

EARTH SCIENCES NEWS

For Faculty, Staff, Students, Alumni, and Friends of Dalhousie Earth Sciences

May 2017

Greetings from the Chair

It is a great pleasure to provide you a report on this year's Earth Sciences activities. On the personal front, I am happy to say that I bought a house, and have now experienced the joy of home maintenance during a Halifax winter! My research lab is also up and running, with an excellent group of students hard at work on high P-T experiments.

As I mentioned in the last newsletter, the department is in a period of change, with faculty retirements, but some balance with renewals. Becky Jamieson retired at the end of June 2016 after 37 years of service. We celebrated her career at a reception in her honour last September. Retirement has not slowed her down – on the contrary, Becky was busy this year as the GAC Precambrian Division's Howard Street Robinson Medalist and Lecturer – sending me email updates from Whitehorse to Victoria to Sudbury! This year Nick Culshaw and Charlie Walls will also step down after more than 30 years of stellar service. We wish them well in their future endeavours.

This year, the department undertook two

faculty searches, one for a Canada Research Chair (CRC) in Coastal Zone Processes, and the other for an instructor in Geospatial Analysis. I am pleased to announce that Dr. Chris Greene will be joining the department as GIS instructor on 1 July, 2017. As announced in the last newsletter, Dr. Owen Sherwood will also be joining us as an Assistant Professor in Marine Geochemistry starting July 1. You'll hear more about Chris and Owen in the next newsletter, as well as the outcome of our CRC search, which is still in progress. In addition, we will be starting another faculty search this summer, in support of Dalhousie's diversity hiring program.

Our excellent faculty research and teaching were rewarded again this year with John Gosse named a Dalhousie Killam Professor, and Mike Young winning the Faculty of Science Teaching Award. I am also grateful to the graduate students for making this year's Christmas potluck a success, and the undergrads did a fabulous job with an elegant end-of-year banquet at Lot 6 in Halifax. As you will see inside, this is a very high-achieving group, with numerous awards for their research presentations, as well as highly placed finishes in national and international competitions.



Along with Acadia, SFX, SMU, and UNB, we organised a Maritimes Earth Sciences booth at this year's Prospectors and Developers Association convention (PDAC) in Toronto. Students had a chance to find out more about the mining industry, develop networking skills, and make inroads in finding employment. The department also sponsored an alumni reception, offering the current students a chance to connect with and be mentored by past graduates. This had very good attendance, and we are planning a similar event for next year's PDAC, so please mark your calendars.

Finally, I'd like to thank Becky Jamieson who took the time to put together this year's newsletter. Comments and feedback are always welcome, and I encourage you to contact me personally.

James Brenan,

Professor & Department Chair

For more department news, visit our website:
<http://www.dal.ca/faculty/science/earth-sciences.html>



High pressure at high altitude: Tso Moriri, NW Himalaya, where subducted continental crust has been returned to the surface. Photo: Djordje Grujic.

In This Issue

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Department News

Department Office Facelift

The Earth Sciences office had remained almost unchanged (right) since we first moved into the Life Sciences Centre.

New department chair James Brennan, with the capable assistance of Ann Bannon and support from the Faculty of Science, arranged for a major renovation of the office area, complete with new flooring, furniture, and storage space.



The newly renovated office (left) is much brighter and better organised. Faculty, staff, and students all welcome the change - especially Norma and Darlene, who finally have the space they need to work!

Visitors are always welcome - stop in and have a look!

Comings ...

Dr. Owen Sherwood (Dal PhD 2006) will join the department July 1 as our newest Assistant Professor.

Dr. Chris Greene has been appointed our new GIS Instructor effective July 1.

... and Goings

Nick Culshaw will retire July 1 after more than 30 years of exceptional teaching and research in structural geology and tectonics.



Charlie Walls will retire July 1 after many years of heroic effort devoted to developing, teaching, and managing our very successful GIS programme.



Gordon Brown retired in August 2016 after more than 40 years of making the best thin sections ever.

We're going to miss you!

Honours Symposium 2017

On Saturday, 1 April, the annual Honours Thesis Symposium was held in the Rowe Building. The 12 students in this year's class presented their results on topics ranging from kimberlite petrology, to rates and timing of uplift in the Arctic and Himalaya, to petroleum reservoir characterization and urban soil contamination. The symposium was followed by an excellent and well attended banquet at Lot 6 in Halifax, organised by the Dawson Club.

The department expresses its gratitude to all the thesis readers and especially to the supervisors who gave their time to make the programme a success. Special thanks also to **Djordje Grujic** for supervising the honours class this year.

Best Thesis Award: Corin Jorgenson (*supervisor J. Brennan*)

Best Presentation Award: Erin Anderson (*supervisor G. Wach*)



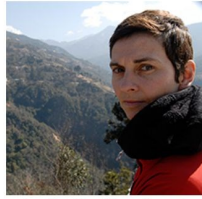
In November 2016, **Gerald R. Gloade**, Program Development Officer with the Mi'kmaq First Nation and designer of the new Canadian 5-cent coin (left), presented a fascinating seminar entitled: "Cultural memory timeline embedded in the Mi'kmaq legends of Kluskap".

Who's Who in Earth Sciences

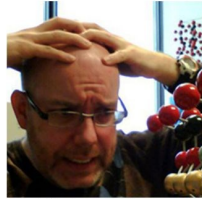
Faculty



James Brenan
Petrology / Mineral Deposits



Isabelle Coutand
Thermochronology / Structure



Richard Cox
Mineralogy / Petrology



Nick Culshaw
Structure / Tectonics



Yana Fedortchouk
Petrology / Mineral Deposits



John Gosse
Geomorphology / Geochronology



Djordje Grujic
Structure / Tectonics



Mladen Nedimovic
Geophysics



Lawrence Plug
Geomorphology



Anne-Marie Ryan
Environmental Geology



Shannon Sterling
Hydrology



Grant Wach
Petroleum Geoscience



Charlie Walls
Geographic Information Systems



Mike Young
Structure / Field Methods

Emeritus & Post-retirement



Basil Cooke
Paleontology



Martin Gibling
Sedimentology



Milton Graves
Ore Deposits / Dinosaurs



Rebecca Jamieson
Metamorphism / Tectonics



Clint Milligan
Structural Geology



Peter Reynolds
Geochronology



David Scott
Paleontology



Marcos Zentilli
Ore Deposits / Geochronology

Staff



Ann Bannon
Administrator



Gordon Brown
Thin Section Technologist



Tom Duffett
Geological Technologist



Norma Keeping
Administrative/Graduate Secretary



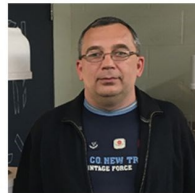
Roman Kislitsyn
Noble Gas Lab Technologist



Brant Laidler
Teaching Lab Technician



Dan MacDonald
Microprobe Lab Technologist



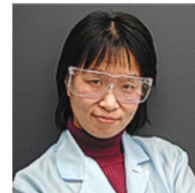
Sergei Ratchinski
Thin Section Technologist



John Thibodeau
Computer & IT Technician



Darlene Van de Rijt
Administrative Secretary



Guang Yang
TCN Facility Manager

Honours & Awards

John Gosse: promoted to Professor; appointed Killam Professor, Faculty of Science, 2017-22.

Mike Young: promoted to Senior Instructor; Award for Excellence in Teaching, Faculty of Science, 2017.



Charlie Walls: Earth Sciences Professor of the Year.

Becky Jamieson: Gesner Medal, Atlantic Geoscience Society, 2017; H.S. Robinson Medal, Geological Association of Canada, 2016-17.

Barrie Clarke (retired): Career Achievement Award, Volcanology & Igneous Petrology Division, Geological Association of Canada, 2017.

Undergraduate Student News

Dawson Club

The Dawson Geology Club's unwritten motto of *"work hard, play hard"*, was in full effect this year. Our team organized a mix of events ranging from axe-throwing at the Timber Lounge (coached by Zach Feener; below) to mineral collecting in Parrsboro with the Fundy Geological Museum. In October, we organised "Thanksgiving with Mike Young" a two-day field trip in SW Nova Scotia that offered first- to fourth-year students an opportunity to learn about the local geologic history and fostered a sense of community and mentorship between incoming and graduating students.



Dawson at the Timber Lounge

In addition to the classic bowling pizza parties and geology fieldtrips, Dawson has been working toward facilitating networking opportunities for undergrads by providing transportation for students to attend seminars at the Bedford Institute of Oceanography and orchestrating funding for students to attend the Prospectors and Developers Association of Canada Convention in Toronto. Because many Earth Sciences students did not know about current research in the department, nor were they familiar with many of the faculty members, we started a seminar series entitled "DIRT on Profs" where professors had 15 minutes to introduce their career trajectories, research in progress, and bumps along the road.



Dal participants at AUGC, Acadia University, October 2016

2016-17 Awards

MacEachern-Ponsford Memorial Award: Raymond Craddock

Michael J. Keen Award:
Corin Jorgenson

Logan Prize (awarded by PDAC & GAC): Carolina Chang

David Barlow Award:
Sarah McLeod, Jillian McKenna

James L. Hall Award:
Juan Chavez

SEG Undergraduate Research Grant:
Corin Jorgenson

CSPG Student Industry Field Trip (SIFT): Maya Soukup

Student-Industry Mineral Exploration Workshop (S-IMEW): Corin Jorgenson

Conference Presentations:

AUGC:

Fiona Henderson (AGS Environmental Geoscience Award)

Erin Anderson (CSPG Petroleum Geoscience Award)

AGS:

Corin Jorgenson (Rupert McNeil Award for best undergraduate presentation)

Congratulations!



Dalhousie's **Dawson Energy** team (above) achieved 4th place in Canada at the International AAPG Imperial Barrel Awards, March 2017. From left: Colton Bentley, Emma Lindsay, Erin Anderson, Sydney Stashin, Kenneth Martyns-Yellowe.

Graduate Student News

2016-17 Defences & Graduations

Ph.D.

Janice Allen (*C. Beaumont*)

Sonja Bhatia (*D. Risk*)

Leslie Eliuk (*G. Wach*)

Sharane Simon (*M. Gibling*)

Zhihai Zhang (*Y. Fedortchouk*)

M.Sc.

Colin Bryden (*R. Jamieson*)

Charlie Carlisle (*G. Wach*)

Glenn Chapman (*R. Jamieson*)

Jane Hawken (*D. Mosher, J. Gosse*)

Sarah MacLeod (*S. Sterling*)

Darragh O'Connor (*G. Wach*)

Carla Skinner (*G. Wach*)

Samantha Van De Kerckhove (*N. Culshaw, R. Jamieson*)



Executive 2016-17:

President: Laura Broom

Vice-President: Masoud Aali

Treasurer: Rachel Milligan

Secretary: Taylor Campbell

Dawson Geology Graduate Society

2016/2017 was a busy year for DGGs! The year started with a 2-week student-organised field trip to Iceland and the Lofoten Islands of Norway. In Iceland (*below, left*), the students explored the only exposed section of the Mid-Atlantic Ridge, and learned about ocean-crust formation, volcanism, and geothermal heat. In Norway, the students observed the results of the Caledonian orogeny and the effects of the glaciations that have shaped the dramatic landscape of the islands.



The school year was eventful, with weekly DIRT talks and Geobeers. New graduate students explored Nova Scotia's fascinating and complex geological history through Nick Culshaw's field course, run for the last time (by Nick) in the fall of 2016. They explored the coast of Nova Scotia, learning about the rich geological history of the province. In December, DGGs hosted a successful department potluck lunch which attracted a full turn-out of faculty and students. To chase away the winter blues, we challenged our professors to a curling match (*above*) and took home the gold! We also had another successful art gala and silent auction, where students and faculty donated their handcrafts, photos, and artwork to raise funds for the next field trip.

Scholarships & Awards:

CSPG Best M.Sc. Thesis: Carla Skinner

NSERC Post Graduate Scholarship: Sean Kelly

Nova Scotia Graduate Scholarships: Sean Kelly, Ryan Kressall, John Evangelatos

GSA Student Research Grants: Laura-Ann Broom, Bryan Maciag, Cody Paige

TOSST (Transatlantic Ocean System Science & Technology): Masoud Aali

Alumni News

Earth Sciences at PDAC

The Prospectors & Developers Association of Canada (PDAC) held its annual convention in Toronto March 5-8, 2017. With attendance exceeding 24,000, this is the largest gathering of mining industry professionals in the world. For the first time, Dalhousie Earth Sciences collaborated with Acadia, SFX, SMU, and UNB to host a Maritimes Earth Sciences booth in the investors exchange (*below*), organized by the undergraduate attendees. Students and faculty from the five universities rotated booth responsibility and interacted with a wide variety of industry representatives, including a number of Dal alumni (*right*).



Faculty members **James Brenan** and **Mike Young** hosted a Dalhousie Earth Sciences alumni reception on Monday evening, March 6. Approximately 40 people attended, including ~10 graduates from the 70s/early 80s, a few from the 90s, ~15 from between 2003 and 2015, and ~10 current students. It was an outstanding opportunity to catch up with former students, meet new people,

allow current students to network, and to share departmental news of retirements, new hires, program updates, and tall tales from the past. All attendees expressed a strong desire to make the reception an annual event.

Support from the Dalhousie Faculty of Science is sincerely appreciated.



Left: **Susan Eaton (BSc '80)**, was recently named one of Canada's top female explorers by *Canadian Geographic* magazine. Susan and her SEDNA Epic Expedition were featured in our 2016 newsletter.

Right: **Jóhann Helgason (PhD '83)**, National Land Survey of Iceland, visited the department in September to present a seminar that was literally out-of-this-world! His talk on Tharsis Montes, Mars, gave a fascinating overview of the volcanic landscape of the Red Planet.



In June, 2016, Dal alumni joined **Dave Gardner** (Shell), **John Foster**, and **Grant Wach** for an Alumni Field Seminar held prior to the AAPG-ACE 2016 meeting in Calgary. The group explored the geology of the southeastern Rocky Mountains and later enjoyed dinner at the Grizzly House in Banff.



Where are they now?

Scott Anderson (PhD '98): Chief Geologist, Precambrian Geoscience Section, Manitoba Geological Survey

Anne Belanger (BSc '11): Analyst, Geoscience & Innovation, PDAC, Toronto

Patricia Corcoran (PhD '01): Professor, Western University

Amanda Diochon (PhD '09): Assistant Professor, Lakehead University

Phil Fralick (BSc '77, MSc '81): Professor, Lakehead University

Pat Neumann Gillies (MSc '78): Instructor, Lakehead University

Kathy Gillis (PhD '87): Professor & former Dean of Science, University of Victoria

John Ketchum (PhD '95): Director, Northwest Territories Geological Survey

David Moynihan (MSc '03): Yukon Geological Survey

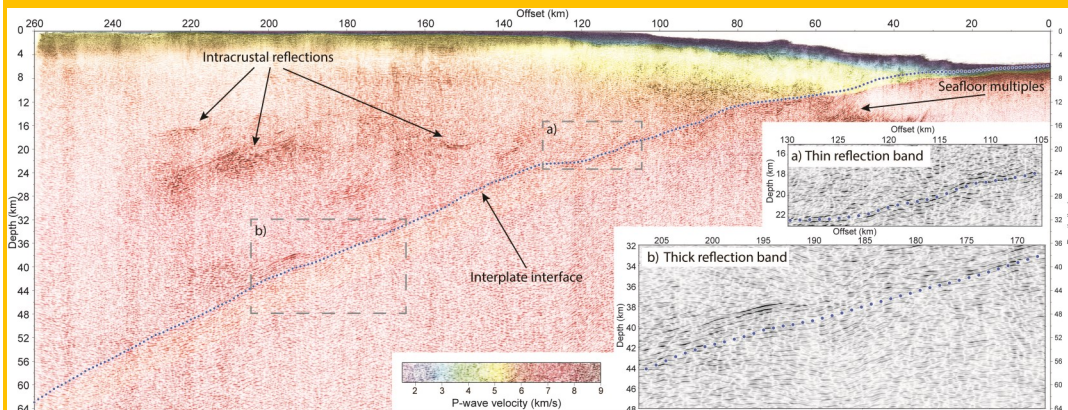
Renee-Luce Simard (PhD '05): Ontario Geological Survey

Laura Ratcliffe (BSc '11): Ontario Geological Survey

Chris Yakymchuk (BSc '08): Assistant Professor, University of Waterloo

Research Profiles

Mladen Nedimović



Depth-converted migrated reflection stack of ALEUT (Alaska Langseth Experiment to Understand the mega-Thrust) multichannel seismic (MCS) reflection Profile 3 superimposed on the corresponding velocity model (*Kuhn et al., in prep*). The blue dotted line represents the interpreted interplate interface, which can be traced to ~60 km.

At left is a sneak preview of the exciting new subduction zone research being carried out by PhD student **Harold Kühn**, Dalhousie Imaging Group (DIG), supervised by Mladen. Profile 3 crosses the middle of the Semidi segment of the Alaska-Aleutian megathrust between Kodiak and Shumagin Islands. This segment last ruptured in 1938 in a M8.2 event.

Djordje Grujic fulfilled a long-time ambition to investigate eclogites formed at the onset of collision between Indian and Asian crustal plates during his recent sabbatical. In October 2015, one week after arriving in Ladakh, his team was camping on the Tso Moriri shore (cover photo) at 4600 m. Thanks to near-desert conditions and light-coloured country rocks, the dark green eclogite lenses were not difficult to spot. 400 kg of samples made it safely to Dal, where they await the arrival of an eager graduate student to tackle questions such as the puzzling relationship of the eclogite to its host rocks. In addition, Djordje, **Isabelle Coutand**, and Killam post-doctoral fellow **Catherine Mottram** (right, showing kinematics of the Main Frontal Thrust) embarked on a challenging project to date young Himalayan faults directly.



Field Notes



Left: **Nick Culshaw** and students, assisted by consultant Dave Gamble, examine Archean komatiites near Kirkland Lake, Ontario (May, 2017). The field trip was run in association with the new “Early Earth” course, co-taught by Nick and **James Brennan**, designed to introduce students to key questions regarding the formation and early evolution of the Earth’s crust and mantle.

Right: **ERTH 4002** students at the Advanced Field School (California, 2016) demonstrate the value of team work. This year, most participants received financial support from Dalhousie University’s Office of International Relations, which recognizes the importance of combining experiential learning with exposure to different cultures.



We thank Dalhousie University, our Alumni, and the Shell Experiential Learning Fund for their generous support of our field programme!

From all of us to all of you ...



Dalhousie Earth Sciences, October 2016

... please keep in touch!

Giving to Dalhousie Earth Sciences

Your gift provides assistance to the department to support a variety of activities that enhance the learning experience. This includes our various field schools and scholarships, and support for other undergraduate and graduate activities. Please consider a donation within a specific category, or donate to the department to use in the area of greatest need. For details, visit: <https://alumniapps2.dal.ca/giving>.

Alternatively, consider an in-kind donation, like the Zeiss axioplan microscope generously donated by **Dr. Prasanta Mukhopadhyay** ("Muki", right), Global Geoenergy Research Ltd, to be used for studying organic-rich sediments.



Did you know that a number of companies (including Suncor, Encana, Vale/Inco, and BP) offer to match employee donations to Dalhousie? Find out if your company matches donations by checking: www.matchinggifts.com/canada/dalhousie/.

To receive information via email about upcoming departmental events, or to receive the departmental newsletter, please ensure that your personal information on file is current. You can update your contact information at:

http://www.dal.ca/faculty/science/earth-sciences/alumni_friends/update_your_contact.html



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