

Dr. Phil J.A. McCausland

Director, Western Paleomagnetic and Petrophysical Laboratory

Adjunct Professor

Department of Earth Sciences,

Western University, 0187 B&G Building.

London, ON Canada N6A 5B7

Tel. +001 (519) 661-2111 x88008

Fax +001 (519) 661-3198

E-mail: pmccausl@uwo.ca

<http://www.uwo.ca/earth/people/faculty/mccausland.html>

Research interests

Paleomagnetism; Tectonics of supercontinents, terranes and orogens; Precambrian and Paleozoic paleogeography; Physical properties and petrography of planetary materials; Meteoritics; Meteorite fall investigation and history; X-ray Computed Tomography and Laser imaging; ⁴⁰Ar-³⁹Ar geochronology; geothermobarometry; shock metamorphism

Education

Ph.D., Geophysics, University of Western Ontario, 2002.

“Geotectonic motions of the Yukon-Tanana terrane, northern Cordillera: Paleomagnetism and geobarometry of Mesozoic and Cenozoic intrusions” (advisors D.T.A. Symons, H.C. Palmer)

M.Sc., Geophysics, Memorial University of Newfoundland, 1998.

“Palaeomagnetism of the Skinner Cove Formation of Western Newfoundland and the birth of the Iapetus Ocean” (advisor J.P. Hodych)

B.Sc. Honours, Geology, Memorial University of Newfoundland, 1995.

“Palaeomagnetism and U-Pb Zircon Age of the Skinner Cove Volcanics of Western Newfoundland” (advisor J.P. Hodych)

Present Scholarly and Professional Activities

President, Solid Earth Section of the Canadian Geophysical Union (2013-present)

Senior Representative for Canada to IAGA (International Association of Geomagnetism and Aeronomy; 2015-present)

Secretary-Treasurer, Geophysics Division of the GAC (2013-present)

Meteorite Impact Advisory Committee – Canada National Fireball Coordinator (2014-present)

Participant, IGCP 628 “The Gondwana Map Project– the geological map and the tectonic evolution of Gondwana”

Participant, IGCP 648 “Supercontinent Cycles & Global Geodynamics”

Honours and Awards

Western University USC Teaching Honour Roll - Award of Excellence 2014 - 2015

W.F. James Professor of Pure and Applied Sciences, 2012, St. Francis Xavier University

APICS-AGS Distinguished Lecturer, 2006 – 2007,

Atlantic Geoscience Society & the Atlantic Provinces Council on the Sciences

Turner Postdoctoral Fellowship, 2002 – 2005, Dept. of Geological Sciences, U. Michigan

Research Funding – Awarded

Natural Sciences and Engineering Research Council – Discovery Grant \$28K/year 2013-2018

Natural Sciences and Engineering Research Council – Engage Grant, with industrial partner
Stillwater Canada Inc. \$24,970; Sept 2015-Feb 2016

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NSERC Research Tools and Innovation (RTI)

[10%] \$144,985

R.L. Flemming (PI) and McCausland, P.J.A., deBruyn, J., Hutter, J., Osinski, G.R.O. and

Schmidt, M. *awarded* April 2016: "Upgrades to Bruker D8 Discover Micro X-ray Diffractometer"

Research Experience & Employment

Director, Western Paleomagnetic and Petrophysical Laboratory, September 2015 – present
Adjunct Professor, Department of Earth Sciences, University of Western Ontario

Assistant Professor September 2012 – August 2015

Department of Earth Sciences, University of Western Ontario

Meteoritics; paleomagnetism as applied to tectonics

Coordinator of ASTRO (Astromaterials Training and Research Opportunities) Cluster,
Canadian Space Agency (September 2012 – August 2015)

W.F. James Professor of Pure and Applied Sciences

May – August 2012

St. Francis Xavier University

Paleogeography of Avalonia and the assembly of Pangea

Postdoctoral Fellow (P. Brown, G. Osinski)

January – April 2012

Department of Earth Sciences, University of Western Ontario

Meteorite physical properties; curation best practices

NSERC Engage Postdoctoral Fellow (D.T.A. Symons)

November 2011 – February 2012

Department of Earth & Environmental Sciences, University of Windsor

Paleomagnetic investigation of the timing of dolomitization and ore-forming events at the Pine
Point Zn-Pb mine, NWT

Research Fellow (J.B. Murphy)

September – October 2011

Department of Earth Sciences, St. Francis Xavier University

Paleomagnetic investigation of mid-Paleozoic volcanics and redbeds related to the
development of the Gulf of St. Lawrence basin

CPSX Postdoctoral Fellow

May 2009 – June 2011

(P. Brown, R. Flemming & A. Hildebrand [U. Calgary])

Centre for Planetary Science & Exploration, University of Western Ontario

Tagish Lake carbonaceous chondrite bulk properties and parent body alteration; Micro XRD
measurement of shock metamorphism; X-ray Micro-CT imaging of meteorites; Lead
investigator of the recovery and description of the September, 2009 Grimsby meteorite fall

Research Fellow (J.B. Murphy and S. Pisarevsky)

August 2006 – July 2007

Department of Earth Sciences, St. Francis Xavier University

Paleomagnetic, geochronologic and geochemical fieldwork and research conducted on Late
Neoproterozoic rocks of eastern Laurentia and Avalonia

Postdoctoral Fellow (P. Brown and R. Flemming)

August 2005 – May 2008

Department of Earth Sciences, University of Western Ontario

Solar system processes via bulk material properties (bulk density, porosity, magnetic
properties) and mineralogy of meteorites; Curator of UWO meteorite collection

Turner Postdoctoral Fellowship (R. Van der Voo)

July 2002 – June 2005

Department of Geological Sciences, University of Michigan

Paleomagnetic and geochronologic research on the Late Neoproterozoic to Cambrian
paleogeography of Laurentia and the opening of the Iapetus Ocean; Paleozoic motions and
deformation of the Kazakhstan continental elements during the assembly of Eurasia

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Teaching experience

University of Western Ontario, Earth Sciences

ES 2250Y co-instructor Geological Field School for 2nd year students (2015)

ES 4490E Senior Thesis class (2013-2014; 2014-2015)

ES 4450Y co-instructor Fourth Year Field School in Atlantic Canada (Fall 2014)

ES 1086G "Origin & Geology of the Solar System" –online offering (Winter 2014)

PS 9603A Lecturer for Astromaterials Module, Planetary Science Graduate Course (Sept 2013)

ES 2240G "Catastrophic Events in Earth History" –online offering (Winter 2013)

ES 1081a "Resources, Environment and Sustainability in a Material Society" (Fall 2012)

St. Francis Xavier, Earth Sciences (September – November 2011)

Lead lecturer, Graduate course on "Paleomagnetic Methods and Tectonic Applications."

Carleton University, Earth Sciences (January – April 2009)

Sessional Lecturer: 2nd year "Mineralogy to Petrology" and 1st year "Dynamic Earth."

University of Windsor, Earth & Environmental Sciences (May, 2008)

Co-led 2nd year Field School: Geological field camp in North Bay region

University of Western Ontario, Earth Sciences (September – December 2007)

ES 2260 (formerly 260) Sessional Lecturer 2nd yr Earth Sciences course "Stratigraphy & Sedimentology: From Beds to Basins"

University of Michigan, Department of Geological Sciences (January 2004 – April 2005)

Lecturer of 2nd year "Dynamic Earth" (Winter 2005)

Co-lecturer of 2nd year "Environmental Geology" (Fall 2004)

Lecturer of 1st-year "Plate Tectonics" to non-Earth Science majors (Winter 2004).

Service

Curator, Western meteorite collection (September 2012 – June 2015)

Member, Executive Council, Centre for Planetary Science and Exploration (March 2013 – August 2015)

Leader, "Georgian Bay Field Trip" along with G. Pratt and P. Corcoran, September, 2014 -3 days with 28 intro geology students in circum-Georgian Bay field excursion.

Western Earth Sciences Departmental Committees:

Colloquium (September 2012 – June 2015; Chair of committee 2014-2015)

Appointments (Elected July 2013 – June 2015)

Search Committee for Hazards & Earthquake Seismology position (2014-2015)

Coordinator of Planetary Sciences Research Group (2007-2008), including administrative activities for the UWO Graduate and Undergraduate Planetary Science Programs, public outreach, conference organization. Curator, UWO Earth Sciences meteorite collection.

Chair for Thesis defences and Comprehensive Qualifying Exams for:

Sweeney, Sarah; MSc defence (Nov 2014)

Clark, David; Ph.D comprehensive exam (July 2014)

Graduate Thesis examinations

Gushulak, Cale (Aug 2016) M.Sc. Geology, supervised by J. Jin

Klein, Robert (March 2016) Ph.D. Geology *University of Helsinki* (external examiner)

Coulter, Adam (Dec 2015) M.Sc. Geology, supervised by G. Osinski

Bingham-Koslowski, Nikole (Aug 2015) Ph.D. Geology, supervised by C. Tsujita and J.Jin

Buitenhuis, Eric (Dec 2013) M.Sc. Geology, supervised by N.Duke and C. Finnegan

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Shankar, Bhairavi (Mar 2013) Ph.D. Planetary Sciences, supervised by G. Osinski

Battler, Melissa (Dec 2012) Ph.D. Planetary Sciences, supervised by N. Banerjee, G. Osinski

Member of thesis advisory committee for

Aviles, Mayling (Ph.D candidate); supervised by Burns Cheadle and Guy Plint

Zylberman, William (Ph.D candidate); supervised by Gordon Osinski and Yoann Quesnel

Anders, Denise (Ph.D, 2016); supervised by Gordon Osinski and Richard Grieve

Kouhi, Derek (M.Sc., 2016); supervised by Kristy Tiampo and Bob Linnen

Reviewer for:

- Geological Society of America Bulletin
- Precambrian Research
- Geophysical Journal International
- Meteoritics and Planetary Science
- Geology
- Gondwana Research
- Economic Geology
- American Journal of Science
- Lithos
- Geoscience Canada
- Journal of Geochemical Exploration
- Canadian Aeronautics and Space Journal
- Journal of Volcanology and Geothermal Research
- Geological Association of Canada
- National Science Foundation

Professional Affiliations

- Fellow, Royal Astronomical Society (Geophysics)
- Canadian Geophysical Union (President, Solid Earth Section)
- Geological Association of Canada (Secretary-Treasurer, Geophysics Division)
- American Geophysical Union (Geomagnetism and Paleomagnetism)
- Meteoritical Society
- Atlantic Geoscience Society
- Geological Society of America
- Mineralogical Association of Canada
- Royal Astronomical Society of Canada

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McCausland Group Graduate Students

Fernandes, Earl (September 2014 – August 2015; *completed*)

Acc. M.Sc. Geology, University of Western Ontario: “Magnetic fabric study and the emplacement of sulfide deposits in the North Range offset dykes of the Sudbury Impact Structure, Ontario, Canada”

Uribe, Diego (September 2014 – present; co supervised with M. Izawa and R. Flemming)

M.Sc. Planetary Science, University of Western Ontario: “Primitive enstatite achondrites as indicators of environments and processes during early planetary differentiation”

Thomson, Andrew (September 2014 – present; co-supervised with C. Tsujita)

M.Sc. Geology, University of Western Ontario: “Quantitative analysis of Middle Devonian coral growth ridges for paleoenvironmental and geodynamic purposes”

MacRae, Michelle (September 2015 – present; co-supervised with J. Jin)

M.Sc. Geology, University of Western Ontario: “Ordovician continental paleogeography and paleoenvironment for the Michigan basin from paleomagnetic and faunal analysis”

Warsame, Halima (September 2015 – present; co-supervised with C. Tsujita)

M.Sc. Geology, University of Western Ontario: “Paleogeography of Early Paleozoic Laurentia and Meguma, Avalonia terranes via paleomagnetism and faunal analysis”

Gunawardana, Hiruni (September 2015 – present; co-supervised with G. Pratt)

M.Sc. Geophysics, University of Western Ontario: “Petrophysical Properties and 3D modeling of sulphide mineralization distribution at the Marathon Cu-PGE deposit, Marathon, Ontario”

Li, Yaozhu (September 2016 – present; co supervised with R. Flemming)

M.Sc. Planetary Science, University of Western Ontario: “Ureilite meteorite record of shock metamorphism and parent body processes”

Sara, Sundeep (May 2016 – present)

Acc. M.Sc. Geology, University of Western Ontario: “Analysis of NI 43-101 effectiveness: Case study approach”

Sridhar, Jayashree (September 2013 – *now withdrawn*)

M.Sc. Geophysics, University of Western Ontario

McCausland Group Honours B.Sc. students

Gunawardana, Hiruni (B.Sc. Geology, 2015, University of Western Ontario): “Devonian paleoposition of Avalonia and Laurentia using paleomagnetic data from the McAras Brook Formation, Nova Scotia”

Uribe, Diego (B.Sc. Geology 2014, University of Western Ontario): “Investigation of the mineralogical record of fireball fragmentation events in meteorite fusion crust”

Bramble, Michael (B.Sc. Planetary Science 2014, University of Western Ontario, co-supervised with R. Flemming): “Quantification of grain size by 2D micro-XRD”

Pol, Joshua (B.Sc. Geology 2014, University of Western Ontario, co-supervised with C. Tsujita): “Analysis of Middle Devonian coral growth ridges by means of quantitative visual based methods”

Rupert, Alexandra (B.Sc. Geology 2014, University of Western Ontario, co-supervised with R. Flemming): “Quantification of ordinary chondrite shock metamorphism using micro-XRD”

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Round, Stephanie (B.Sc. Geology 2010; University of Western Ontario, co-supervised with R. Flemming): "Classification of meteorites by olivine unit cell using micro X-ray diffraction"

Brown, Ross L. (B.Sc. Geophysics 2006; University of Western Ontario, co-supervised with L. Mansinha): "Locating subsurface structures by means of Ground Penetrating Radar and Magnetometer Surveys"

Undergraduate employment and mentorships

Deng, Mingzhen (Lindsay) (work study 2016-17)

Research assistant, Paleomagnetic Laboratory

Jenkins, Laura (summer 2016; co-supervised with R. Flemming)

NSERC CREATE Fellowship – University of Western Ontario

Kosmala, Anna (work study 2015-16)

Research assistant, Paleomagnetic Laboratory

Sara, Sundeep (work study 2015-16)

Research assistant, Paleomagnetic Laboratory

Warsame, Halima (summer, 2015)

Research assistant, Paleomagnetic Laboratory

Cunningham, Celeste (summer, 2015)

NSERC USRA - University of Western Ontario

Houde, Victoria (summer, 2015; co-supervised with R. Flemming)

NSERC USRA - University of Western Ontario

Gunawardana, Hiruni (summer 2014; summer 2015)

Research assistant, Paleomagnetic Laboratory

Hoefs, Ryan (work study 2014-15)

Research assistant, Meteorite Laboratory

Bajwa, Courtney (work study 2014-15)

Research assistant, Meteorite Laboratory

Uribe, Diego (summer 2014)

Research assistant, Meteorite Laboratory

O'Connor, Amanda (summer 2014; co-supervised with E. Webb)

Undergraduate CSA-ASTRO Research Award, University of Western Ontario

MacRae, Michelle (summer 2014; co-supervised with R. Flemming and G. Osinski)

Undergraduate CSA-ASTRO Research Award, University of Western Ontario

CoDyre, Sarah (summer 2014; co-supervised with R. Flemming)

Undergraduate CSA-ASTRO Research Award, University of Western Ontario

Nigim, Jamal (summer 2014; co-supervised with P. Simpson)

Undergraduate CAMBR Research Award, University of Western Ontario

Bramble, Michael (summer 2013)

NSERC USRA - University of Western Ontario

Uribe, Diego (summer 2013)

Undergraduate CSA-ASTRO Research Award, University of Western Ontario

Contributions to Research

...by the Numbers...	Total	Lead AU	citations (Web of Science)
Refereed Journal articles:	42	10	total ~1050; H=14
Refereed other publications:	7	4	
Articles submitted / in revisions:	0	0	
Conference abstracts:	87	39	<i>My students listed in italics</i>
Google scholar site:	https://scholar.google.com/citations?user=ERhoSvYAAAAJ&hl=en		

Refereed Journal Publications

Symons, D.T.A., Kawasaki, K, McCausland, P.J.A. and Hart, C.J.R. *accepted*. Paleopole for the 69 Ma Prospector Mountain Stock: A critique of the Carmacks / “Baja BC” transport estimate for Yukon, Canada. *Geophysical Journal International*

Pontefract, A., Osinski, G.R., Cockell, C.S., Southam, G., McCausland, P.J.A., Umoh, J. and Holdsworth, D.W. *accepted*. Microbial diversity of impact-generated habitats. *Astrobiology*
 Bramble, M.S., Flemming, R.L., and McCausland, P.J.A. 2015. Grain size measurement from two-dimensional micro-X-ray diffraction: Laboratory application of a radial integration technique. *American Mineralogist*, v. 100, p. 1899-1911, doi:10.2138/am-2015-5181

Symons, D.T.A., McCausland, P.J.A., Kawasaki, K. and Hart, C.R. 2015. Post-Triassic para-autochthoneity of the Yukon-Tanana Terrane: Paleomagnetism of the Early Cretaceous Quiet Lake Batholith. *Geophysical Journal International*, v 203, pp 312–326, doi: 10.1093/gji/ggv296

Samson, C., Butler, S., Fry, C., McCausland, P.J.A., Herd, R.K., Sharomi, O., Spiteri, R.J. and Ralchenko, M. 2014. 3-D Laser images of splash-form tektites and their use in aerodynamic numerical simulations of tektite formation. *Meteoritics and Planetary Science* v 49, pp 740-749, doi: 10.1111/maps.12287

Fry, C., Melanson, D., Samson, C., McCausland, P.J.A., Herd, R.K., Ernst, R.E., Umoh, J. and Holdsworth, D.W. 2013. Physical characterization of a suite of Buzzard Coulee H4 chondrite fragments. *Meteoritics and Planetary Science* v 48, pp 1-13, doi: 10.1111/maps.12130

Jin, J., Harper, D.A.T., Cocks, L.R.M., McCausland, P.J.A., Rasmussen, C.M.Ø. and Sheehan, P.M. 2013. Locating the Late Ordovician equator in Laurentia using palaeobiological and palaeomagnetic data. *Geology* v 41, pp 107-110; doi:10.1130/G33688.1 [highlighted in: Editor’s Choice, *Science* Dec 14, 2012]

McCausland P.J.A., Flemming, R.L., Wilson, G.C., Renaud, J., Dillon, D. and Holdsworth, D.W. 2013. The Wood Lake, Ontario H4 ordinary chondrite, a new Canadian meteorite. *Canadian Journal of Earth Sciences* v 50, pp 32-43.

Wilson, G.C. and McCausland, P.J.A. 2013. Canadian meteorites: a brief review. *Canadian Journal of Earth Sciences* v 50, pp 4-13.

Bazhenov, M.L., Levashova, N.M., Degtyarev, K.E., Van der Voo, R., Abrajevitch, A.V. and McCausland, P.J.A. 2012. Unravelling the Early-Middle Paleozoic paleogeography of Kazakhstan on the basis of Ordovician and Devonian paleomagnetic results. *Gondwana Research* v. 22, pp. 974 – 991.

Torsvik, T.H., Van der Voo, R., Preeden, U. and ten others. 2012. Phanerozoic Polar Wander, Paleogeography and Dynamics. *Earth Science Reviews* v. 114, pp 325-368.

Pisarevsky, S.A., McCausland, P.J.A., Hodych, J.P., O’Brien, S., Tait, J.A. and Murphy, J.B. 2012. Paleomagnetic study of the Late Neoproterozoic Bull Arm and Crown Hill Formations (Musgravetown Group) of eastern Newfoundland: implications for Avalonia and West Gondwana paleogeography. *Canadian Journal of Earth Sciences* v. 49, 308-327.

Singleton, A.C., Osinski, G.R., McCausland, P.J.A., Moser, D. 2011. Shock induced changes in density and porosity in shock metamorphosed crystalline rocks, Haughton impact

structure, *Meteoritics and Planetary Science* v. 46, pp 1774-1786, doi: 10.1111/j.1945-5100.2011.01290.x

McCausland, P.J.A., Samson, C. and McLeod, T. 2011. Meteorite Small Fragment Bulk Density via Visible Light 3D Laser Imaging, *Meteoritics and Planetary Science* v. 46, pp 1097-1109, doi: 10.1111/j.1945-5100.2011.01217.x

Brown, P.G., McCausland, P.J.A., Fries, M., Silber, E., Edwards, W.N., Wong, D.K., Wiegert, P., Weryk, R.J., Fries, J. and Krzeminski, Z. 2011. The Fall of the Grimsby Meteorite - I: Fireball dynamics and orbit from radar, video and infrasound records. *Meteoritics and Planetary Science* v. 46, pp 339-363, doi: 10.1111/j.1945-5100.2010.01167.

McCausland, P.J.A., Hankard, F., Van der Voo, R. and Hall, C.M. 2011. Ediacaran paleogeography of Laurentia: Paleomagnetism and ⁴⁰Ar-³⁹Ar geochronology of the 583 Ma Baie des Moutons syenite, Quebec. *Precambrian Research*, v. 187, pp 58-78, doi: 10.1016/j.precamres. 2011.02.004.

Izawa, M.R.M., Flemming, R.L., Banerjee, N.R. McCausland, P.J.A. 2011. Micro X-ray diffraction (μ XRD) assessment of shock stage in enstatite chondrites, *Meteoritics and Planetary Science*, v. 46, pp 638-651, doi: 10.1111/j.1945-5100.2011.01180.x

2010 and before

Izawa, M.R.M., Flemming, R.L., King, P.L., Peterson, R.C. and McCausland, P.J.A. 2010. Mineralogical and spectroscopic investigation of the Tagish Lake carbonaceous chondrite by X-ray diffraction and infrared reflectance spectroscopy, *Meteoritics and Planetary Science*, doi: 10.1111/j.1945-5100.2010.01043.

Izawa, M.R.M., Flemming, R.L., McCausland, P.J.A., Southam, G., Moser, D.E. and Barker, I.R. 2010. Multi-technique investigation reveals new mineral, chemical and textural heterogeneity in the Tagish Lake C2 chondrite. *Planetary and Space Science*, v. 58, pp 1347-1364.

van Drongelen, K., Tait, K., Clark, G. and McCausland, P.J.A. 2010. Petrographic and geochemical analysis of the Shelburne meteorite, an L5 ordinary chondrite fall. *Journal of the Royal Astronomical Society of Canada*, v. 104, pp 132-141.

Izawa, M.R.M., King, P.L., Flemming, R.L., Peterson, R.C. and McCausland, P.J.A. 2010. Mineralogical and spectroscopic investigation of enstatite chondrites by X-ray diffraction and infrared reflectance spectroscopy, *Journal of Geophysical Research –Planets*, v. 115. doi:10.1029/2009JE003452

McCausland, P.J.A. and Plotkin, H. 2009. The 1904 Shelburne (Ontario) L5 chondrite fall, revisited. *Journal of the Royal Astronomical Society of Canada*, v. 103, pp 181-188.

Symons, D.T.A., Kawasaki, K. and McCausland, P.J.A. 2009. The Yukon-Tanana terrane: Part of North America at ~215 Ma from paleomagnetism of the Taylor Mountain batholith, Alaska. *Tectonophysics*, v. 465, pp 60-74.

Beech, M., Coulson, I.M., Nie, W. and McCausland, P.J.A. 2009. The thermal and physical characteristics of the Gao Guenie (H5) Meteorite, *Planetary and Space Science*, v. 57, pp 764-770.

Murphy, J.B., McCausland, P.J.A., O'Brien, S.J., Pisarevsky, S. and Hamilton, M.A. 2008. Age, geochemistry and Sm-Nd isotopic signature of the 0.76 Ga Burin Group: Compositional equivalent of Avalonian basement? *Precambrian Research*, v. 165, 37-48.

Abrajevitch, A., Van der Voo, R., Bazhenov, M.L., Levashova, N.M. and McCausland, P.J.A. 2008. The role of the Kazakhstan orocline in the late Paleozoic amalgamation of Eurasia. *Tectonophysics*, v. 455, pp 61-76.

McCausland, P.J.A., Van der Voo, R. and Hall, C.M. 2007. Circum-lapetus paleogeography of the Precambrian-Cambrian transition with a new paleomagnetic constraint from Laurentia. *Precambrian Research*, v. 156, pp 125-152.

Edwards, W.N., Eaton, D.W., McCausland, P.J.A., ReVelle, D.O. and Brown, P.G. 2007. Calibrating infrasonic to seismic coupling using the Stardust Sample Return Capsule shockwave: Implications for seismic observations of meteors. *Journal of Geophysical Research - Planets*, v. 112, doi:10.1029/2006JB004621.

Levashova, N., Mikolaichuk, A.V., McCausland, P.J.A., Bazhenov, M.L. and Van der Voo, R. 2007. Devonian paleomagnetic results from the North Tien Shan and their implications for the paleogeography of Kazakhstan's tectonic units with respect to Baltica. *Earth and Planetary Science Letters*, v. 257, pp 104-120.

McCausland, P.J.A., Symons, D.T.A., Hart, C.J.R., and Blackburn, W.H. 2006. Assembly of the northern Cordillera: New paleomagnetic evidence for coherent, moderate Jurassic to Eocene motion of the Intermontane Belt and Yukon-Tanana terranes. In *Geological Association of Canada Special Paper 46: Paleogeography of the North American Cordillera: Evidence For and Against Large-Scale Displacements*, pp 145-168.

Symons, D.T.A., and McCausland, P.J.A. 2006. Paleomagnetism of the Fort Knox stock, Alaska, and rotation of the Yukon-Tanana terrane after 92.5 Ma. *Tectonophysics*. v. 419, pp 13-26.

McCausland, P.J.A., Murphy, J.B., and MacNiocaill, C. 2006. Preface: Endings and beginnings: Paleogeography of the Precambrian-Cambrian transition. *Precambrian Research*, v. 147, pp 187-192; doi:10.1016/j.precamres.2006.01.014.

McCausland, P.J.A., Brown, P.G., and Wilson, G.C. 2006. The Dresden (Ontario) H6 chondrite, Part II: Classification, estimated fireball trajectory, and possible origin. *Journal of the Royal Astronomical Society of Canada*, v. 100, pp 104-113.

Hildebrand, A.R., McCausland, P.J.A., Brown, P.G., Longstaffe, F.J., Russell, S.D.J., Tagliaferri, E., Wacker, J.F., and Mazur, M.J. 2006. The fall and recovery of the Tagish Lake meteorite. *Meteoritics and Planetary Science*, v. 41, pp 407-431.

McCausland, P.J.A., Symons, D.T.A., and Hart, C.J.R. 2005. Rethinking "Yellowstone in Yukon" and Baja British Columbia: Paleomagnetism of the Late Cretaceous Swede Dome stock, northern Canadian Cordillera. *Journal of Geophysical Research – Solid Earth*, v. 110, B12107, doi:10.1029/2005JB003742.

Symons, D.T.A., Harris, M.J., McCausland, P.J.A., Blackburn, W.H., and Hart, C.J.R. 2005. Mesozoic-Cenozoic Paleomagnetism of the Intermontane and Yukon-Tanana Terranes, Canadian Cordillera. *Canadian Journal of Earth Sciences*, v. 42, pp 1163-1185.

Symons, D.T.A., Hart, C.J.R., Harris, M.J., and McCausland, P.J.A. 2004. Paleomagnetism of the Eocene Flat Creek Pluton, Yukon: Tectonics of the Intermontane Terrane and Mackenzie Mountains. In Sussman, A.J, and Weil, A.B., eds. *Orogenic Curvature: Integrating paleomagnetic and structural analyses*, *Geological Society of America Special Paper 383*, pp 187-204.

Symons, D.T.A., Erdmer, P., and McCausland, P.J.A. 2003. A new cratonic North American paleomagnetic pole from the Yukon shows post-Eocene mobility of the Canadian Cordilleran terranes. *Canadian Journal of Earth Sciences*, v. 40, pp 1321-1334.

Cawood, P.A., McCausland, P.J.A., and Dunning, G.R. 2001. Opening Iapetus: Constraints from the Laurentian margin in Newfoundland. *Geological Society of America Bulletin*, v. 113, pp 443-453.

Symons, D.T.A., Williams, P.R., McCausland, P.J.A., Harris, M.J., Hart, C.J.R., and Blackburn, W.H. 2000. Paleomagnetism and geobarometry of the Big Creek batholith suggests that the Yukon-Tanana terrane has been a parautochthon since Early Jurassic. *Tectonophysics*, v. 326, pp57-72.

Brown, P.G., and 21 others. 2000. The Fall, recovery, orbit, and composition of the Tagish Lake meteorite: A new type of Carbonaceous Chondrite. *Science*, v. 290, pp 320-325.

McCausland, P.J.A., and Hodych, J.P. 1998. Paleomagnetism of the 550 Ma Skinner Cove volcanics of western Newfoundland and the opening of the Iapetus Ocean. *Earth and Planetary Science Letters*, v. 163, pp 15-29.

Book Chapters

McCausland, P.J.A. 2016. Fireballs. *Observers Handbook 2016*, The Royal Astronomical Society of Canada, Ed. D.M.F. Chapman, pp 255-256.

McCausland, P.J.A. 2015. Fireballs. *Observers Handbook 2015*, The Royal Astronomical Society of Canada, Ed. D.M.F. Chapman, pp 255-256.

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Invited Presentations and Colloquia

April 2, 2016 [*Keynote*] "Paleomagnetism: A Key Tool for Understanding Supercontinents and Geodynamics" Advances in Earth Sciences Research Conference, Ottawa, ON.

March 11, 2016: [*Invited*] "Precambrian Laurentia – Baltica Relations Through Two Supercontinents and Dispersal" University of Helsinki, Finland.

Jan 15, 2016: [*Invited*] "Elusive Keystone Laurentia - ancestral North America's journey through two supercontinents before Pangea" University of Windsor, Gravenor Lecture.

Nov 26, 2015: [*Invited*] "Elusive Keystone Laurentia - ancestral North America's journey through two supercontinents before Pangea" University of Toronto, Scarborough colloquium.

August 27, 2015: "Not a simple game: Results in a new era." University of Michigan; Rob Van der Voo 75th Birthday & Retirement Symposium.

March 12, 2013: [*Invited*] UWO Senior Alumni speaker series: "Topsy-turvy: Reversal of the Earth's geomagnetic poles" talk to about 270 alumni at McKellar Hall, UWO + Q&A session

Nov 2, 2012: Colloquium presentation with Dr. J. Jin: "Precisely locating the Ordovician equator in Laurentia using fossil and paleomagnetic data." Department of Earth Sciences, Western University

Oct 26, 2012: "Canadian meteorites: A brief review." Centre for Planetary Science & Exploration Research Forum, Western University

July 30, 2012: [*Invited*] "Magnetism in rocks records the motion of continents and the birth of ancient oceans: an example from the dawn of animal life" W.F. James Chair Lecture, St. Francis Xavier University

Feb 1, 2012: [*Invited*] "Meteorites as Essential Planetary Materials" Western University

March 1, 2011: [*Invited*] "Paleogeodynamics of the Precambrian-Cambrian transition" Department of Geology, University of Toronto

Oct 1, 2010: Colloquium presentation, "Orbit and Fall of the Grimsby meteorite; Arrival of an (extra) ordinary chondrite!" Department of Earth Sciences, Western University

Outreach activities 2008-present

November 20, 2016, "Rocks that fall to Earth" talk at London Gem & Mineral Show, for 15 people.

November 9, 2016, "Mission Meteorite" presentation and outreach event for 60 grade 6 students, visiting UWO.

February 17, 2016, "Recent fireball events in Canada" talk at Royal Astronomical Society of Canada, St. John's Centre.

February 3, 2016, "Meteorites -from fireballs to falls & finds!" talk at Gem and Mineral Club of Scarborough. <http://www.scarbagemclub.ca/2016/01/our-february-meeting-fireball-events-and-meteors/>

September 19, 2015, presentation in International Observe the Moon night activities, Cronyn Observatory, Western University.

February 5, 2015, "Landing on a Comet & Other Explorations" talk at London Gem & Mineral Society, for 42 people.

November 21, 2014, Panel Discussion "Would you go to Mars on a one-way mission to explore and to start a human colony?" at Royal Astronomical Society of Canada, London Centre. Panelists were Phil McCausland, Melissa Battler, Dale Armstrong and Phil Stooke.

November 16, 2014, "ESA Rosetta & Philae update + Meteorites: Falls and finds!" talk at London Gem & Mineral Show, for 35 people.

Nov 15-16, 2014, London Gem & Mineral Show: Co-organizer (with R. Flemming) of Western display booth.

October 6, 2014, "The magnetic record in rocks, plate tectonics and reversal of the Earth's geomagnetic poles" London Gem & Mineral Society, monthly meeting presentation to 42 people.

March 21, 2014, St. Thomas fireball & meteorite fall media briefing: National media news coverage of St. Thomas fireball event and possible meteorite fall. Panelists were Phil McCausland, Peter Brown and Bill Cooke (NASA-GSFC).

Nov 16-17, 2013, London Gem & Mineral Show: Co-organizer (with R. Flemming) of Western display booth.

October 30, 2013, Western University, Centre for Planetary Science and Exploration outreach event to Grades 5-6: "Mission to Meteorite" Event organized by N. Banerjee for 50 students from University Heights.

October 18, 2013, St. Paul's Junior High, St. John's, NFLD: "Meteorites: Falls and finds!" Guest class for 27 Grade 7 Science students.

October 16, 2013, Royal Astronomical Society of Canada, St. John's Centre: "Stalking the wild meteorite of Oman: 2013"

October 11, 2013, Oxford County Geological Society: "Reversals of the Earth's geomagnetic field: Fantastic discovery and an enduring problem"

May 3, 2013, Kitchener-Waterloo Gem & Mineral Club: "Meteorites as Essential Planetary Materials"

Feb 6, 2013, Watford Cubs (invitation from Mellissa Joris): "Meteorites and the starry sky!" Group of 25 children 5 to 9 years old.

Nov 17, 2012, London Gem & Mineral Show: "Canadian Meteorites: A brief review" – two talks on Saturday and Sunday

Sept 22, 2012, International Observe the Moon Night (InOMN), Cronyn Observatory, UWO: "Observing the moon up close: Meteorites and lunar samples!" talk to over 40 people at sundown before lunar observing.

August 3, 2012, Invited talks at Gemboree! Bancroft Gem and Mineral show: "Meteorites as Essential Planetary Materials" Friday & Saturday talks to 50+ people each time.

March 16, 2012, Brantford Lapidary & Mineral Society: "Meteorites as Essential Planetary Materials"

Nov 15, 2011, The Science Café series panel discussion of "Living in Space: Reaching the Final Frontier," on Wednesday at Canada South Science City, Windsor, ON.

March 3, 2011, London Gem & Mineral Society: Fall and recovery of the remarkable Tagish Lake meteorite.

Oct 2-3, 2010: Ancaster Gem & Mineral show, two presentations "Grimsby meteorite fall" to 40+ people each time

May 20, 2010: Rainbow's End Metal Detecting Association, Hamilton, ON "Finding meteorites like Grimsby" meeting of 35 members.

National Geographic Channel special on the Grimsby fall:

<http://channel.nationalgeographic.com/series/naked-science/5126/Overview>

Grimsby meteorite fall public talks: Grimsby Museum: Fall of the Sept 25, 2009 Grimsby meteorite. January 10, 2010; Royal Astronomical Society of Canada –Niagara Centre, March, 2010; Ancaster Gem & Mineral Show, October 2-3, 2010; London Gem and Mineral Show: November 25, 2010.

Various media interviews regarding the Grimsby fireball and meteorite fall event; October 2009 through November, 2010.

December 15, 2008, Royal Astronomical Society of Canada –St. John's: This fall's Guelph fireball and Buzzard Coulee meteorite events –field notes.

October 30, 2008, Centre Wellington District High School, Fergus, Ontario: Class presentation on Guelph Fireball and meteorites; Scott Grigsby-Lehmann, Earth and Space Science Teacher grades 12 and 9; Also, various media interviews (CTV, CBC, Newspapers, Discovery Channel) on the Guelph fireball event of October 15, 2008, for which I was the lead investigator.

May 10, 2008, Ontario Science Centre: The Tagish Lake Meteorite: A unique, primitive messenger from the Early Solar System

March 2008, Departmental tour and meteorite demonstration, Nexus UWO High School tour event, "Mission to Planet Meteorite: Exploring the solar system without a spacecraft."

February 15, 2008, Royal Astronomical Society of Canada –St. John's: "Terrestrial impact craters: Recent discoveries and some surprises!"

Past Scholarly and Professional Activities

- Central Rep, Planetary Division of the Geological Association of Canada (2012-2015)
- Junior Representative for Canada to IAGA (International Association of Geomagnetism and Aeronomy; 2010-2015)
- President, Geophysics Division of the Geological Association of Canada (2006-2013)
- Secretary, Solid Earth Section of the Canadian Geophysical Union (2009-2013)
- Guest Editor of the January 2013 special issue of the Canadian Journal of Earth Sciences, in "Planetary Geology and Geophysics: Canadian Contributions" (with Marie-Claude Williamson, Paul Sylvester, Steve Grasby, and Richard Léveillé)
- Guest Editor, Precambrian Research special issue "Endings and Beginnings: Paleogeography of the Precambrian-Cambrian transition," July 2006 (with B. Murphy and C. MacNiocaill)
- Submission of several new meteorite descriptions to the Meteoritical Society for official recognition, including Grimsby (H5), Wood Lake (H4), Lovina (ataxite), NWA 2221 (Ureilite), NWA 2202 (Polymict Euclite), NWA 1685 (LL4 polymict breccia).
- Co-leader, *Sultanate of Oman* meteorite field search with students and PDFs, Feb, 2013.
- Participant, "Cosmogenic Nuclide Dating" -Dr J. Gosse (Dalhousie University), Feb 26, 2014.
- Organizer of the CSA-ASTRO short course (London, Ontario, May 2013) with R. Flemming (UWO), a three-day meeting for astromaterials research and training for 60 participants.
- Convenor of a session for the Winnipeg GAC-MAC meeting (May, 2013) entitled: "Paleogeodynamics of the Earth Before Pangea."
- Co-convenor of session for the CGU meeting (May, 2011) with Claire Samson (Carleton) entitled: "Meteorites and planetary materials."
- Co-convenor of four sessions at the Toronto Joint AGU-GAC-MAC-CGU meeting (May, 2009): two in tectonophysics and two in planetary science.
- Convenor of a session for the CGU meeting (Banff, May 2008) with P. Audet (UBC) entitled: "Solid Earth Geophysics Review."
- Organizer of the Planetary Science Research Symposium (London, Ontario, Nov 2007) with P. Brown (UWO), a one-day meeting of Planetary Scientists from across Canada.
- Convenor of a session for the CGU-CMOS-AMS Joint meeting (St. John's, May 2007) with J. P. Hodych (Memorial U): "Paleomagnetism, rock magnetism and geomagnetism."
- Convenor of a session for the AGU-CGU Joint meeting (Montreal, 2004) with B. Murphy (St. FX) and Conall MacNiocaill (Oxford) called: "Endings and beginnings: Paleogeography, life and climate of the terminal Neoproterozoic through Cambrian time." Also at same meeting co-chair of the AGU Union session: "Extreme environments of the Precambrian Earth."

- Judge for Student best paper awards for the GAC Geophysics Division at the GAC/MAC annual meetings since 2004; for CGU Solid Earth Section since 2010, and for various student best presentation and paper awards at the Atlantic Universities Geological Conference (AUGC-undergraduate) in 2005 and 2006.
- Numerous public lectures and “Open House” activities; Outreach contributions include articles, public presentations and school visits on the Grimsby meteorite, the Tagish Lake meteorite as well as lectures on other meteorite and planetary studies (see above).
- Mentorship of graduate students: C. Fry (with C. Sampson and R. Herd, Carleton); C. Charles (with D. Davis, U of T); M.R.M. Izawa (with R. Flemming and N. Banerjee, Western); A. Singleton (with G. Osinski and D. Moser, Western); K. van Dronghelen, (with K. Tait, U of T).
- Tagish Lake meteorite “sidebar” chapter contribution to the Canadian-version textbook: “Earth, An Introduction to Physical Geology,” by Tarbuck, Lutgens and Tsujita (2004).