave emission over sea ice. | \$10,000 |
| Barber, D.G. | Meteorological Services of Canada. Research Grant to link microwave remote sensing to a one-dimensional thermodynamic model of snow covered sea ice. | \$22,000 |
| Barber, D.G. | Northern Studies Training Program to support the C-ICE'01 experiment | \$15,000 |
| Barber, D.G. | C-ICE'01 - Polar Continental Shelf Project, Energy Mines and Resources. This is a | \$120,000 |

| | | |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| | grant of in-kind support for helicopter, twin otter and snow machine rental; room and board; field equipment and logistical field support. | |
| Barber, D.G. | Meteorological Services of Canada. CRYSYS Research Grant to examine aspects of remote sensing of snow on sea ice. | \$35,000 |
| Barber, D.G., | Canadian Arctic Shelf Exchange Study (CASES; L. Fortier/Laval/PI). An NSERC network grant for \$10M over 5 years; My portion in cash is over and above access to ship time. | \$691,000 |
| Barber, D.G., | Canadian Arctic Shelf Exchange Study (CASES; L. Fortier/Laval/PI). Ship time allocation for subgroup-2, which I lead (calculated as 57 berths for 42 days each at \$600 per day). | \$1,436,400 |
| Barber, D.G. | Three year grant from the Canadian Forest Service, NSERC and SHRC tri-council to develop an ecological forest classification system in Manitoba (with Dr's Baydack and Campbell) | \$400,000 |
| Barber, D.G. | C-ICE'02 - Polar Continental Shelf Project, Energy Mines and Resources. This is a grant of in-kind support for helicopter, twin otter and snow machine rental; room and board; field equipment and logistical field support. | \$120,000 |
| Barber, D.G., | A Canadian Research Icebreaker (L. Fortier, Laval/PI). A CFI international fund award totally 27.5M\$ over four years. My portion of this grant is 1.14M\$ in direct capital equipment that my lab purchased and will maintain | \$1,136,382 |
| Barber, D.G., | A Canadian Research Icebreaker (L. Fortier, Laval/PI). A CFI international fund award totally 27.5M\$ over four years. My portion of this grant is about 3.2M\$ in support in kind for ship time and access to the infrastructure for my research group | \$3,200,000 |
| Barber, D.G. | Northern Studies Training Program to support the C-ICE'02 experiment | \$22,000 |
| Barber, D.G. | CRYSYS support from Meteorological Service of Canada for modelling snow on sea ice | \$32,000 |
| Barber, D.G. | University of Manitoba Research Support Grant to prepare an application for a Networks of Centre's of Excellence in Arctic System Science. | \$5,000 |
| Barber, D.G. | Canada Research Chair (Tier II). Five year grant to support operations of the chair | \$500,000 |
| Barber, D.G. | Canada Foundation for Innovation. Chair infrastructure award | \$400,000 |
| Barber, D.G. | Western Economic Diversification and the University of Manitoba. Support to develop a CFI Institutional Innovation Fund proposal for the Agassiz Centre | \$50,000 |
| Barber, D.G. | ArcticNet – a Network of Centres of Excellence to study the changing Arctic. I am theme leader for the Hudson Bay project in ArcticNet and participate in each of the other 3 themes. I control operating funds for theme 3 of about 0.7M\$ per year from the total NCE budget of 45M\$ over 7 years. | \$700,000 |
| Barber, D.G. | ArcticNet – a Network of Centres of Excellence to study the changing Arctic. Ship time allocation for the subgroups for which I play a leadership role; estimated at 25 berths, 42 days in duration at \$600 per day representing an average annual value. | \$630,000 |
| Barber, D.G. | Northern Studies Training Program to support my C-ICE and CASES 2003 experiments | \$14,000 |
| Barber, D.G. | Snow Water Equivalent (SWE) estimation and biological linkages. CRYSYS support for ongoing arctic system science program | \$40,000 |
| Barber, D.G. | Polar Continental Shelf Project (PCSP) logistics support for my Resolute Bay and | \$65,000 |

| | | |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| | CASES field experiments in 2003 for twin otter, helicopter and field logistics. | |
| Barber, D.G. | European Space Agency (ESA) access to ENVISAT data in support of CASES. 275 ASAR scenes Sept 03 to Sept 04. | \$275,000 |
| Barber, D.G. | Canadian Space Agency. Sub-ice primary production estimates from Radarsat (with C. Michel, DFO, FWI). | \$50,000 |
| Barber, D.G. | Canadian Space Agency. Optical Properties of Lake Winnipeg | \$150,000 |
| Barber, D.G. | CRYSYS support for Sea Ice/climate interactions in Hudson Bay | \$25,000 |
| Barber, D.G. | Canadian Space Agency – purchase of ENVISAT data | \$60,000 |
| Barber, D.G. | NSERC Discovery Grant (5 years) | \$255,000 |
| Barber, D.G. | NSERC Equipment Grant (Air/Ice boat) | \$28,000 |
| Barber, D.G. | European Space Agency (ESA) data from ENVISAT and MERIS (2003-2004) | \$175,000 |
| Barber, D.G. | Polar Continental Shelf Project (PCSP) logistics support for the CASES04 project | \$70,000 |
| Barber, D.G. | Manitoba Centres of Excellence Fund to support Theme 3 of ArcticNet | \$82,000 |
| Barber, D.G. | Network of Centres of Excellence – ship time funds for theme 3 | \$1,200,000 |
| Barber, D.G. | Polar Continental Shelf Project – support for Churchill sea ice camp | \$10,000 |
| Barber, D.G., | Manitoba Hydro – Annual Mooring for the Nelson River | \$155,000 |
| Barber, D.G. | Manitoba Hydro – Summer Nelson River Program (field logistics July/August, 2005) | \$200,000 |
| Barber, D.G. | Manitoba Hydro – Helicopter Support for the Ice-Plume Study Oct'05-May'06) | \$144,000 |
| Barber, D. G. | Manitoba Centre of Excellence Fund (MCEF) support for ArcticNet | \$100,663 |
| Barber, .D. G. | Manitoba Hydro – Peatlands Project | \$28,000 |
| Barber, D.G. | Canada Research Chair (Tier II). Year 1 of a 5 year renewal to support operations of the chair | \$100,000 |
| Barber, D.G. | Environment Canada, CRYSYS project | \$20,000 |
| Barber, D.G. | NSERC outreach award – Arctic Climate Change Youth Forum | \$11,450 |
| Barber, D.G. | NSERC Promo Science (2years) | \$50,000 |
| Barber, D.G. | Manitoba Hydro purchase of monitoring equipment for the Nelson River project | \$241,000 |
| Barber, D.G. | CFCAS, Storms in the Arctic (year 1) | \$124,500 |
| Barber, D.G. | NSERC Major Facility Access Grant (MFA) for technical support for the Amundsen (my portion of the grant per year for 3 years) | \$153,000 |
| Barber, D.G. | Canada Foundation for Innovation (CFI) Leaders Edge Fund (LEF) for scientific equipment for the NGCC Amundsen (10.8M\$ grant; L. Fortier) U of M portion was 40%. | \$4,241,106 |
| Barber, D.G. | NSERC International Polar Year Award for the Circumpolar Flaw Lead (CFL) | \$768,000 |

| | | |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| | system study (3 year grant showing total) | |
| Barber, D.G. | Federal International Polar Year Programs for the Circumpolar Flaw Lead (CFL) system study (4 year grant showing total) | \$6,000,000 |
| Barber, D. G. | Infrastructure support from the Federal International Polar Year Programs for ship time, helicopter and twin Otter support for the CFL system study (2 year grant showing total) | \$15,300,052 |
| Barber, D.G., | Nelson River Mooring Equipment Grant from Manitoba Hydro | \$150,000 |
| Barber, D.G. | Circumpolar Flaw Lead System Study, Year Zero seed funding | \$60,000 |
| Barber, D. G. | Manitoba Centre of Excellence Fund (MCEF) support for ArcticNet | \$100,663 |
| Barber, D.G. | NSERC northern supplement for the International Polar Years | \$40,000 |
| Barber, D.G. | NSERC Promoscience award for Schools on Board | \$130,000 |
| Barber, D.G. | Canada Research Chair (Tier 1) – seven years at 200K per year | \$1,400,000 |
| Barber, D.G. | Canada Foundation for Innovation – L band scatterometer | \$317,000 |
| Barber, D.G. | ArcticNet NCE funding (Phase 2): Freshwater-Marine coupling in Hudson Bay; 3 year grant showing total | \$363,285 |
| Barber, D.G. | ArcticNet NCE funding (Phase 2): Sea Ice in a changing climate; 3 year grant showing total | \$391,230 |
| Barber, D.G. | ArcticNet NCE funding (Phase 2): Hudson Bay Integrated Regional Impact Study (IRIS); 3 year grant showing total | \$190,000 |
| Barber, D.G. | ArcticNet NCE funding (Phase 2): Schools on Board; 3 year grant showing total | \$160,000 |
| Barber, D.G. | ArcticNet NCE funding (Phase 2): Ship time allocation for the subgroups which I lead; estimated at 25 berths, 42 days in duration at \$1000 per day representing an average annual value. | \$1,050,000 |
| Barber, D.G. | Canada Foundation for Innovation (CFI), Infrastructure Operating Funds (IOF) | \$508,932 |
| Barber, D.G. | Manitoba Networks of Centres of Excellence funding | \$91,855 |
| Barber, D.G. | Wang, F, Papakyriakou, T., and D. G. Barber. The Sea Ice Environmental Research Faculty (SERF). Canada Foundation for Innovation. Leaders Opportunity Fund | \$973,127 |
| Barber, D.G. | Walter and Gordon Duncan Foundation. Schools on Board Traditional Knowledge Kits. | \$15,800 |
| Barber, D.G. | NSERC Discovery Grant (5 years) | \$350,000 |
| Barber, D.G. | NSERC northern supplement | \$25,000 |
| Barber, D.G. | Imperial Oil Limited (IOL) – ArcticNet joint research agreement (operating funds) | \$462,200 |
| Barber, D.G. | Imperial Oil Limited (IOL) – ArcticNet joint research agreement capital funds) | \$468,928 |
| Barber, D. G. | Manitoba Networks of Centres of Excellence program | \$172,000 |
| Barber, D.G. | ArcticNet/Imperial Oil Ship Time allocation for metocean and sea ice; July-November, 2009. | \$1,260,000 |

| | | |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Barber, D.G. | International Polar year Winnipeg Symphony Gala | \$10,000 |
| Barber, D.G. | Canada Excellence Research Chair Program (combined grant led by DB) showing externally contributed funds only; total project (48M\$) | \$22,000,000 |
| Barber, D.G. | Manitoba Hydro. Support for a freshwater plume study of the Nelson Estuary | \$600,000 |
| Barber, D. G | BP oil and gas company, ArcticNet joint research agreement operating funds | \$625,200 |
| Barber, D. G | BP oil and gas company, ArcticNet joint research agreement capital funds | \$388,000 |
| Barber, D.G. | ArcticNet/BP Ship Time allocation for metocean and sea ice; July-November, 2010. | \$1,400,000 |
| Barber, D.G. | Manitoba Hydro support for Research in Hudson Bay and the Nelson River Estuary, Ship time and postdoctoral fellow support | \$300,000 |
| Barber, D. G. | ArcticNet – Freshwater-Marine coupling | \$191,095 |
| Barber, D. G. | ArcticNet – Sea Ice | \$130,410 |
| Barber, D.G. | Imperial Oil Limited (IOL) – ArcticNet joint research agreement | \$916,950 |
| Barber, D.G. | ArcticNet/Imperial Oil Ship Time allocation for metocean and sea ice; august, 2011 | \$700,000 |
| Barber, D. G. | Manitoba Networks of Centres of Excellence program | \$160,000 |
| Barber, D.G. | Indirect Costs of Research Program (CFI) | \$320,000 |
| Barber, D.G. | Imperial Oil – ArcticNet oil and gas industry program, Ship time for ice research | \$750,000 |
| Barber, D. G. | Imperial Oil – ArcticNet oil and gas industry program, Research Funding | \$884,950 |
| Barber, D. G. | Government of Manitoba, Canada Excellent Research Chairs (CERC) matching funds- showing 7 year total. | \$3,500,000 |
| Barber, D. G. | Government of China. International travel grant to support a 1 month sabbatical leave in China with meetings at the Ocean University of China, The Chinese Arctic and Antarctic Administration, University of Beijing, and the Chinese Polar Institute | \$12,000 |
| Barber, D. G. | Beaufort Sea Regional Environmental Assessment (BREA) unmanageable sea ice features. Three year grant showing total | \$1,125,000 |
| Barber, D.G. | NSERC - The Schools on Board Program; outreach and environmental education. Three year grant showing total | \$75,000 |
| Barber, D.G. | ArcticNet Ship Time allocation for sea ice research; summer 2012 | \$480,000 |
| Barber, D.G. | Greenland research project in Daneborg. Air fare, shipping, accommodations, field transportation. March 7 – 31, 2012, Greenland Natural Resources Institute | \$32,000 |
| Barber, D. G. | Funding to support aircraft time for the Arctic-Ice project in Resolute Bay, ArcticNet incremental funding | \$24,192 |
| Barber D.G. | Funding to support an international meeting for the Arctic Ocean Drift Study (Arctic ODS) from the University of Alaska, Fairbanks | \$10,000 |
| Barber, D.G. | European Space Agency. Research into microwave scattering of melt ponds | \$97,103 |
| Barber, D.G. | Transport Canada Arctic Marine shipping; education and outreach | \$50,000 |

| | | |
|--------------------------|------------------------------------------------------------------|---------------------|
| Barber, D.G. | ArcticNet Ship Time allocation for sea ice research; summer 2013 | \$350,000 |
| Barber, D.G. | Imperial Oil sea ice motion in the Southern Beaufort Sea | \$301,520 |
| Barber, D.G. | Transport Canada Arctic Marine shipping in Hudson Bay | \$587,000 |
| Barber, D.G. | World Wildlife Fund, Narwhal Habitat analysis | \$52,200 |
| Total Grants Held | | \$89,014,924 |

Service

The following activities illustrate some of the impacts of my work at both the national and international level.

- Appointed to the International Advisory Committee of the Norwegian ICE centre, Norwegian Polar Institute (NPI) Tromsø, Norway. Advise on budget and science program priorities of the NPI-ICE program (2012-2016).
- Appointed as chair of the NSERC Postgraduate fellowships and scholarship committee for the term 2011 to 2014
- Member, European Space Agency Earth Science Advisory Council (ESAC) four-year appointment (2011-2015).
- Invited presentations – Chinese Academy of Sciences, Polar marine programs.
- Invited presentations – Korean Polar Research Institute.
- Invited Presentation, Polar Bear Technical Committee; Sea ice as a habitat for polar bears.
- Invited Parliamentary Presentation on the Arctic and Climate Change.
- Member, GEWEX Radiation Panel
- Invited Presentation; Polar Bear Management, sea ice habitat, and the CITES process.
- Chair, NSERC northern supplements committee
- Member, Research Management Committee (RMC) of ArcticNet.
- Member, NSF committee on a Polar Observing System.
- Chair, Canada Foundation for Innovation, Institutional Innovation Competition (2009)
- Member, NSERC IPY committee.
- Member, ICARP II steering committee.
- Co-Lead on the International Polar Year (IPY) PanArctic Marine Ecosystem Cluster (PAN-AME) with Dr. Stig Falk-Petersen (Norway).
- Lead of the Canadian Flaw Lead (CFL system) proposal to Canadian IPY.
- Collaborator on 4 IPY proposals linking international polar research as part of IPY.
- Nominated (with 7 colleagues) for the Brockhouse Award (2004)
- Nominated to the Canadian National Committee for the Scientific Committee on Oceanic Research (2004-2007)
- Awarded a Canada Research Chair (Tier II) in ‘Arctic System Science’ 2002-2007.
- International Arctic Polynya Program (IAPP). Appointed by my peers as a member, Arctic Ocean Science Board IAPP committee for the term 2001-2005.
- Scientific Steering Committee member and subgroup PI for the CASES network.

- Member, Research Management Committee of ArcticNet, (2003-2010) and CASES (2002-2007).
- Appointed as external reviewer of Geography programs at the U of Western Ontario and Regina.
- Appointed to the NSERC Environmental Earth Sciences Grant Selection Committee (09) for the term 2000 to 2003.
- Guest Editor. *Annals of Glaciology*, International Glaciological Society, Fairbanks, Alaska.
- Guest Editor. North Water Physical Processes special issue. *Atmosphere-Ocean*.
- Co-Editor with W.O. Smith on a textbook on the bipolar physical and biological processes in polynyas.
- Principal Investigator for the Sea Ice/Climate dynamics subgroup of the North Water Polynya (NOW) experiment (1997-2001).
- Appointed as a member of the Canada Foundation for Innovation (CFI) Roundtable on Environmental Science (2001).
- Appointed to a NASA review panel for Earth Science Enterprise (2002)
- I receive, on average, 4 requests per year to be a guest speaker at conferences, workshops, and government planning meetings (e.g., CFCAS climate change workshop in Ottawa, CMOS Rimouski, Chapman conference on arctic oceanography, Latvia polar processes, etc).
- I review, on average, 15 journal papers per year for journals such as *Journal of Geophysical Research (Oceans and Atmosphere)*, *Journal of Climate*, *Journal of Physical Oceanography*, *Arctic*, *Atmosphere-Ocean*, *Canadian Journal of Remote Sensing*, etc.
- I have contributed to a number of foreign grant agency review processes including NSF, Norwegian Research Council, NASA, ESA and NOAA.
- I contribute an average of 100 media interviews per year pertaining to climate change and sea ice.

Leadership

I am recognized as a world leader in the field of ‘Arctic System Science’. My group is recognized as a world-class research unit as evidenced by the successful competition for a Canada Excellence Research Chair (CERC) in Arctic Geomicrobiology and Climate Change. My team and I were also instrumental in the planning and research output from the NSERC-funded networks NOW and CASES; the CFI-funded Canadian Research Icebreaker *Amundsen* (Laval and Manitoba being the two Universities receiving funds); the CFI funded Sea Ice Environmental Research Facility (SERF); and in development of the ArcticNet Network of Centres of Excellence (NCE). I am one of four principal scientists in our ArcticNet networks of Centres of Excellence (NCE). I lead the Hudson Bay Integrated Regional Impact Study (IRIS), all sea ice related research, and coupled ocean-sea ice-atmosphere (NEMO) modeling in Baffin Bay, Hudson Bay and the Southern Beaufort Sea, on behalf of the ArcticNet network. I also recently led the International Polar Year (IPY) Circumpolar Flaw Lead (CFL) study; a \$40M international science project focused on the impacts of climate change on the High Arctic through an overwintering of the Canadian Research Icebreaker *Amundsen* in the southern Beaufort Sea. Over 365 scientists from 22 countries participated. This project was the first ever to keep a fully staffed research icebreaker mobile in the flaw lead system of the high Arctic through an annual cycle. I am recognized internationally through a number of invited presentations (e.g., International Polar Year, Chinese Academy of Sciences, American Geophysical Union (AGU), Canadian Meteorological and Oceanographic Society (CMOS),

International Glaciological Society (IGS), American Meteorological Society (AMS), Russian Academy of Sciences, American Society for Limnology and Oceanography, IMPACTS (Russia), ICARP I and II, European Space Agency (ESA, Italy), Arctic Science Summit Week (ASSW) and Arctic Frontiers (Norway). I have also been recognized for leadership by appointments to several NSERC national committees (e.g., GSC 09; IPY, NSP, Bursaries and Scholarships, etc.), CFI committees (Chair, CFI MAC, member of the environmental round table), and international committees (GEWEX, IAPP, IASC, ISAC, SEARCH, AOSB, etc.).

My work has significant influence and impact for governments at the international, national, provincial and territorial levels. I have had direct input on a number of issues (e.g., Arctic climate change, ringed seal and polar bear legislation, National Energy Board (NEB) proceedings, Marine Transportation and cumulative impacts of Hydroelectric regulation in Hudson Bay) and have influenced many other issues (e.g., talks to various levels of government on the need for Greenhouse gas emission controls, Arctic shipping, coastal erosion, northern oil and gas development, mining, Arctic Council briefings, etc.). My work has also been used extensively by industry, particularly oil and gas through development of engineering values for infrastructure design and information systems required for ice management. The ArcticNet-Industry partnership has resulted in five sea ice and metocean data reports to industry detailing ice mechanical state variables, and climate forcing of ice required for development of ice modelling and management by industry. I have also contributed extensively to development of cumulative impacts of hydroelectric regulation on marine processes in Hudson Bay, through a 9-year partnership with Manitoba Hydro. My work is also often used by Inuit organizations involved in sustainable development (e.g., Fisheries Joint management Committee, Inuvialuit Game and Wildlife councils, Beaufort Regional Environmental Assessment, etc.). I have also been involved with the Intergovernmental Panel on Climate Change (IPCC) as a reviewer of the cryosphere chapter and as a lead author of the Snow, Sea Ice, and Permafrost international assessment report commissioned by the Arctic Council. I currently lead an NSERC CRD application (\$15M) joint with Manitoba Hydro, a CFI application (\$28M) to develop the Churchill Marine Observatory (CMO) joint with industry, government and international partners, and a CFI Major Science Infrastructure application for the CCGS *Amundsen* (\$8.1M). My CRC has allowed me to significantly improve my institution's leverage of additional research resources. I have raised over \$89M since I began my academic career at U of M in 1993: \$5M in my first 7 years; \$14M in the next 7 years; and \$70M in the most recent 7 years. I lead or co-lead a number of national and international research projects:

Major Research Projects

i-AMS – Industrialization of the Arctic Marine System.
(2015-2021)

I lead an NSERC Collaborative Research and Training Experience (CREATE) program grant. The focus of this program is to integrate leading edge science with industry currently developing a presence in the rapidly opening Arctic. The focus spans a variety of issue designed to ensure sustainable development of Arctic natural resources, transportation, fisheries and development of scientifically based regulation of these emerging industries. This is a \$960K proposal to the NSERC CREATE program.

BaySys – Freshwater – marine coupling in the Hudson Bay marine system
(2015-2019)

I lead a large-scale multidisciplinary proposal to conduct a winter and spring field program in Hudson Bay in collaboration with Manitoba Hydro and ArcticNet. This NSERC-CRD proposal calls for a four-year effort to examine the relative contributions of climate change versus those of hydroelectric regulation of freshwater-marine coupling in the Hudson Bay system. This is a \$14.96M proposed NSERC Collaborative Research and Development (CRD) network grant application.

The Churchill Marine Observatory (CMO)
(2015-2020)

I lead a group of scientists proposing to develop a marine observatory in Churchill Manitoba. This system will integrate an oil in sea ice mesocosm (OSIM) with an environmental observatory (EO). Research in this facility will examine the detection, impacts and mitigation of oil in sea ice. The project is currently a CFI application to the 2014 call for proposals. Partners include numerous private sector companies, federal, provincial and territorial governments, Inuit organizations and the Port of Churchill (Omnitrac). This is a \$31M proposed CFI institutional innovation program proposal. <http://www.winnipegfreepress.com/local/a-place-to-study-arctic-oil-spills-256126451.html>

Oil2Sea – a proposal to the Villum Foundation, Denmark.
(2015-2020)

I co-lead a proposal with Dr. S. Rysgaard to the Villum Foundation of Denmark for a \$34M (CDN) project to examine the effects of oil and gas development and Arctic Shipping in the Greenland Sea and Baffin Bay. The project will focus on marine waters around Greenland and will provide new data on the vulnerabilities of oil and gas exploration and marine shipping relative to the physical, biological and biogeochemical systems operating in this region. The project brings together members of the Arctic Science Partnership (ASP) into an international collaboration on the impacts of industrial development on the Arctic marine system. I lead the sea ice subgroup of this proposal.

MOSAiC – Multidisciplinary drifting Observatory for the Study of Arctic Climate
(2015-2020)

My group contributes to a USA-led international, multidisciplinary study of the effects of a rapidly changing sea ice cover on the exchange of mass and energy across the OSA interface by drifting with the sea ice for a full annual cycle; development of improved process parameterization of these processes; and integration of these processes into local and regional scale couple ocean-sea ice-atmosphere models. This is proposed as a \$32M (US) research collaboration being coordinated by the International Arctic Science Committee (IASC). (<http://www.mosaicobservatory.org/contacts.html>)

Horizon 2020 - The Pan-Arctic Research Collaboration (PARC)
(2015-2020)

This is a proposal to establish a Pan-Arctic Research Collaboration to develop a comprehensive research program for the four Arctic regions as pointed out by ACIA (Arctic Climate Impact Assessment). For each region we will address impacts on or effects from 1) Shipping/tourism, 2) renewable resources, 3) non-renewable resources and 4) biodiversity. This project is led by the Arctic Research Centre (ARC) of Aarhus University; I lead the sea ice components of this proposal.

The Arctic Science Partnership (ASP)
(2012-2018)

My group was instrumental in the development of a unique international Arctic marine science network known as ASP. This network fully couples the Arctic Research Centre (ARC) at the University of Aarhus, the Greenland Climate Research Centre (GCRC), Nuuk, Greenland, and the Centre for Earth Observation Science (CEOS), University of Manitoba. ASP has resulted in an Arctic System Science focused research centre of over 350 scientists, technicians, research associates and graduate students. The ASP network shares logistical resources in terms of field stations, ships, and instrumentation between Canada, Denmark and Greenland. The network also shares staff costs in terms of faculty, research staff, students and technicians. Field programs are fully coordinated to maximize scientific output and minimize costs. ASP also coordinates international proposal development for Arctic System Science related projects amongst the network centres. (www.asp-net.org).

Drift-ICE – The Changing Arctic Ocean from an Earth System Science Perspective
(2014-2018)

My team has collaborated on the development of an international sea ice program funded by the Norwegian Research Council, Statoil and international funding partners. This proposal seeks to conduct an overwintering drift study using the Norwegian research vessel the Lance. My team contributes to the physical forcing of sea ice and the biological consequences of this forcing in the Atlantic Sector of the Arctic. The project was funded in 2014 and has a budget of \$30 million (NOK).

ArcticNet - Oil and Gas Industry partnership
(2007- 2014)

My group began working with various multinational oil and gas industry partners through a unique ArcticNet partnership. My team leads the sea ice research in this partnership. This includes collection of data required to make decisions regarding oil and gas exploration in the Southern Beaufort Sea, Baffin Bay and the Canadian Arctic Archipelago. My team extends the work we usually do on sea ice physics and climate forcing of sea ice and we collect these data in regions where our oil and gas partners are exploring. The relationship also extends to representing sea ice hazards, development of sea ice management information systems, and acting as a sea ice specialist in community consultation, climate change and national energy board deliberations as they pertain to hydrocarbon development in the Arctic. This partnership has generated over \$20M in research support. (<http://www.cbc.ca/news/canada/north/story/2011/02/15/science-bp-imperial-oil-amundsen-arcticnet.html>)

Canada Excellence Research Chair (CERC) program.
(2009-2017)

My team competed nationally for recognition as a world-class research centre with focus on Arctic System Science (Phase 1) and to attract a world class Arctic research scientist to the University of Manitoba (Phase 2). We were successful in the CERC competition attracting over \$58M in core CERC and partner funding for a Canada Excellence Research Chair (CERC) in Arctic Geomicrobiology and Climate Change. I led

development of this project and now coordinate the activities of the CERC unit and our involvement in the ASP network (<http://umanitoba.ca/research/cerc.html>)

Design of the Canadian Coast Guard Ship *Diefenbaker*.
(2007-2013)

I hosted the Canadian Coast Guard (CCG) design team, which spent two weeks with our science teams on board the CCGS *Amundsen* during an overwintering experiment that I lead as part of the International Polar Year (IPY) Circumpolar Flaw Lead (CFL) system study. During this period we assisted the design team in how a research icebreaker functions on a daily basis, including science equipment, navigation, daily scheduling, conflict management, networking and data integrity issues. Immediately after IPY-CFL I was seconded to an expert panel that provided scientific input to the design of laboratories, scientific equipment, networking space, communications and scientific data management for the CCGS *Diefenbaker*. This secondment resulted in direct design input to the final design of the *Diefenbaker*. (<http://pm.gc.ca/eng/media.asp?id=2252>)

The International Polar Year (IPY) Circumpolar Flaw Lead (CFL) System Study.
(2007-2011).

The IPY-CFL project was a large multidisciplinary project funded by the Canadian Government Federal IPY program office, NSERC, and several international agencies. The project used the CCGS *Amundsen* in the Banks Island Flaw Lead to study the effect of climate change on physical-biological coupling within this unique hemispheric feature of the Arctic marine system. Over 350 investigators participated from 22 different countries, with 11 different Canadian Universities and 6 different Canadian government departments. The total budget was just under \$40M over five years. The project was the largest IPY project in the world. I was the lead investigator of this project. (http://www.ipy-api.gc.ca/pg_IPYAPI_029-eng.html)

The Sea Ice Environmental Research Facility (SERF).
(2010-2015).

SERF is a \$1.6M project that created a microcosm of the Arctic Ocean on the campus of the University of Manitoba, Winnipeg, MB. SERF consists of an in-ground pool that contains simulated sea water. This ocean is allowed to freeze using the cold of a Winnipeg winter. The pool is fully instrumented for all geophysical, biogeochemical and electromagnetic properties of the sea ice, underlying ocean and overlaying atmosphere. A removable roof allows for protection against excessive warming or cooling, and can be used to control the amount and location of snow cover on the sea ice. (<http://home.cc.umanitoba.ca/~wangf/serf/>).

ArcticNet – a Network of Centres of Excellence
(2004 – 2017)

I am one of four principals in the NCE application to create a network of Centres of Excellence in the theme of polar marine science. The ArcticNet NCE was funded in July, 2003 at a level of \$45M. I lead one of four themes entitled “Land-Ocean Interactions in Sub-Arctic Hudson Bay: Managing the Largest Canadian Watershed in a New Climate”. This theme supports a major field experiment in Hudson Bay using the new Canadian Research Icebreaker *Amundsen* as a platform for social, medical, physical and marine

ecosystem studies of the Hudson Bay and associated inputs of freshwater. My team provides marine modelling to the network, required for projections of our science to 2030 and 2050, as part of the major outputs from the NCE known as Integrated Regional Impact Studies (IRIS). I also participate in each of the other three themes and contribute to the overall management of the NCE as an IRIS lead (http://www.arcticnet.ulaval.ca/research/iris_3.php).

A Canadian Research Icebreaker – A program funded by the Canada Foundation for Innovation ‘International Fund’.

(2002 – 2017)

I am a principal investigator in the CFI application to purchase and retrofit the Canadian Research Icebreaker *Amundsen* as a state-of-the-art national research infrastructure. This application was funded at a level of \$27.7M. These funds have been used to retrofit the structure of the ship and to purchase in excess of \$8M in scientific equipment which is integrated into the ship infrastructure. Laval and Manitoba being the two Universities receiving funding for the Amundsen program. The ship forms the basis for a new polar science platform in which Canadians lead International investigators in multidisciplinary polar science. My lab leads the physical processes components, contaminants and biogeochemistry. (<http://www.amundsen.ulaval.ca/index.php?url=1>)

Community Based Monitoring Program

(2004-2018)

This program directly engages Inuit in the process of science. Hamlet offices and Hunters and trappers committees interact as a liaison with my science teams where they install meteorological stations, collect ocean surface profile data and conduct traditional knowledge studies of snow on sea ice with Inuit youth. This program has been conducted in several different Inuit communities including Paulatuk, Sachs Harbour, Ulukhaktok, Resolute Bay and Sanikiluaq.

Schools on Board Program

(2004-2018)

This outreach program is a key element of ArcticNet, CASES and the IPY-CFL networks. This program has won awards from the University of Manitoba, the Canadian Network for Environmental Education and Communication and NSERC. The program partners with high schools to engage a broad audience of grades 10 through 12 in experiential science aboard the icebreaker *Amundsen*. The school can select one student and one teacher to participate in the Arctic field program and these people become ambassadors for Arctic science back in their schools and with local school boards. The program has recently expanded to include ‘Schools on Tundra’ a coastal/terrestrial program based out of the Churchill Northern Studies Centre (CNSC). I initiated this program and have provided management oversight since its inception. (<http://www.arcticnet.ulaval.ca/sb/>)

CONVECTION: Greenland Sea Convection mechanisms and Their Climatic Implications
(2000-2005)

CONVECTION is a collaborative research program to be performed in the Greenland Sea by a consortium of 11 institutes from 8 countries within the European Union and my lab in Canada. CONVECTION aims to assess open-ocean deep water production in the Greenland Sea by a combination of operational remote sensing, modelling and field

measurements. We seek to understand the physics underlying convection and how this process links with global climatic factors. The field measurements comprise work in two winter and three summer cruises. My lab will work closely with partners at the Scott Polar Research Institute (Cambridge University, UK) and the Danish Meteorological Institute (Copenhagen) on the integration of Radarsat and surface energy balance measurements within CONVECTION. This project has been funded to a level of \$2M+ Euro-dollars.

North Water Polynya Study (NOW) (1987 – 2001)

The NOW study was funded by NSERC as a National Network Award (1997-2001) to the level of \$5M. Industry and government support (national and international) increased this level to a total of \$34M. The project focused on the North Water Polynya in northern Baffin Bay and is part of the International Arctic Polynya Program (IAPP) of the Arctic Ocean Sciences Board (AOSB). The objectives were to determine the role of sensible and latent heat mechanisms in the creation and maintenance of the Polynya and to link these physical mechanisms to their biological consequences throughout the marine trophic web. I currently lead one of three physical science groups as PI for the 'sea ice/climate dynamics' sub component of this experiment. There are 24 investigators in my subgroup from Canada, USA, Japan, Poland and the UK. We are about to publish a special issue of the journal *Atmosphere-Ocean* on the results from the physical side of this study (see publications).

National Aeronautics and Space Administration (USA), Sea Ice Thermodynamics and Clouds (2000- 2003)

I was invited to participate as a co-investigator on a multiyear study seeking to develop remote sensing products of the thermodynamic state of snow covered sea ice. This project is led by S. Nghiem (NASA, JPL) and has a team consisting of 4 other US investigators from three different labs. As the sole Canadian collaborator on this project my role is to link my sea ice thermodynamics work with the NASA thrust. Our objectives overlap considerably and my group provides much of the input on the in situ observations, remote sensing validation and model development. This project has a budget in excess of \$1.5M over three years.

Autosub Under Ice: (2001-2003)

The proposal 'Observations and modelling of coastal polynya and sea ice processes in Antarctic and Arctic' was accepted by peer review to go forward to the full proposal stage under the United Kingdom (UK) NERC thematic program 'Autosub Under Ice'. The purpose of this proposal is to use Autosub to map sea ice thickness and ocean structure in two critically important regions where such joint measurements will yield new insight into mesoscale processes. The Arctic section of the program is proposed for August 2002, with the Antarctic work following in subsequent years, January/February 2003 and 2004. This program brings together expertise from UK (SPRI: Wadhams and KU: Willmott), Germany (IfM: Backhaus), Canada (UM: Barber) and USA (NASA: Comiso). The final budget for this program was just over \$1.2M.

Canadian Globe SAR program:

(1998-2001)

GlobeSAR is a program sponsored by the Canada Centre for Remote Sensing (CCRS), the Canadian Space Agency (CSA) and the Canadian International Development Agency (CIDA). I have three projects under this umbrella in the South American countries of Argentina, Brazil and Peru. The objectives of this program are to couple Canadian and South American academics in the theory and applications of synthetic aperture radar. The project funds visits between the labs and collaboration on field experiments using Radarsat data.

The Arctic Ice Regime Shipping System (AIRSS):

(1997-2000)

The AIRSS project was funded by Transport Canada, the Canadian Ice Service, and the National Ice Service (Washington, DC). The objective of this project was to migrate pre-competitive research from my work on the thermodynamics of sea ice and the geophysical inversion of thermodynamic information on sea ice from the time series evolution of synthetic aperture radar (SAR) scattering. The project resulted in the development of 'ablation state' information products for use in Canadian and US Ice Service support for tactical navigation of ice breaking vessels. The project also resulted in the development of an information system, implemented by the CIS, for a sea ice breakup early warning system for use by Inuit in Arctic Canada.

CIDA and Centre for International Forestry Research (CIFOR) Forest and Peoples Project: (1998-2000)

I participated in a project that examines the changes in forest utilization by aboriginals in E. Kalimantan, Indonesia. In this work I contribute information on land-cover mapping using remote sensing data and model socioeconomic and landscape processes using Geographical Information Systems. Technologically, approaches developed in the Arctic are applicable here and vice versa.

Canadian Ice Working Group (CIWG):

(1989-2003)

The CIWG is an organization of Canadian and US researchers active in the study of floating ice. The organization is structured to promote the exchange of research and operational ice forecasting developments. Three Co-Chairs (University, Government and Industry) coordinate the activities of the 150+ membership. I served as the University Co-Chair of this group over the reporting period.

The Collaborative Interdisciplinary Cryosphere Experiment (C-ICE): An Arctic Systems Science Experiment.

(1990 – 2001)

C-ICE is a multi-year multidisciplinary research program designed to study processes operating through the ocean-sea ice-atmosphere interface in the Canadian Arctic. A field experiment is conducted annually from Resolute Bay, NT. Collaborating agencies include: the University of Waterloo; Canadian Ice Services (CIS); the Canadian Climate Centre (CCC), Environment Canada; the Canada Centre for Remote Sensing (CCRS); the Meteorological Survey of Canada (MSC), Downsview, Ontario; the Department of Fisheries and Oceans (DFO), Winnipeg, Manitoba; the National Research Council (NRC), Ottawa, Ont.; The Polar Continental Shelf Project (PCSP), of Energy Mines and

Resources, Ottawa, Ont.; Norland Science, Ottawa, Ontario; University of Washington; University of Kansas; the Jet Propulsion Laboratory (JPL) ; Office of Naval Research, and the University of Colorado.

The Canadian Cryospheric Systems Experiment (CRYSYS)
(1989 – 2004)

CRYSYS is a Canadian led international project lead by the Meteorological Survey of Canada (B. Goodison, PI). The CRYSYS project examines aspects of the cryosphere (portions of the planet system containing frozen water) relative to climate variability and change. The objective is to develop the capabilities to monitor pertinent geophysical variables of the cryosphere using remote sensing and to utilize these data in modelling cryospheric processes. CRYSYS is a foreign interdisciplinary project within the NASA Earth Science Enterprise program and is funded by MSC, NASA, and NSERC.

National Aeronautics and Space Administration (USA), The RADARSAT Geophysical Processor System (RGPS)
(1994- 2000)

I serve as a NASA subcommittee chairman for the Seasonal SAR scattering group for the Alaska SAR facility RGPS. In this capacity I organize and administer the implementation of seasonal SAR scattering from a research and implementation perspective as it pertains to the RGPS. Committee members are located throughout the world and collectively we make recommendations to NASA as to research priorities and strategic directions for maximizing the exploitation of radar data in Global Change Studies. The project is an integral part of NASA's Earth Science Enterprise.

World Bank and CIDA Lake Malawi Biodiversity Conservation Project.
(1997 – 2001)

I lead a team of researchers participating in a Global Ecological Facility (GEF) project examining the impact of human pressures on the biodiversity of Lake Malawi, Africa. Within this project I contribute remote sensing and GIS technologies to the broad scientific goals of the study and have responsibility to examine landscape changes, sedimentation and impacts on fisheries habitat. Technologically, approaches developed in the Arctic are applicable here and vice versa. The LBMCP was funded by the World Bank to a level of (\$17M USD) over a five-year period.

The Program for International Polar Ocean Research (PIPOR)
(1989 – 1998)

PIPOR was an international organization coordinated by the Alfred Wegner Institute in Germany. The group was supported by the European Space Agency (ESA), the National Aeronautics and Space Administration (NASA), the Canadian Space Agency (CSA), and the Japanese Space Agency (NASDA). The objective was to coordinate international investigations of polar oceans. This included a continuum of activities from coordination of research equipment and personnel, to obtaining remote sensing data from the participating space agencies. I served as a Co-Investigator in this group over the reporting period.

Office of Naval Research (USA), Accelerated Research Initiative (ARI) on the Electromagnetics of Sea Ice
(1994- 1998)

The premise of this ARI was that the electromagnetic interactions at one frequency are related to those at other frequencies through a set of, as yet undefined, transfer functions. With a budget of \$5M (US) the ONR was able to attract high-level researchers from the USA and Canada. The goal of the project was to develop fully invertible numerical models of electromagnetic interaction (EMI) at a variety of frequencies over snow covered sea ice. The project had both laboratory and field components in the CRREL labs in New Hampshire, in the Beaufort Sea and at the C-ICE site in the Canadian Arctic. I was the only Canadian investigator invited to participate in this US funded initiative. My role was to lead research into the physical, electrical and thermodynamic characteristics of snow on sea ice. This project culminated in a special issue of the IEEE Transactions on Geoscience and Remote Sensing (see publications).

Communicating Science

I am often asked to communicate Arctic System Science to the public, politicians and the private sector. I list a few recent ones to illustrate my role in communicating science to policy and the public.

- Invited to China for meetings between Chinese polar scientists, China science administrators and my research group in Canada. Presented to the China Arctic and Antarctic Administration (CAA), the Chinese Academy of Meteorological Sciences and the Polar Research Institute of China (PRIC). June/July, 2011.
- Selected as one of four plenary speakers to the largest Arctic Science conference ever held, the Oslo International Polar Year Science Conference, Oslo, Norway. June, 2010.
- Selected as a guest speaker to the Provincial of Manitoba Provincial legislature on Arctic climate change and impacts on Hudson Bay and northern Manitoba, April, 2010
- Guest for a half-hour episode of ‘Mansbridge One-on-One’ hosted by CBC national news Anchor, Peter Mansbridge. Topic of discussion was climate change, climate gate and Arctic sea ice. December, 2009.
- Selected as a speaker at the ‘Bacon and Eggheads’ seminar on Parliament Hill, Ottawa. Two hundred and fifty parliamentarians, aids, and government leaders attended. Topic of my presentation was climate change and sea ice. November, 2009.
- Selected as an expert advisor for the Imperial Oil, Exxon exploratory drill plans in the Beaufort Sea, at the request of the Inuvialuit Game Council (IGC), Inuvik, NWT. I provided arms length expertise to review the plans for offshore drilling operations as they pertain to sea ice management on behalf of the IGC. December, 2009.
- Selected as a guest speaker to the Pew Institute on climate change and impacts as they pertain to the United States with a particular emphasis on navigation through the NW passage, impacts on marine ecosystems and industrial development of the Arctic, New Hampshire, USA. September, 2009

Other Evidence of impact (selected)

- Member, Science steering committee, ESA conference on Earth Observations of the Cryosphere. Frascati, Italy, Oct, 2012.
- Member, NSERC review panel on Fellowships and Scholarships 2012-2015

- Nominated as a member of the European Space Agency (ESA) Earth Science Advisory Committee 2011-2015. This is the highest level advisory committee of ESA.
- Chair, Scientific Steering Committee (SSC) of CFL
- Chair, NSERC northern supplements committee
- Chair, Canada Foundation for Innovation (CFI) Multidisciplinary Advisory Committee (MAC)
- Co-Chair International IPY PanArctic Marine Ecosystem Cluster (PAN-AME).
- Member, International Study of Arctic Change (ISAC).
- Member, International GEWEX Radiation Panel
- Member, International ICARP II steering committee.
- Member, International NSF committee on a Polar Observing System.
- Member, Research Management Committee (RMC) of ArcticNet.
- Member, NSERC International Polar Year (IPY) committee.
- Member, NSERC Environmental Earth Sciences GSC-09
- Member Canadian National Committee for the Scientific Committee on Oceanic Research (SCOR)
- Member, International Arctic Polynya Program (IAPP) of the Arctic Ocean Sciences Board (AOSB).
- I receive, on average, 20 requests per year to be a guest speaker at conferences, workshops, and government planning meetings (e.g., CFCAS climate change workshop in Ottawa, CMOS Rimouski, Chapman conference on arctic oceanography, Latvia polar processes, Arctic Oil companies, etc.).
- I review, on average, 30 journal papers per year for key journals in my field.
- I have contributed to a number of foreign grant agency review processes including NERC NSF, NERC, NASA, ESA, NPI, FRC and NOAA.
- I contribute an average of 100 media interviews per year pertaining to the Arctic, climate change and sea ice