

Curriculum Vitae
Andrew Frederiksen
October 5, 2023

Associate Dean (Academic)
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A. Research

A.1 Research statement

I am primarily an earthquake seismologist with a structural focus; that is, I use data from earthquakes and other passive sources to obtain information about the Earth's internal structure, from which I attempt to draw conclusions about the history and dynamics of large-scale Earth processes. Earthquake data have a greater ability to illuminate the Earth's interior than any artificial source, and so are the main information source used to develop models of the Earth below the crust. However, the earthquake seismogram is a highly complex encoding of the interaction between seismic waves and earth structure; as a consequence, there is a need for innovation in the modelling, inversion, and interpretation of earthquake records, as well as in interpreting the resulting constraints on the Earth's physical properties in terms of geology and mineral physics. Thus, the three major goals of my research to date have been: (i) the development and application of techniques for obtaining information on Earth structure from earthquake recordings, (ii) understanding the origin, history and dynamics of the lithosphere, and the relationship between crust and mantle evolution, and (iii) understanding the specific history of the assembly and modification of the North American continent, as experienced by the lithosphere as well as the crust.

A.2 Publications in refereed journals

[Names of students under my supervision are bolded. Order is reverse chronological.]

40. Keleş, D., Eken, T., Licciardi, A., Frederiksen, A.W., and Taymaz, T. (2023) Depth-dependent anisotropy along northwest segment of North Anatolian Fault Zone: evidence for paleo-tectonic features contributing to overall complexity, submitted to *Journal of Geophysical Research Solid Earth*.

39. He, B., Wang, K., Liu, T., Lei, T., Du, N., Van der Lee, S., Darbyshire, F., Frederiksen, A., Zhu, H., Lumley, D., Halls, H., and Liu, Q. (2023) Lithospheric structures of the Midcontinent Rift

revealed by full-waveform joint inversion of ambient-noise data and teleseismic P waves, submitted to *Earth and Planetary Science Letters*.

38. Aleqabi, G.I., Wyession, M.E., Wiens, D.A., Shen, W., Van der Lee, S., Darbyshire, F.A., Frederiksen, A.W., Stein, S., Jurdy, D., and Revenaugh, J. (2023) Joint inversion of SPREE receiver functions and surface wave dispersion curves for 3-d crustal and upper mantle structure beneath the U.S. Midcontinent Rift, submitted to *Journal of Geophysical Research Solid Earth*.

37. Sabermahani, S. and Frederiksen, A.W. (2023) Shear-wave anisotropy measurements in the crust from receiver functions: An interplay of lower and upper crustal anisotropy, submitted to *Seismological Research Letters*.

36. McCormack, K.L., Zoback, M.D., Frederiksen, A.W., and Dvory, N.Z. (2023) Shear-wave anisotropy measurements in the crust from receiver functions: An interplay of lower and upper crustal anisotropy, *Geosciences* **2023**, 13, 79, doi:10.3390/geosciences13030079.

35. Frederiksen, A.W., Pokar, P., Barrow, E., Revenaugh, J., and Van der Lee, S. (2021) Altered mantle fabric beneath the Mid-Continent Rift, *Geochemistry, Geophysics, Geosystems* **22**, e2021GC010012, doi:10.1029/2021GC010012.

34. Rost, S., Cornwell, A., Thompson, D., Houseman, G., Frederiksen, A., Altuncu Poyraz, S., Teoman, U.M., Kahraman, M., Türkelli, N., Gülen, L., and Utkucu, M. (2021) Structure of the North Anatolian Fault Zone imaged via teleseismic scattering tomography, *Geophysical Journal International* **227**, 922–940, doi:10.1093/gji/ggab265.

33. Frederiksen, A.W. (2020) Transfer functions between teleseismic data components, *Geophysical Journal International* **221**, 1248-1263, doi:10.1093/gji/ggaa085.

32. Bollmann, T., Van der Lee, S., Frederiksen, A.W., Wolin, E., Revenaugh, J., Wiens, D.A., Darbyshire, F.A., Stein, S., Wyession, M.E., and Jurdy, D. (2019) P-wave Teleseismic Travel-time Tomography of the North American Midcontinent, *Journal of Geophysical Research* **124**, 1725-1742, doi:10.1029/2018JB016627.

31. Chichester, B., Rychert, C., Harmon, N., Van der Lee, S., Frederiksen, A., and Zhang, H. (2018) Seismic imaging of the North American Mid-Continent Rift using S-to-P receiver functions, *Journal of Geophysical Research* **123**, 7791-7805, doi:10.1029/2018JB015771.

30. Stein, S., Stein, C., Elling, R., Kley, J., Keller, R., Wyession, M., Rooney, T., Frederiksen, A., and Moucha, R. (2018) Insights from North America's Failed Midcontinent Rift into the Evolution of Continental Rifts and Passive Continental Margins, *Tectonophysics* **744**, 403–421, doi:10.1016/j.tecto.2018.07.021.

29. Zaporozan, T., Frederiksen, A.W., Bryksin, A., and Darbyshire, F. (2018) Surface-Wave Images of Western Canada: Lithospheric Variations Across the Cordillera/Craton Boundary, *Canadian Journal of Earth Sciences* **55**, 887-896, doi:10.1139/cjes-2017-0277.

28. Zhang, H., Van der Lee, S., Wollin, E., Bollmann, T., Revenaugh, J., Wiens, D., Frederiksen, A., Darbyshire, F., Aleqabi, G., Wyession, M., Stein, S., and Jurdy, D. (2016) Distinct Crustal Structure of the North American Mid-Continent Rift from P Wave Receiver Functions, *Journal of Geophysical Research* **121**, 8136–8153, doi:10.1002/2016JB013244.

27. Stein, S., Stein, C., Kley, J., Keller, G., Merino, M., Wolin, E., Wiens, D., Wyession, M., Alequabi, G., Shen, W., Frederiksen, A., Darbyshire, F., Jurdy, D., Waite, G., Rose, W., Vye, E., Rooney, T., Moucha, R., and Brown, E. (2016) New insights into North America's Midcontinent Rift, *Eos* **97**, doi:10.1029/2016EO056659.

26. Ola, O., Frederiksen, A.W., Bollmann, T., Van der Lee, S., Darbyshire, F., Wolin, E., Revenaugh, J., Stein, C., Stein, S., and Wyession, M. (2016) Anisotropic Zonation in the Lithos-

phere of Central North America: Influence of the Mid-Continent Rift, *Tectonophysics* **683**, 367–381, doi:10.1016/j.tecto.2016.06.031.

25. Wolin, E., Van der Lee, S., Bollmann, T.A., Wysession, M.E., Stein, S., Wiens, D.A., Darbyshire, F.A., Frederiksen, A.W., and Revenaugh, J. (2015) Seasonal and diurnal variations in long-period noise at SPREE stations: the influence of soil characteristics on shallow stations' performance, *Bulletin of the Seismological Society of America* **105**, 2433–2452.

24. Frederiksen, A.W. and **Delaney, C.** (2015) Deriving crustal properties from the P coda without deconvolution: the southwestern Superior Province, North America, *Geophysical Journal International* **201**, 1491–1506.

23. Frederiksen, A.W., Thompson, D., Rost, S., Cornwell, D.G., Gülen, L., Houseman, G.A., Kahraman, M., Poyraz, S.A., Teoman, U.M., Türkelli, N., and Utukcu, M. (2015) Crustal thickness variations and isostatic disequilibrium across the North Anatolian Fault, western Turkey, *Geophysical Research Letters* **42**, 751–757, doi:10.1002/2014GL062401.

22. Frederiksen, A.W., **Deniset, I., Ola, O., and Toni, D.** (2013) Lithospheric fabric variations in central North America: influence of rifting and Archean tectonic styles, *Geophysical Research Letters* **40**, 1–5, doi:10.1002/grl.50879.

21. **Zhang, J.** and Frederiksen, A.W. (2013) 3-D crust and mantle structure in southern Ontario, Canada via receiver function imaging, *Tectonophysics* **608**, 700–712, doi:10.1016/j.tecto.2013.08.011.

20. Frederiksen, A.W., Bollmann, T., Darbyshire, F., and Van der Lee, S. (2013) Modification of continental lithosphere by tectonic processes: a tomographic image of central North America, *Journal of Geophysical Research* **112**, B07318, doi:10.1029/2006JB004861.

19. Frederiksen, A.W. (2011) Panel deconvolution of receiver-function gathers: improved images via cross-trace constraints, *Geophysical Journal International* **184**, 1275–1288, doi:10.1111/j.1365-246X.2010.04904.x.

18. **Idowu, O.,** Frederiksen, A.W., and Cassidy, J.F. (2011) Imaging the Nechako Basin, British Columbia, using ambient seismic noise, *Canadian Journal of Earth Sciences* **48**, 1038–1049, doi:10.1139/E11-007.

17. Stein, S., Van der Lee, S., Jurdy, D., Stein, C., Wiens, D., Wysession, M., Revenaugh, J., Frederiksen, A., Darbyshire, F., Bollmann, T., Lodewyk, J., Wollin, E., Merino, M., and Tekverk, K. (2011) Learning from failure: the SPREE Mid-Continent Rift Experiment, *GSA Today* **21**, 5–7, doi:10.1130/G120A.1.

16. Camacho, A., Yang, P., and Frederiksen, A. (2009) Constraints from diffusion profiles on the duration of high-strain deformation in thickened crust, *Geology* **37**, 755–758, doi:10.1130/G25753A.1.

15. Hyndman, R.D., Currie, C.A., Mazzotti, S., and Frederiksen, A. (2009) Temperature control of continental lithosphere elastic thickness: Effective elastic thickness T_e vs upper mantle velocity V_s , *Earth and Planetary Science Letters* **277**, 539–548, doi:10.1016/j.epsl.2008.11.023.

14. Plomerova, J., Frederiksen, A.W., and Park, J. (2008) Seismic anisotropy and geodynamics of the lithosphere-asthenosphere system, *Tectonophysics* **462**, 1–6, doi:10.1016/j.tecto.2008.08.007.

13. Darbyshire, F.A., Eaton, D.W., Frederiksen, A.W., and Ertolahti, L. (2007) New insights into the lithosphere beneath the Superior Province from Rayleigh wave dispersion and receiver function analysis, *Geophysical Journal International* **169**, 1043–1068, doi:10.1111/j.1365-246X.2006.03259.x.

12. Eaton, D.W. and Frederiksen, A.W. (2007) Seismic evidence for convection-driven motion of the North American plate, *Nature* **446**, 428–431, doi:10.1038/nature05675.
11. Frederiksen, A.W., **Miong, S.K.**, Darbyshire, F.A., Eaton, D.W., Rondenay, S., and Sol, S. (2007) Lithospheric variations across the Superior Province, Ontario, Canada: evidence from tomography and shear-wave splitting, *Journal of Geophysical Research* **112**, B07318, doi:10.1029/2006JB004861.
10. Frederiksen, A.W., Ferguson, I.J., Eaton, D., **Miong, S.-K.**, and Gowan, E. (2006) Mantle Fabric at Multiple Scales Across an Archean-Proterozoic Boundary, Eastern Ontario, Canada, *Physics of the Earth and Planetary Interiors* **158**, 240–263, doi:10.1016/j.pepi.2006.03.025
9. Van der Lee, S. and Frederiksen, A.W. (2005) Surface-wave tomography applied to the North American upper mantle, in *Seismic Earth: Array Analysis of Broadband Seismograms*, American Geophysical Union Geophysical Monograph **157**, 67-80.
8. Eaton D., Frederiksen, A. and **Miong, S.K.** (2004) Shear-wave splitting observations in the lower Great Lakes region: Evidence for regional anisotropic domains and keel-modified asthenospheric flow, *Geophysical Research Letters* **31**, L07610.
7. Frederiksen, A.W. and Revenaugh, J. (2004) Lithospheric imaging via teleseismic scattering tomography, *Geophysical Journal International* **159**, 978-990.
6. Sherrington, H., Zandt, G., and Frederiksen, A.W. (2004) Crustal Fabric in the Tibetan Plateau Based on Waveform Inversions for Seismic Anisotropy Parameters, *Journal of Geophysical Research* **109** B02312, doi:10.1029/2002jb002345.
5. Frederiksen, A.W., Folsom, H., and Zandt G. (2003) Neighbourhood inversion of teleseismic Ps conversions for anisotropy and layer dip, *Geophysical Journal International* **155**, 200-212
4. Frederiksen, A.W., Bostock, M.G., and Cassidy, J.F. (2001) S-wave velocity structure of the Canadian upper mantle, *Physics of the Earth and Planetary Interiors* **124**, 175-191.
3. Frederiksen, A.W., and Bostock, M.G. (2000) Modelling teleseismic waves in dipping anisotropic structures. *Geophysical Journal International* **141**: 401-412.
2. Frederiksen, A.W., Bostock, M.G., VanDecar, J.C., and Cassidy, J.F. (1998) Seismic structure of the upper mantle beneath the northern Canadian Cordillera from teleseismic travel-time inversion, *Tectonophysics* **294**, 43-55.
1. Shi, L., Francis, D., Ludden, J., Frederiksen, A., and Bostock, M. (1998) Xenolith evidence for lithospheric melting above anomalously hot mantle under the northern Canadian Cordillera, *Contributions to Mineralogy and Petrology* **131**, 39-53.

A.4 Presentations

[Only invited presentations listed; too many conference abstracts (ca. 4-5 per year since 2001) to list here.]

- Frederiksen, A.W., Crust and lithosphere of the mid-continent: tectonic domains and novel seismic imaging techniques, invited talk, University of Toronto, March 2017.
- Frederiksen, A.W., Bollmann, T.A., Darbyshire, F.A., Jurdy, D.M., Revenaugh, J., Stein, S.A., Van der Lee, S., Wiens, D.A., and Wysession, M.E., Traces of extension in continental lithosphere: Towards a seismic image of the Mid-Continent Rift, invited talk, 2012 Fall Meeting of the American Geophysical Union, Abstract T41G-01, December, 2012.

- Frederiksen, A.W., Defining Mantle Anomalies in Time and Space: Seismic Images of the Superior Province and Mid-Continent Rift, invited talk, presented at Northwestern University, University of Alberta and University of Calgary in early 2012.
- Frederiksen, A.W., Olaleye, M., Toni, D.A., Darbyshire, F.A, and Eaton, D.W. (2010) Accretion, modification and erosion of Archean lithosphere: evidence from the Superior Province and adjacent region, abstract T31F-01 (invited) presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.
- Frederiksen, A.W. (2007). Deep beneath Ontario: Seismic observations and lithospheric tectonics, invited keynote, Congrès annuel du GEOTOP, Lac MacDonald, Québec.

A.5 Software packages

- RAYSUM: Modelling and inversion of teleseismic waveforms in anisotropic, dipping layers. Developed 1999-2002, in wide use worldwide.
- SCATTER: Waveform tomography of teleseismic scattered wavefields. Developed 2001-2004.
- Panel Deconvolution: Improved deconvolution of receiver functions with inter-trace constraints, developed 2008-2011.
- Teleseismic transfer function modelling and inversion: developed 2014-present, Monte Carlo inversion 2018-present.

B. Teaching

B.1 Graduate supervision

- Sabermahani, S. (Ph.D., in progress, began Sept. 2021)
- Sharma, A. (M.Sc., Sept. 2019–Dec. 2022, co-supervised with Dr. Fiona Darbyshire of UQÀM) *Two-Station Rayleigh Wave Tomography of Canada*
- Ramlakhan, K. (M.Sc., Sept. 2016–March 2022) *Variations in crustal properties from the transfer-function approach in the South Island, New Zealand*
- Campbell, R. (M.Sc., Sept. 2015–June 2019) *Layer Stripping the Response from Sedimentary Basins in Teleseismic Data Using Transfer Functions*, received Winthrop Spencer Gold Medal
- Zaporozan, T. (M.Sc., Sept. 2012–Dec. 2016) *Surface-Wave Tomography of Western Canada Using a Two-station Approach*
- Ola, O. (M.Sc., Jan. 2012–Aug. 2014) *Lithospheric Fabric in Central North America: the Superior Province and the Mid-Continent Rift*
- Bryksin, A. (M.Sc., began Sept. 2011, did not complete)
- Olaleye, M. (M.Sc., Sept. 2008–May 2011) *Receiver Function Analysis of Crustal and Upper Mantle Stratigraphy Across the Western Superior Province*
- Idowu, O. (M.Sc., Sept. 2007–Aug. 2009) *Surface Wave Tomography of the Nechako Basin, British Columbia, Using Ambient Seismic Noise*
- Zhang, J. (M.Sc., Sept. 2003–Dec. 2005) *3-D Structure in Southern Ontario via Receiver Function Imaging*

B.2 Undergraduate supervision

- Pokar, P. (B.Sc. Hons., May 2019) *Seismic Anisotropy Beneath the Southwestern Mid-Continent Rift*
- Chau, D. (B.Sc. Hons., May 2019, co-supervised with Dr. Ian Ferguson) *MASW and Multi-Geophysical Method Investigation of Landfill Deposits at Westview Park, Winnipeg*
- Barrow, E. (B.Sc. Hons., May 2018) *Shear-Wave Splitting Over the Mid-Continent Rift*
- Naseem, C. (B.Sc. Hons., May 2016, co-supervised with Dr. Ian Ferguson) *Magnetic delineation of the Spiritwood Valley buried aquifer in southern Manitoba using airborne and ground data*
- Tyomkin, Y. (B.Sc. Hons., May 2016) *Modelling of bulk crustal properties of the North American Mid Continental Rift System, Minnesota and Wisconsin, USA, via Z-R transfer function analysis and H-k stacking*
- Campbell, R. (B.Sc. Hons., May 2015) *Investigating the North American Mid Continental Rift by Estimating Depth to Moho and Vp/Vs with the H-K Stacking Technique in Southern Minnesota*
- Clayton, B. (B.Sc. Hons., May 2015, co-supervised with Dr. Wooil Moon) *Space-Borne INSAR (Interferometric Synthetic Aperture Radar) Monitoring of Landslide Hazards of Turtle Mountain, Rocky Mountains, Alberta*
- Ramlakhan, K. (B.Sc. Hons., May 2015) *Variations in Crustal Thickness and Composition in the Proterozoic Mid-Continent Rift Spanning Lake Superior*
- Sheng, A. (B.Sc. Hons., May 2014, co-supervised with Dr. Anton Chakhmouradian) *Structure and Origin of the Shoulderblade Breccia Dome, Central Manitoba*
- Delaney, C. (B.Sc. Hons., began 2013, did not complete)
- Deniset, I. (B.Sc. Hons., May 2012) *Investigating upper-mantle and lithospheric fabric across the south-west edge of the Superior Province by shear-wave splitting*
- Toni, D. (B.Sc. Hons., May 2009) *Investigating Anisotropy in the Upper Mantle using Shear-Wave Splitting from the Manitoba Teleseismic Array*
- Olaleye, M. (B.Sc. Hons., May 2008) *Mapping Lateral Crustal Thickness and Poisson's Ratio Variations in the Southern Cordillera, British Columbia Using the Zhu and Kanamori Stacking Algorithm for Receiver Functions.*
- Bucher, P. (B.Sc. Hons., May 2007) *Delineation of the Upper Mantle at the St. Lawrence Rift Valley Using Teleseismic P-Wave Tomography.*
- McPherson, J. (B.Sc. Hons., May 2005) *Channel Boundary Delineation and Reservoir Prediction in Two Stacked Glauconitic Channel Reservoirs Using Forward Seismic Modelling, Spectral Decomposition and Event Similarity Prediction, Glauconitic Formation, Southeastern Alberta.*
- Miong, S-K. (B.Sc. Hons., May 2005) *Application of Shear-Wave Splitting Analysis in Imaging Asthenospheric and Lithospheric Anisotropy Beneath the Superior Province, Canadian Shield.*
- Letkeman, A. (B.Sc. Hons., Dec. 2002) *Imaging the Deep Structures of the Grenville Province, Ontario Using Teleseismic Receiver Functions.*

B.3 Courses taught

Undergraduate:

- Fall 2008, Winter 2011, Fall 2012, Winter 2015, 2017, 2019, 2021, 2023: GEOL 4320 Physics of the Earth: Seismology and Heat Flow, University of Manitoba
- Winter 2005, 2007, 2010, 2012, 2016, 2018, 2022: GEOL 3740 Exploration Seismology, University of Manitoba
- Fall 2019: GEOL 4250 Theory and Application of Geophysical Imaging Methods
- Summer 2004, 2007, 2009, 2011, 2015, 2017, 2019: GEOL 4260/4740 Geophysics Field Course (co-taught all years except 2009), University of Manitoba
- Fall 2002 through 2018: GEOL 2060 Introductory Geophysics, University of Manitoba
- Fall 2012: GEOL 4270 Advanced Studies in Earth Sciences (Observational Seismology), University of Manitoba
- Winter 2004, 2006: GEOL 4810 Geophysical Data Analysis, University of Manitoba
- Winter 2002: EART113 Physics in the Earth Sciences, University of California Santa Cruz

Graduate:

- Fall 2012, Winter 2016, Winter 2017, Winter 2022: GEOL 7490 Advanced Seismology 2 (Observational Seismology), University of Manitoba
- Fall 2004, 2007, 2008, Winter 2012, Fall 2015, 2016, 2019, Winter 2022: GEOL 7480 Advanced Seismology 1 (Theoretical Seismology), University of Manitoba
- Winter 2020: GEOL 7200 Earth Systems of Central Canada (partial — team-taught course)
- Winter 2009, Fall 2011, Winter 2013, Fall 2013, Fall 2017, 2019: GEOL 7720 Geophysical Imaging and Data Processing, University of Manitoba
- Winter 2005, 2007: GEOL 7230 Geophysics of the Earth's Crust and Mantle (co-taught), University of Manitoba
- Winter 2004, 2007: GEOL 7260 Geophysical Information, University of Manitoba

C. Professional activity

C.1 Relevant work history

07/2019-present	Associate dean (academic), University of Manitoba
06/2020-10/2020	Acting dean, University of Manitoba
04/2015-present	Professor, University of Manitoba
07/2013-12/2013	Acting associate dean (academic), University of Manitoba
04/2008-03/2015	Associate professor, University of Manitoba
07/2002-03/2008	Assistant professor, University of Manitoba

01/2001-06/2002	Post-doctoral researcher, earthquake seismology Supervisor: Dr. J. Revenaugh, UCSC
01/1999-05/2000	Teaching Assistant, various earth science courses Various supervisors, UBC
07/1994-12/2000	Research assistant, earthquake seismology Supervisors: Drs. M. Bostock & R. Ellis, UBC
05/1993-08/1993	Geophysics summer student, geophysical data processing Supervisor: Dr. D. Poley, Shell Canada

C.2 Educational history

1997-2000	Ph.D., Geophysics (Seismology), University of British Columbia Title of thesis: <i>Seismic Imaging of the Canadian Upper Mantle</i> Supervisor: Dr. M.G. Bostock
1994-1996	M.Sc., Geophysics (Seismology), University of British Columbia Title of thesis: <i>A Teleseismic Study of the Northern Cordilleran Upper Mantle Beneath the SNORCLE Transect</i> Supervisor: Dr. M.G. Bostock
1991-1994	B.Sc. (1st Class Hons.), Solid Earth Geophysics, McGill University

C.3 Awards and grants

09/2020-08/2025	National Science and Engineering Research Council of Canada (NSERC) Discovery Grant, \$150,000
04/2018-03/2023	CFI Innovation Fund multi-institutional project: National Facility for Seismic Imaging (co-PI; lead institution is Dalhousie). \$14,741,374 total budget, of which \$5,850,000 from CFI. Research Manitoba contribution (secured by me) of \$350,000.
12/2017	Outstanding Reviewer, Geophysical Journal International; AGU Outstanding Reviewer, Geophysical Research Letters
05/2016	Clayton H. Riddell Faculty of Environment, Earth and Resources Graduate Teaching Award
09/2015-08/2020	National Science and Engineering Research Council of Canada (NSERC) Discovery Grant, \$110,000
04/2011-04/2014	National Science and Engineering Research Council of Canada (NSERC)/Earth Sciences Sector (Natural Resources Canada) CRD grant, joint with UBC, \$100,000
04/2010-03/2013	Natural Resources Canada GEMS grant, \$30,000

09/2008-08/2015	National Science and Engineering Research Council of Canada (NSERC) Discovery Grant, \$140,000.
09/2003-08/2008	National Science and Engineering Research Council of Canada (NSERC) Discovery Grant, \$122,250.
09/2006-09/2010	Canada Foundation for Innovation Institutional Operating Fund, \$21,763.
09/2003	Canada Foundation for Innovation New Opportunities Grant, \$181,360.
09/2002	University of Manitoba startup grant, \$50,000.
01/2001-06/2002	NSERC Post-Doctoral Fellowship.
01/1997-12/1998	NSERC Post-Graduate Scholarship (PGS) B.
01/1994-08/1996	NSERC PGS A.
05/1994	Logan Medal, Department of Earth and Planetary Sciences (EPS), McGill University.
09/1992-05/1994	R.P.D. Graham Scholarship, EPS, McGill University.
09/1991-05/1992	Entrance Scholarship, EPS, McGill University.

C.4 Administrative activity

Departmental committees:

- Environmental mineralogy search committee, 2018-2019
- Graduate curriculum review committee, 2016-present
- Sedimentology search committee, 2015-2017
- Undergraduate curriculum review committee, 2015-2016
- Department awards committee, 2013-present
- Graduate admissions and graduate affairs committees, 2006-2013, chaired 2008-2013.
- Honours thesis evaluation committee, 2002-2007, 2009-2012
- Search committee for watershed systems junior chair position, 2011.
- Department centenary committee, 2006-2010
- Endowment fund committee, 2005-2010 (chaired committee 2006-2010)
- Geophysics program review committee, 2005-2006
- Geological Sciences seminar coordinator, 2003-2007
- Tectonics position search committee, 2003-2005
- Geophysics technician search committee, 2003-2004

Faculty committees:

- Faculty rep. to Graduate Studies Executive, 2018-present

- Faculty undergraduate curriculum committee, 2017-present (chaired as ADA from 2019)
- Faculty research committee, 2016-2019
- Faculty graduate curriculum committee, 2016, 2019-present (chaired as ADA)
- Faculty by-laws committee, 2015
- Faculty computing committee, 2005-2009
- One tenure and two promotion committees, 2012; one tenure and five promotion committees, 2019; one promotion committee, 2020
- Faculty representative to University Senate, 2007-2010
- Faculty seminar committee, 2003-2005
- Faculty research synergy committee, 2003-2004

Other university service:

- Associate Dean (Academic), 07/2019-present
- Member, university NSERC awards committee, 2018-2019
- Served as acting Associate Dean, Academic July-December, 2013.
- Served as acting Department Head at various times, for periods up to one month (most recently in February, 2016).
- Handled media requests and radio/TV interviews regarding major newsworthy earthquakes.

C.5 Service to profession and professional recognition

- Member of NSERC evaluation committee 168 (scholarships and fellowships, Earth Sciences), 2015-2017; committee chair 2017-2018.
- Treasurer, Solid Earth Section, Canadian Geophysical Union, 2013-2019
- Member-at-large of Executive, Solid Earth Section, Canadian Geophysical Union, 2011-2013, 2019-present
- Associate Editor, Journal of Geophysical Research, American Geophysical Union, 2009-present
- Chair of Publications Subcommittee, 2013 GAC-MAC conference, Winnipeg, 2012-2013.
- One of three guest editors, special issue of Tectonophysics, Elsevier, 2006-2007.
- Extensive peer review history; journals include:
 - Bulletin of the Seismological Society of America
 - Computers and Geosciences
 - Canadian Journal of Earth sciences
 - Earth and Planetary Science Letters

- G-Cubed
- Geology
- Geophysical Journal International (Outstanding Reviewer, 2017)
- Geophysical Research Letters (Outstanding Reviewer, 2017)
- Geophysics
- GSA Bulletin
- Journal of Geodynamics
- Journal of Geophysical Research
- Journal of Paleolimnology
- Journal of Seismology
- Lithos
- Physics of the Earth and Planetary Interiors
- Seismological Research Letters
- Solid Earth
- Tectonics
- Tectonophysics
- Terrestrial, Atmospheric, and Oceanic Sciences
- Yukon Exploration Geology
- Reviewed grant proposals for:
 - Alberta Ingenuity Fund
 - Czech Science Foundation
 - MITACS
 - NSERC
 - NSF
 - POLARIS