MATHIEU DUMBERRY

DEPARTMENT OF PHYSICS, UNIVERSITY OF ALBERTA
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EDUCATION

1999 – 2004 Harvard University Cambridge, MA, USA
Ph. D. in Geophysics, May 2004
Thesis: *Torsional oscillations in the Earth's core: theory, observation and geodynamic consequences*
Principal advisor: Jeremy Bloxham

1995 – 1998 University of British Columbia Vancouver, BC, Canada
M. Sc. in Earth and Ocean Sciences, April 1998
Thesis: *Electromagnetic coupling between the fluid core and its solid neighbours*
Principal advisor: Bruce A. Buffett

1991 – 1994 Université de Sherbrooke Sherbrooke, QC, Canada
B. Sc. in Physics, December 1994
Internship advisor: Richard Marchand

PROFESSIONAL AND RESEARCH EXPERIENCE

2020 – present Physics, University of Alberta Edmonton, AB, Canada
Professor

2014 – 2019 Physics, University of Alberta Edmonton, AB, Canada
Associate Professor

Jan - July 2019 EAS, McGill University Montréal, Québec, Canada
Invited Professor

Feb - July 2015 ISTerre, Université Grenoble-Alpes Grenoble, France
Professeur invité

Oct 2014 - Jan 2015 Institut de Physique du Globe Paris, France
Professeur invité

2008 – 2014 Physics, University of Alberta Edmonton, AB, Canada
Assistant Professor

2004 – 2007 SEE-IGT, University of Leeds Leeds, UK
NERC Postdoctoral Research Fellow

List of Publications

Peer-reviewed: (underlined = students or postdocs)

- Zhang, J. and **Dumberry, M.**, 2021, Viscous dissipation in the fluid core of the Moon, *J. Geophys. Res.: Planets, 126*, e2021JE006966.
- Triana, S. A., **Dumberry, M.**, Cébron, D., Vidal, J., Trinh, A., Gerick, F. and Rekier, J., 2021, Core eigenmodes and their impact on the Earth's rotation, *Surv. Geophys.*, https://doi.org/10.1007/s10712-021-09668-y.
- **Dumberry, M.** and Mandea, M., 2021, Gravity variations and ground deformations resulting from core dynamics, *Surv. Geophys.*, https://doi.org/10.1007/s10712-021-09656-2.
- **Dumberry, M.**, 2021, The influence of a fluid core and a solid inner core on the Cassini sate of Mercury, *J. Geophys. Res.: Planets, 126*, e2020JE006621.
- Steinbrügge, G., **Dumberry, M.**, Rivoldini, A., Schubert, G. Cao, H., Schroeder, D. M. and Soderlund, K. M., 2021, Challenges on Mercury's interior structure posed by the new measurements of its obliquity and tides, *Geophys. Res. Lett., 48*, e2020GL089895.
- Rosat, S., Gillet, N., Boy, J.-P., Couhert, A. and **Dumberry, M.**, 2021, Interannual variations of degree 2 from geodetic observations and surface processes, *Geophys. J. Int., 225*, 200-221.
- Gillet, N., **Dumberry, M**. and Rosat, S., 2021, The limited contribution from outer core dynamics to global deformations at the Earth's surface, *Geophys. J. Int., 224*, 216-229.
- Organowski, O. and **Dumberry, M.**, 2020, Viscoelastic relaxation within the Moon and the phase lead of its Cassini state, *J. Geophys. Res. Planets, 125*, e2020JE006386.
- Stys, C. and **Dumberry, M.**, 2020, A past lunar dynamo thermally driven by the precession of its inner core, *J. Geophys. Res. Planets, 125*, e2020JE006396.
- **Dumberry, M.** and More, C., 2020, Weak magnetic field changes over the Pacific due to high conductance in lowermost mantle, *Nature Geoscience, 13*, 516-520.
- Stys, C. and **Dumberry, M.**, 2018, The Cassini state of the Moon's inner core, *J. Geophys. Res. Planets, 123*, 2868-2892.
- **Dumberry, M.**, 2018, Earth Rotation, Excitation, Core, In: Grafarend E. (eds) *Encyclopedia of Geodesy*, Encyclopedia of Earth Sciences Series, Springer, Cham.
- More, C. and **Dumberry, M.**, 2018, Convectively driven zonal flow accelerations in the Earth's fluid core, *Geophys. J. Int., 213*, 434-446.
- **Dumberry, M.** and Wieczorek, M. A., 2016, The forced precession of the Moon's inner core, *J. Geophys. Res. Planets, 121*, 1264-1292.
- Mitrovica, J. X., Hay, C.C., Morrow, E., Kopp, R. E., **Dumberry, M.** and Stanley, S., 2015, Reconciling past changes in Earth's rotation with 20th century global sea-level rise: resolving Munk's enigma, Science Advances, 1, e1500679.
- **Dumberry, M.** and Rivoldini, A., 2015, Mercury's inner core size and core-crystallization regime, *Icarus, 248*, 254–268.
- Davies, C. J., Stegman, D. R. and **Dumberry, M.**, 2014, The strength of gravitational core-mantle coupling, *Geophys. Res. Lett., 41*, 3786–3792, doi:10.1002/2014GL059836.
- Koot, L. and **Dumberry, M.**, 2013, The role of the magnetic field morphology on the electromagnetic coupling for nutations, *Geophys. J. Int., 195*, 200-210.
- Yseboodt, M., Rivoldini, A., Van Hoolst, T. and **Dumberry, M.**, 2013, Influence of an inner core on the long period forced librations of Mercury, *Icarus, 226*, 41-51.
- **Dumberry, M.**, Rivoldini, A., Van Hoolst, T. and Yseboodt, M., 2013, The role of Mercury's core density structure on its longitudinal librations, *Icarus, 225*, 62-74.

- Koning, A. H., and **Dumberry, M.**, 2013, Internal forcing of Mercury's long period free librations, *Icarus*, 223, 40–47.
- **Dumberry, M.** and Koot, L. 2012, A global model of electromagnetic coupling for Earth nutations, *Geophys. J. Int., 191*, 530-544.
- **Dumberry, M.**, 2011, The free librations of Mercury and the size of its inner core, *Geoph. Res. Lett., 38*, L16202, doi:10.1029/2011GL048277.
- Veasey, M., and **Dumberry, M.**, 2011, The influence of Mercury's inner core on its physical libration, *Icarus, 214*, 265-274.
- Koot, L., and **Dumberry, M.**, 2011, Viscosity of the Earth's inner core: constraints from nutation observations, *Earth Planet. Sci. Lett., 308*, 343-349.
- **Dumberry, M.**, 2011, A new twist on inner-core spin, *Nature Geoscience, 4*, 216-217.
- Aubert, A., and **Dumberry, M.**, 2011, Steady and fluctuating inner core rotation in numerical geodynamo models, *Geophys. J. Int., 184*, 162-170.
- Finlay, C.C., **Dumberry, M.**, Chulliat, A. and Pais, A., 2010, Short timescale core dynamics: theory and observations, *Space Sci. Rev., 155*, 177-218.
- **Dumberry, M.**, 2010, Gravitationally driven inner core differential rotation, *Earth Planet. Sci. Lett., 297*, 387-394.
- Koot, L., **Dumberry, M.**, Rivoldini, A., de Viron, O and Dehant, V., 2010, Constraints on the coupling at the core-mantle and inner core boundaries inferred from nutation observations, *Geophys. J. Int., 182*, 1279-1294.
- **Dumberry, M.** and Mound, J., 2010, Inner core - mantle gravitational locking and the super-rotation of the inner core, *Geophys. J. Int., 181*, 806-817.
- **Dumberry, M.**, 2010, Gravity variations induced by core flows, *Geophys. J. Int., 180*, 635-650.
- **Dumberry, M.**, 2009, Influence of elastic deformations on the inner core wobble, *Geophys. J. Int., 178*, 57–64.
- **Dumberry, M.**, 2009, Taylor's constraint and torsional oscillations, in *Les Houches, session LXXXVIII: Dynamos* . Eds P. Cardin and L. F. Cugliandolo, Elsevier, p383-401.
- **Dumberry, M.**, 2008, Gravitational torque on the inner core and decadal polar motion, *Geophys. J. Int., 172*, 903–920.
- **Dumberry, M.** , 2008, Decadal variations in gravity caused by a tilt of the inner core, *Geophys. J. Int., 172*, 921–933.
- **Dumberry, M.** and Mound, J., 2008, Constraints on core-mantle electromagnetic coupling from torsional oscillations normal modes, *J. Geophys. Res., 113*, B03102, doi:10.1029/2007JB005135.
- **Dumberry, M.**, 2007, Geodynamic constraints on the steady and time-dependent inner core axial rotation, *Geophys. J. Int., 170*, 886-895.
- **Dumberry, M.**, 2007, Torsional oscillations, in *Encyclopedia of Geomagnetism and Paleomagnetism*, Gubbins, D and Herrero-Bervera, E. Eds., Springer, Dordrecht, The Netherlands, pp.746-748.
- **Dumberry, M.** and Finlay, C. C., 2007, Eastward and westward drift of the Earth's magnetic field for the last three millennia, *Earth Planet. Sci. Lett., 254*, 146-157.
- **Dumberry, M.** and Bloxham, J., 2006, Azimuthal flows in the Earth's core and changes in the length of day at millennial timescales, *Geophys. J. Int., 165*, 32-46.

- **Dumberry, M.**, 2005, Comment on "Could the $M_\omega = 9.3$ Sumatra earthquake trigger a geomagnetic jerk?", *EOS, 86*, 343.
- **Dumberry, M.** and Bloxham, J., 2004, Variations in the Earth's gravity field caused by torsional oscillations in the core. *Geophys. J. Int., 159*, 417-434.
- **Dumberry, M.** and Bloxham, J., 2003, Torque balance, Taylor's constraint and torsional oscillations in a numerical model of the geodynamo. *Phys. Earth Planet. Inter., 140*, 29-51.
- Bloxham, J., Zatman, S. and **Dumberry, M.**, 2002, The origin of geomagnetic jerks. *Nature, 420*, 65-68.
- **Dumberry, M.** and Bloxham, J., 2002, Inner core tilt and polar motion. *Geophys. J. Int., 151*, 377-392.
- Marchand, R., Charbonneau-Lefort, M., **Dumberry, M.** and Pronovost, B., 2001, ARANEA, a program for generating unstructured triangular meshes with JAVA Graphics User Interface. *Comput. Phys. Comm., 139*, 172-195.
- **Dumberry, M.** and Buffett, B. A., 1999, On the validity of the geostrophic approximation for calculating the changes in the angular momentum of the core. *Phys. Earth Planet. Inter., 112*, 81-99.
- Marchand, R. and **Dumberry, M.**, 1996, CARRE: a quasi-orthogonal mesh generator for 2D edge plasma modelling. *Comput. Phys. Comm., 96*, 232-246.
- Marchand, R., **Dumberry, M.**, Demers, Y., Côté, C., Le Clair, G., Larsen, J.-M., Bonnin, X. and Braams, B. J., 1995, Up-down symmetry in double null divertor experiments and magnetic field topology. *Nucl. Fusion, 35*, 297-304.

Awards, Academic Honors and Fellowships

- Excellence in Refereeing, Journal of Geophysical Research - Planets, 2016.
- Canadian Geophysical Union Young Scientist Award, May 2013
- Awarded the "Zatman lecture" at the 11th symposium of SEDI (Study of the Earth's Deep Interior) in Kunming, China, July 2008.
- Discovery grant of the National Sciences and Engineering Research Council of Canada (NSERC), 2008 – 2012, 2012 – 2017, 2017 – 2022
- Postdoctoral Fellowship of the Natural Environment Research Council of United Kingdom (NERC), 2004 – 2007.
- Outstanding student paper award, Geodesy Section, Fall Meeting of the American Geophysical Union, 2002.
- Certificate of Excellence in Teaching, Derek Bok Center, Harvard University, Fall of 2000 and Spring of 2001.
- Ph. D. Scholarship of the Fonds pour la Formation de Chercheurs et l'Aide à la Recherche du Québec (FCAR), 2001 – 2002.
- Ph. D. Scholarship of the NSERC of Canada, 1999 – 2001.
- M. Sc. Scholarship of the Fonds pour la Formation de Chercheurs et l'Aide à la Recherche du Québec (FCAR), 1995 – 1997.

Teaching Experience

Fall 2019 2020, 2021	University of Alberta "Particles and waves", PHYS124 *Lecturer*	Edmonton, AB, Canada
Winter 2012 2013, 2014, 2016, 2017, 2018	University of Alberta "Introductory Computational Physics", PHYS 234 *Lecturer*	Edmonton, AB, Canada
Fall 2015 2016, 2017, 2018, 2019	University of Alberta "Physics of the Earth", GEOPH 210 *Lecturer*	Edmonton, AB, Canada
Spring 2017	University of Alberta (School in Cortona) "Natural Disasters", INTD 200 *Lecturer*	Cortona, Italy
Winter 2011, 2012, 2013	University of Alberta "Introduction to Geophysics", GEOPH 110 *Lecturer*	Edmonton, AB, Canada
Fall 2008, 2009, 2010, 2013 2020, 2021	University of Alberta "Gravity, Magnetic and Electrical Techniques", GEOPH 325 *Lecturer*	Edmonton, AB, Canada
Winter 2008, 2009, 2010, 2011	University of Alberta "Global Geodynamics", GEOPH 440/521 *Lecturer*	Edmonton, AB, Canada
Winter 2003	Harvard University "History of the Earth", EPS 8 (Profs. Paul F. Hoffman and Daniel P. Schrag) *Teaching Fellow*	Cambridge, MA, USA
Fall 2000 and Winter 2001	Harvard University "Applied Mathematics 21a,b", AM 21a,b (Prof. Jeremy Bloxham) *Teaching Fellow*	Cambridge, MA, USA
Winter 2000	Harvard University "Introduction to Planetary Physics", EPS 106 (Prof. Jeremy Bloxham) *Teaching Fellow*	Cambridge, MA, USA

Students & Postdocs

Current Graduate Students

- Roman Bakatiuk, MSc. student, started in January 2022,

Current Undergraduate Students

- Ian MacPherson, undergraduate research project, *Dissipation in the Cassini state of Mercury*, started in May 2020
- Dhananjhay Bansal, undergraduate research project, *Forced precession of Trappist-1 planets*, started in May 2021

Former Postdoctoral Research Assistant

- Colin More, January 2018 – October 2018, *Quasi-geostrophic models of core dynamics*.
- Laurence Koot, July 2009 – December 2010, *Earth's nutations and core-mantle electromagnetic coupling*. Now a postdoctoral Fellow at *Royal Observatory of Belgium*.

Former Graduate Students

- Olivier Organowski, MSc., September 2016 - December 2018, *Viscoelastic Relaxation within the Moon and the Phase Lead of its Cassini State.*
- Christopher Stys, MSc, September 2016 - December 2018, *Inner Cassini States of the Moon, and their implications for a mechanically driven dynamo*. Honors: *Hibbs travel award.*
- Colin More, PhD., January 2011 - October 2017, *Magnetically-forced axisymmetric zonal accelerations in Earth's outer core*. Honors: *NSERC-PGS doctoral fellowship, IGR Best student presentation, Hibbs travel award.* Service: *president of the graduate student association.*
- Zhenhua Li, PhD. (co-supervision), September 2013 - September 2017, *Rotational Seismology and Its Applications in Microseismic Event Localization*.
- Daniel Laycock, PhD., September 2009 - December 2014, *A generalized two dimensional quasigeostrophic model of thermal convection*. Honors: *NSERC-CGS doctoral fellowship, Hibbs travel award, Hibbs fellowship*. Now employed by the Royal Bank of Canada.
- Martin Veasey, MSc., July 2008 – October 2010, *The free librations of Mercury and the size of its inner core*. Honors: *Hibbs travel award*. Now employed by the British Defense Service.

Former Undergraduate Students

- Jiarui Zhang, undergraduate research project, *Dissipation in the Cassini state of the Moon*, May to August 2020
- Gonzalo Rubio, undergraduate thesis project advisor, *Numerical simulation of a quasi-geostrophic model of thermal convection*, January to April 2017.
- Christopher Stys, undergraduate thesis project advisor, *Gravity variations induced by the precession of the Moon's inner core*, January to April 2016.
- Simone Strohmair, undergraduate research project, *Librations on Mercury*, January to May 2013.
- Matthew Quigley, Summer undergraduate research, *Archaeomagnetic westward drift*, May to August, 2012, Honors: *Physics department summer research grant*. Currently completing undergraduate degree in Physics, Univ. of Alberta.
- Alice H. Koning, Co-op internship., Sept - Dec. 2011, *Internal forcing of Mercury's long period free librations*. Currently pursuing an MSc in Astrophysics, Univ. of Alberta.
- Mitchell Liddell, Summer undergraduate research, May to August 2009, Honors: *NSERC undergraduate research grant*. Currently pursuing an MSc in Geophysics, Univ. of Alberta.

Recent presentations at conferences

Recent conference presentations (oral) as first author

- The influence of a fluid core and a solid inner core on the Cassini sate of Mercury, *MExAG*, online, April 2021.
- The influence of a fluid core and a solid inner core on the Cassini sate of Mercury, *Fall AGU*, San Francisco, USA, Dec. 2020.
- The enigmatic magnetic field of the Earth: why its temporal variation is weaker over the Pacific?, *CUPC meeting*, online, London, Canada, Nov. 2020
- Gravity variations and surface deformations connected to Earth's core dynamics, *ISSI workshop*, Bern, Switzerland, Sept. 2021
- The low geomagnetic secular variation and weak core flows in the Pacific, *Fall AGU*, San Francisco, USA, Dec. 2019.
- Mechanically generated ancient lunar dynamo: constraints from reconstructions of its past Cassini state, *The core of the Moon*, Marseille, France, May 2019.
- On zonal flows and axial dipole field changes, *Fourth Swarm Science Meeting & Geodetic Mission Workshop*, Banff, Canada, March 2017.
- The forced precession of the Moon's inner core, *Advances in Lunar Magnetism from Paleomagnetism to Dynamos*, Cargése, France, May 2016.
- Earth's core contribution to variations in length of day, *Fall AGU*, San Francisco, USA, Dec. 2015.
- A generalized quasi-geostrophic model of thermal convection, *Fall AGU*, San Francisco, USA, Dec. 2015.
- A generalized quasi-geostrophic model of thermal convection, *IUGG*, Prague, Czech Republic, July 2015.
- A generalized quasi-geostrophic model of thermal convection, *CGU*, Montreal, Canada, May 2015.
- A generalized quasi-geostrophic model of thermal convection, *EGU*, Vienna, Austria, April 2015.
- Mercury's inner core size and core-crystallization regime, *EGU*, Vienna, Austria, April 2015.

Recent conference presentations (poster) as first author

- The low geomagnetic secular variation and weak core flows in the Pacific, *IUGG*, Montreal, Canada, July 2019.
- The low geomagnetic secular variation in the Pacific and the inhomogeneous conducting lower mantle, *Fall AGU*, Washington DC, USA, Dec. 2018.
- The low geomagnetic secular variation in the Pacific and the inhomogeneous conducting lower mantle, *SEDI*, Edmonton, Canada, July 2018.
- The forced precession of the Moon's inner core, *SEDI*, Nantes, France, July 2016.
- QGZ: a quasi-geostrophic model of thermal convection, *Fall AGU*, San Francisco, USA, Dec. 2014.
- QGZ: a quasi-geostrophic model of thermal convection, *SEDI*, Kanagawa, Japan, July 2014.
- Mercury's inner core size and core-crystallization regime, *SEDI*, Kanagawa, Japan, July 2014.

Recent conference presentations (oral) by students, postdocs

- **More, C.** and Dumberry, M., Using a two-dimensional approach to model the short timescale zonal flow in Earth's core, *IUGG*, Prague, Czech Republic, July 2015.
- **Koot, L.**, Constraints on the structure and dynamics of the core-mantle and inner core boundaries inferred from nutations (Invited), *SEDI*, Leeds, July 2012.
- **Laycock, D.** and Dumberry M., A quasi-geostrophic model of zonal wind generation on the gas giants, *AGU*, San Francisco, Dec. 2011.
- **Koot, L** et al., Constraints on the couplings at the core-mantle and inner core boundaries inferred from nutation observations (Invited), *AGU*, San Francisco, Dec. 2009.

Recent conference presentations (poster) by students, postdocs

- **Stys, C.** and Dumberry, M., The internal Cassini states of the Moon and its ancient dynamo, *Fall AGU*, Washington DC, USA, Dec. 2018.
- **Organowski, O.** and Dumberry, M., Viscoelastic relaxation within the Moon and the phase lag of its Cassini state, *Fall AGU*, Washington DC, USA, Dec. 2018.
- **Stys, C.** and Dumberry, M., The Internal Cassini states of the Moon and its ancient dynamo, *SEDI*, Edmonton, Canada, July 2018.
- **Organowski, O.** and Dumberry, M., Viscoelastic relaxation within the Moon and the phase lag of its Cassini state, *SEDI*, Edmonton, Canada, July 2018.
- **More, C.**, Dumberry, M. and Heimpel, M., A comparison between a full three dimensional and a quasigeostrophic model of thermally-driven convection in a spherical shell, *SEDI*, Edmonton, Canada, July 2018.
- **More, C.** and Dumberry, M., A quasi-geostrophic magnetoconvection model of the decadal zonal flow dynamics in Earth's core, *Fourth Swarm Science Meeting & Geodetic Mission Workshop*, Banff, Canada, March 2017.
- **More, C.** and Dumberry, M., A two-dimensional approach to modelling the short timescale zonal flow in Earth's core, *Fall AGU*, San Francisco, USA, Dec. 2015.
- **Laycock, D.** and Dumberry, M., A quasigeostrophic model of zonal wind generation on the gas giants, *Fall AGU*, San Francisco, USA, Dec. 2014.
- **More, C.** and Dumberry, M., Using a two-dimensional approach to modelling the short timescale zonal flow in Earth's core, *Fall AGU*, San Francisco, USA, Dec. 2014.
- **More, C.** and Dumberry, M., Adding a Lorentz force to an existing QG model of the outer core, *Gordon Research Conference*, South Hadley, Mass., June 2013.
- **Laycock, D.** and Dumberry, M., A quasigeostrophic model of zonal wind generation in the gas giants, *Gordon Research Conference*, South Hadley, Mass., June 2013.
- **Laycock, D.** and Dumberry, M., A quasigeostrophic model of zonal wind generation in the gas giants, *AGU*, San Francisco, Dec. 2012.
- **Laycock, D.** and Dumberry, M., A quasigeostrophic model of zonal wind generation in the gas giants, *CIRES workshop*, Boulder, May 2012.

Invited Seminars

- University of Alberta, Edmonton, Canada, September 2019
- McGill University, Montréal, Canada, March 2019
- University of Münster (2), Münster, Germany, June 2015
- ETH Zurich, Switzerland, May 2015
- Université Grenoble-Alpes, Grenoble, France, March 2015
- Institut de Physique du Globe, Paris, France, January 2015
- University of Leeds, Leeds, UK, October 2014
- Université du Québec à Montréal, Montréal, Canada, October 2014
- McGill University, Montréal, Canada, October 2014
- Université de Montréal, Montréal, Canada, September 2014
- University of Alberta, Edmonton, Canada, September 2013
- University of Toronto, Toronto, Ontario, Canada, March 2013
- California Institute of Technology, Los Angeles, USA, October 2010
- University of Liverpool, Liverpool, UK, November 2007
- Princeton University, Princeton, USA, March 2007
- University of Edinburgh, Edinburgh, UK, February 2007
- University of Alberta, Edmonton, Canada, January 2007
- Institut de Physique du Globe de Strasbourg, France, November 2006
- Université du Québec, Montréal, Canada, October 2006
- University of California, Los Angeles, USA, March 2006
- University of Newcastle, Newcastle, UK, November 2005
- University of Toronto, Toronto, Canada, March 2005
- University of Leeds, Leeds, UK, February 2005
- University College London, London, UK, January 2005
- Princeton University, Princeton, USA, April 2004
- Université du Québec, Montréal, Canada, November 2003
- Brown University, Providence, USA, March 2002.

Invited oral presentations at international conferences

- CUPC meeting, online, London, Canada, November 2021
- AGU fall meeting (2), San Francisco, USA, December 2015
- CGU/AGU spring meeting, Montreal, Canada, May 2015
- EGU general assembly, Vienna, Austria, April 2015
- 8th Euromech conference, Bad Reichenhall, Germany, September 2010.
- AGU fall meeting, San Francisco, USA, December 2008.
- Zatman Lecture, 11th Symposium of SEDI, Kunming, China, July 2008.
- Physics Summer School, Les Houches, France, August 2007.
- IUGG General Assembly, Perugia, Italy, July 2007.
- EGU general assembly, Vienna, Austria, April 2005.
- AGU fall meeting, San Francisco, USA, December 2003.

Additional Research Experience

1999 – 2004	EPS, Harvard University *Research and Teaching Assistant*	Cambridge, MA, USA
1995 – 1998	EOS, University of British Columbia *Research Assistant*	Vancouver, BC, Canada
1993 – 1994	INRS Énergie et Matériaux *Research Internship*	Varennes, QC, Canada
June 1994	KFA Forschungzentrum für Plasmaphysik *Research Internship*	Jülich, Germany

Service

International

- Vice-Chair, SEDI, since July 2019
- Leading organizer, SEDI meeting, Edmonton, Canada, July 2018
- Guest Editor, Geophysical Journal International, SEDI special issue, 2018-2019
- Associate Editor, Geophysical Research Letters, since October 2018
- SEDI scientific committee, since 2015
- NSF panelist, geophysics program, October 2013
- DFG panelist, dynamic Earth program, February 2015
- FRQNT panelist, CO-03 Mathématiques, physique et informatique, January 2022
- Chair of division 1, working group 1, International Association of Geomagnetism and Aeronomy (IAGA) (2014-2016)
- Regular organizer and convener of sessions at international meetings.
- Reviewed more than 100 scientific papers, including many for top journals such as *Nature*, *Science*, *Nature Geoscience* and *PNAS*.
- Regular reviewer of grant applications for *NSERC (Canada)*, *NSF (USA)*, *NASA (USA)*, *NERC (UK)* and *ANR (France)*.

University & Departmental

- Geophysics Focus Area coordinator (2019-)
- Geophysics Undergraduate program renewal committee (2020-)
- Graduate Student Admission committee (2017-2018)
- Hiring committee, Astrophysics position (2015)
- Graduate Scholarship committee (many years since 2010)
- Best Student Paper Award committee (many years since 2010)
- Faculty of Science representative on Faculty of Engineering Council (2012-2013)
- Faculty of Science representative on Campus St-Jean Council (2017-2018, 2021-)
- Served on numerous PhD candidacy exams, MSc and PhD thesis defences.