

Acadia University

Earth and Environmental Science Newsletter Summer 2019



View from the Department

Another school year is firmly into history now, 34 more degrees were issued in E&ES and last year's senior class is now scattered to the four winds (and added to the alumni mailing list!) Reading the [list of degrees](#) offered, the Earth and Environmental Science Department is a truly diverse unit – BSc degrees in three different areas, honours degrees, MSc degrees, and that doesn't include the array of double major degrees, jointly with Biology, Chemistry, Environmental Studies or Engineering. We hope the new alumni will let us know where they go.

After six years at the helm, Ian Spooner is taking a very deserved year off as department head, although he will continue to teach his courses. With a large group of students working with him on projects and theses, and his ongoing work at the Morton Centre and other environmental *causes célèbres* around Nova Scotia, he relishes dropping the day-to-day running of the department and the many meetings that come with it. He also received funding to travel to Stirling, Scotland, to learn more about the role of lake stratigraphy in archaeology and to visit some of the significant archaeological sites in and around Scotland. In his place, Rob Raeside is returning as acting

head for the year and is eager(?) to substitute in the meeting rooms.

Another big change this year will see two professors on the Geology side depart Acadia. Peir Pufahl has accepted a position at Queen's University, and will leave this summer, and Christa Pufahl has opted to go along too! We will miss them both as they provided so much experience in sedimentary geology, oceanography, geomorphology, as well as opportunities for graduate study. Peir will continue to run the field course in Bermuda, which we have shared in the past with students from Queen's.

A major milestone was achieved when the Environmental Science programs were successfully re-accredited through the Canadian Environmental Accreditation Commission. Both the Honours and the BSc program were accredited following the review undertaken in April last year. The accreditation provides recognition of the mission and objectives, institutional and program requirements, program development and maintenance, curriculum, faculty complement, admissions, student services, institution facilities and learning resources, financial resources, and

scholarly activity. The accreditation is valid until July 2025.



The department was deeply saddened by the death of Kirk Woodman (B.Sc. Geology, 1985) in Burkina Faso. Kirk worked for Progress Minerals, based in Vancouver, and was abducted from the mining site in the north of the country and subsequently shot by the abductors. He had worked in Burkina Faso and neighbouring Niger for many years. Several years ago, he was the banquet speaker at the end-of-year dinner, when he told of his experiences in Niger, illustrated with beautiful images of that semi-desert region. We thank the many alumni who have contributed to a scholarship fund in Kirk's memory.

Another new award was announced this year. The Reginald Moore Memorial Award in Geoscience was made possible by a gift from Dr. Peter von Bitter, Senior Curator Emeritus of Natural History at the Royal Ontario Museum. Dr. Reg Moore was pivotal to his development at Acadia and he writes that "what I learned from him, both as a teacher and as a human being, has been valued by me and has stood me in very good stead throughout my life and career as a geologist and paleontologist." Members of the department are very grateful to the generosity of Dr. von Bitter for establishing this award, which will allow us to recognize and help students who emulate some of Dr. Moore's core academic values – engagement in geoscience and the demon-

stration of the promise of continuing development. Dr. Moore was as interested in where students were going as where they were at, so the award will recognize *promise, aptitude and emerging talent*.

Our [Geology field methods course](#) and [Environmental Science field school](#) continue to be highlights of the teaching year. Do review the links here – lots of photos of students "in action". As always, we encourage you to consider a donation to one of our funds (Field School or General) – the money that we raise there has largely been focused on providing access to students who require some financial aid to participate in field schools. The department subsidizes the cost, but our budget can only stretch so far, and students typically pay about half the actual cost of accommodation and van rentals for the schools. If you are interested in donating to the department, please click on the link on the gift box below.

We hope you enjoy learning about our activities in this newsletter. Huggins third floor is always a busy place, any time of year. Here we include a sample of the news items from the past year that we have posted on [our website](#).

[Giving to Acadia](#)



Also feel free to drop a note to ees@acadiau.ca (that message goes to the department head) as we love to hear from you! We'll gather up your news and include it in our next letter!

All the best,
Rob Raeside, Acting Department Head
rob.raeside@acadiau.ca

Highlights of the year

At the start of term, we always try to find opportunities for students to experience some field work, when the weather is still cooperative. A new venture this year was two weekend Archaeology field exercises in Grand Pre on 22-23 September (actually in Ian Spooner's back yard!) They reported beautiful weather and lots of great "finds" from a location at the Battle of Grand Pre.



Another group of students participated in the Joggins 10th Anniversary Research Symposium, which included a day of talks and a guided tour of the fossil cliffs.

The following weekend, sunny skies and midday low tides provided an ideal opportunity to investigate the intertidal sand bar at Rainy Cove, and of course the spectacular folds, fossils and unconformity along the shore. It's a surreal world out there on the tidal sand bars – megaripples a metre or more high, criss-crossed



by smaller ripples, and when dug out, grain size variations that can be correlated with the spring and neap tidal cycles. Then you can turn around and see it all again in the eolian deposits of the Triassic. Equally stunning is watching how fast the tide comes in!

Class work sometimes involves field work too, especially before the snow flies.



Cliff Stanley took the Geophysics class to an aggregate quarry on the South Mountain where a screen of metamorphosed greywacke cut by veins with kaolinite and hematite alteration parallel to those at the Millett Brook uranium occurrence is exposed. Provincial regulations require quarry operators to monitor the concentrations of hazardous elements in their aggregate materials as they exploit the quarry. Each year, the class visits this quarry to measure the uranium concentrations of the working face using a gamma-ray spectrometer to ensure that the rocks produced are consistent with federal standards.

Other class trips took students on day-trips to Ross Creek, Blue Beach, the South Mountain granite, and even the old Wolfville burial ground (to assess the rate of weathering on tombstones!) Sandra Barr led a two-day trip around the South Shore to see the igneous and metamorphic rocks so well displayed there.

Not all field work is class-oriented. The Fletcher Club and ESSA teamed up for a morning of rafting on the Shubenacadie River when the spring tides were at the best in October.



Much fun was had by all as they surfed the tidal bore and got thoroughly drenched in muddy water.

ESSA (the Environmental Science Student Association) also did a beach clean-up:



These two jars with notes inside made from Port Williams around Cape Split to Halls Harbour!

Our rock room continues as a vibrant operation, producing nearly 1000 new thin and polished sections in the past year. Many Earth Science departments have closed their petrographic facilities, and our lab now prepares thin sections for several other universities.

The Annual Colloquium of the Atlantic Geoscience Society was held in Fredericton in early February. Nearly 200 participants enjoyed a full and diverse program pushing the boundaries of geoscience in all its branches. As usual, the event was well attended by industry, government and university participants, including 3 professors, 18 students and at least twice that many former students from Acadia University. Pictured below is a select group who were captured after the banquet, including Sandra Barr, Rob Raeside and Cliff Stanley, and in the middle, Dylan Wyles, winner of the best poster award, *Applied paleolimnological assessment of anthropogenic impact in a back-barrier lagoon, Pictou Landing, Nova Scotia*.



One highlight of the conference was the award of the Laing Ferguson Distinguished Service Award to Dr. Elisabeth Kusters in recognition of "her many volunteer activities, board member of the Joggins Fossil Centre, executive director of CFES, and prominent activist for all things geological." Dr. Kusters also taught the Sedimentation and Stratigraphy course at Acadia for a few years.

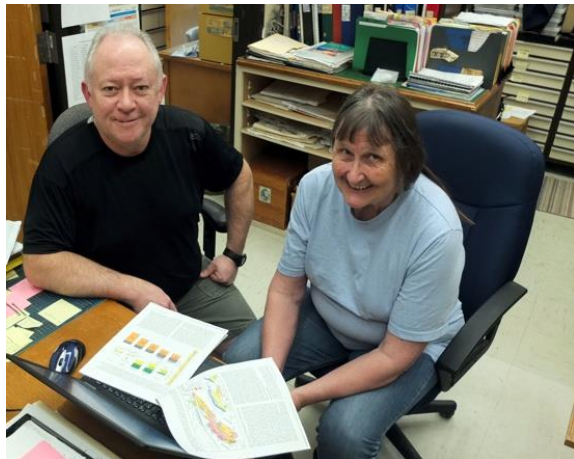
The E&ES year-end banquet was held in the Clark Commons at Acadia.



Speakers at the event were Maylia Kempt Parker (left) and Dewey Dunnington (right), here chatting with Nelson O'Driscoll and Ian Spooner. Maylia has worked in the environmental consulting business in New Hampshire, Prague, and Halifax, and is now is Director of Air Quality & Resource Management, Nova Scotia Environment. Dewey is working toward a PhD at Dalhousie University.

Some students and faculty received national awards this year. **Gabriel Santos (MSc Geol 2018)** was winner of the Gelinus Medal of the Geological Association of Canada for the best thesis in volcanology and igneous petrol-

ogy. His thesis was on "Petrology, geochemistry, age, and tectonic setting of the Margaree Pluton, Aspy terrane, Cape Breton Island, Nova Scotia" and involved some of the most difficult field work done by any students in Cape Breton Island. Not to be outdone, his supervisor, Sandra Barr, was co-recipient of the Association's Best Paper Award for the top article in the Canadian Journal of Earth Sciences. Co-authored with **Chris White (BSc Geol 1984)** and Ulf Linnemann, Dresden, Germany, it was on *U-Pb (zircon) ages and provenance of the White Rock Formation of the Rockville Notch Group, Meguma terrane, Nova Scotia, Canada: evidence for the "Sardian gap" and West African origin.*



Sandra and Chris reviewing the finished paper.

Other faculty members were recognized for their work in various ways. Alice Cohen was featured in the [Acadia Research Spotlight](#), where you can read a longer interview with her. Her advice to students starting a project? "Be excited about your research project, because you're going to be sick of it by the end."

Finally, Ian Spooner was awarded the Acadia University Faculty of Science Teaching Award. Awarded annually, the nomination for this award was made by his students and colleagues in recognition of his many years of work in and outside the classroom. Since coming to Acadia in 1994, Ian has taught 11 different courses at levels ranging from first-year ("Natural Disasters") to senior & graduate ("Quaternary Environments") and in a wide range of areas from Sedimentary Petrology to Environmental Impact Assessment. His classes are engaging and often unpredictable; Ian's ability to weave stories into lessons is one of a kind. The tales of his adventures in the field might even be matched by the adventures that students have in his field labs. You can read some comments from his several nominators on [our website](#).

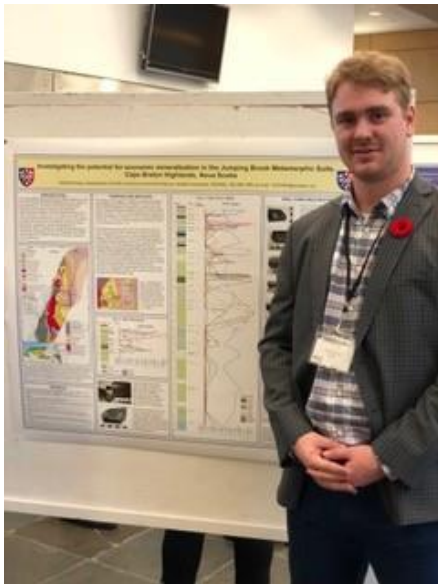
Science Atlantic conferences

The two Science Atlantic conferences always mark a highlight of the year. The first one is the Earth Science conference (the AUGC), which this year was held at Dalhousie University in early November. Ten students and professors attended the conference, starting with an ice-breaker at Dalhousie on Thursday evening, in preparation for field trips on Friday. Most of the Acadia students participated in the early starting Parrsboro field trip, led by Tim Fedak (Nova Scotia Museum). The weather was mild, but the rain was heavy as they searched the shores at Wasson's Bluff for faults and fossils.



Friday night was the CSEG Challenge Bowl, where the Acadia team took fourth place, and on Saturday the scientific presentations. Ten oral papers and seventeen posters were presented, ranging across all areas of geoscience. Doing the honours for Acadia was Garrett Velkjar, who also won the Atlantic Geoscience Society Award for Environmental Geoscience for his paper *Decoupling sources of natural and anthropogenic impact using lake sediment archives: an example from Cecil Lake, Fort St. John, B.C.*

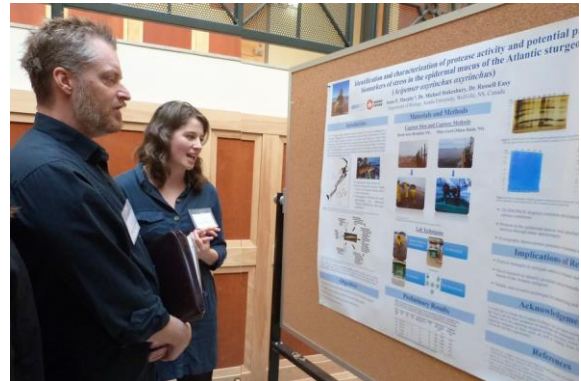
Two students also presented posters, Crystal Smith on her work on mineral dispersion in till from East Kemptonville, and Garrett Hoey who investigated mineralization in drill core from the western Cape Breton Highlands.



Garrett Hoey with his poster presentation.

In March the Science Atlantic Environment conference convened at St. F.X. University. Nine undergraduate and three graduate students

attended with Dr. O'Driscoll. Sara Stewart won the 2nd place undergraduate presentation award and Sara Adams the 2nd place graduate presentation award. Students experienced great talks by their peers, several events related to the proposed Boat Harbour remediation (lecture, field trip, and a panel discussion), and enjoyed a banquet with Jacquelyn Stevens overviewing her career path from geology to environmental law.



Anna Murphy discussing her work with Nelson O'Driscoll.



Megan MacIsaac discussing the use of granite dust to control lily beetles.

WHERE ARE THEY NOW?

Some news of the achievements and adventures of our alumni/alumnae.

Jolene Ashini (BSc Geol 2016) entered the law program in Victoria, and was excited, but nervous, about starting a new chapter that isn't geology-related.

Nadine Barrett (Wood) (BSc Geol 2005) works with the NS Dept. of Environment after a stint

at Natural Resources, helping to develop policy on leasing Crown land for maple syrup/blueberry operations and renewable wind energy projects. Now as a training consultant she has been incorporating a lot of her own artwork into her job through graphic facilitation. She has even started part-time

studies at NSCAD! She writes that her two sons are very good rock collectors and quite fascinated with fossils (of course!)

Josh Caines (BSc Geol 2015) updated us on his exploits. After obtaining his degree and then a diploma in Marine Geomatics, he moved to Texas to pursue a career as a geophysical technician, doing survey design and data processing of seismic projects for oil and gas exploration. One unique assignment took him to Oak Island, Nova Scotia, to do survey work for the show from the History Channel, "The Curse of Oak Island". In 2018 Josh returned to Canada as offshore geoscientist for Pangeo Subsea Ltd. of Newfoundland, working in the field of marine construction. His current position requires him to travel to Europe regularly and work offshore on ROV equipped survey vessels. The work involves interpretation of 3D seismic data, including detection of unexploded World War two era ordinance to allow for safe dredging operations and the installation of subsea cables.

Greg Edgecombe (BSc Geol 1985) was elected as Fellow of the Royal Society on May 9. Greg works at the Natural History Museum in London, England and is considered one of the world's foremost paleontologists. His current job titles include Research Leader and Merit Researcher at the Natural History Museum, and an Associate in Invertebrate Zoology at Harvard University in Cambridge, Mass.

Randal Evans (BSc Envs 2012) and Shaun Todd (BSc Geol 2012) were married in September. They were working full-time as geologists with Kirkland Lake Gold last summer.

Catharine Farrow (MSc Geol 1989) moved from Sudbury to Toronto so her son can attend high school & pursue his hockey career in Toronto. She retired as CEO of TMAC in 2017 after the successful build of the Doris Mine/Mill Complex in Nunavut and having declared commercial production in June of 2017 – she writes, "It was a fantastic 5 years doing what many said we could never do - we built a wonderful team & a historic mine, the first gold mine in Kitikmeot Region, Nunavut." She continues to be involved

in several other mining ventures and as an adjunct professor at Laurentian University.

Patricia Gordon (BSc Geol 1956) wrote at length to us following the release of last year's newsletter, and the message got picked up by *The Acadia Bulletin*, and will be available online soon. See it also [here](#).

Dan Hagan (BSc Geol 2003) is a professional geologist in Bancroft, Ontario, doing mostly environmental and engineering projects. He reports that he and his wife bought a cottage in Baxter's Harbour, NS on the North Mountain, about 15 minutes north of Kentville. Rumour has it that he will rent it out too!

Steve Krbavcic (BSc Geol 2015) is working as an environmental planner for Hydro One. The work is incredibly rewarding if not extremely busy most days.

Jill MacDonald (BSc Envs 2014) works with Perennia Food and Agriculture, based in the Kentville Research and Development Centre. She is working on a large research project in viticulture as well as participating in field research for fruit and vegetable variety trials, and aphid and virus sampling.

Kelly Mahoney (MSc 1996) works as senior policy advisor for the Department of Education, Culture and Employment of the Northwest Territories.

Ngaio Richards (BSc Envs 1998) works as a forensics and field specialist for Working Dogs for Conservation in Missoula, MT. She recently published "Using Detection Dogs to Monitor Aquatic Ecosystem Health and Protect Aquatic Resources" available from [Palgrave Macmillan](#)

Paul Ténrière (MSc Geol 2002) now works as a consultant through his company, Teniere Geoconsulting Services, mainly doing technical report work, due diligence and mining technical advisory work. He was enjoying learning the structural complexities of Grenville marble in the western Adirondacks (Balmat Mine), "which are so bugged up with isoclinal folds and tectonic slides that I can barely make heads or tails of it". He now lives in Rothesay, NB, closer to his wife's parents.

Highlights of the Year

We asked various people around the department to tell us one of the highlights from their year. Here are their responses.

Sandra Barr: For me, probably the highlight of the past year was undoubtedly the fact that I am still here on the 3rd floor of Huggins doing what I most want to be doing – teaching, interacting with students and colleagues, and research. After 42 years, I feel incredibly fortunate that this is the case. I recall the first class that I taught here at Acadia (and some alumni do also, because I hear from some of you occasionally!) – Geology 101 in the large lecture room in the chemistry building in September 1976. Luckily the technology was more straight-forward back then – just writing on the board and talking, although I remember that I was nervous and barely prepared even for that, having just got off a plane from Thailand 2 days before! Although teaching is different in many ways now, it is still rewarding and fun. Research work is different too – now I can determine the ages of most igneous rocks within 2 or 3 million years. Every new age is another step toward understanding the Earth, but somehow they always seem to raise more questions than they answer!

Pam Frail (rock room technician): It was quite exciting to know we had enough funds to purchase new thin section production equipment. After extensive consultation with 4 suppliers we are leaning toward Struers brand for the equipment's fulfillment of our requirements and their Canadian sales and service presence. They sent a Tegramin 30 polishing machine as 'equipment on trial' and this confirmed our choice. We've also ordered an Accutom 100 for cut and grind, updating our complete process from chip to finished product. Looking forward to September!

David McMullin: David McMullin spent part of his sabbatical last year in Italy, where geology and culture meet every day. In the hills of Tuscany, different tectonic slices provide different soils for the famed Tuscan wines. Mt. Vesuvius towers over the city of Naples and the partially excavated ruins of Herculaneum that

were buried in the eruption of 79AD. In Sicily the town of Agrigento sits above the famed Valley of the Temples which sits on the softest soft-rock I have seen, barely indurated calcarenites that wash away every winter and threaten to collapse temples that have stood for over 2000 years. The time in Sicily would not have been complete without a hike up Mt. Etna, Europe's largest and most active volcano. A truly awesome time.

Nelson O'Driscoll and Rachel Clarke (MSc) attended the Society of Environmental Toxicology and Chemistry meeting in Helsinki Finland this past spring. Work was presented from the Acadia Mercury Lab (Twitter: @MercuryLab2) on several topics including (i) lichens as metal biomonitors across Nova Scotia; (ii) mercury photochemistry in the Grado Lagoon Italy; (iii) mercury release wetland restoration on Brier Island, NS, and (iv) mercury bioaccumulation in invertebrates from Kejimikujik Park.

Rob Raeside: I had a few days to introduce graduate student Caleb Grant to the metamorphic and igneous rocks of the central Cape Breton Highlands. It has been 30 years since I mapped those rocks, and it seemed every new outcrop we met yielded examples of textures and structures I wanted to include in teaching Structural Geology! We never stop learning, but now I wish I could go back and add these examples of deformation to my lectures – the students of years gone by have missed so much!

Ian Spooner had a busy year. He remains on the Boat Harbour Advisory Committee who have provided funding since 2016 and supported research by Baillie Holmes, and Kirklyn Davison. This work has been a significant component of the Boat Harbour remediation effort in Pictou County. A mini field course on field archaeology took place in fall 2018 and was a huge success with 26 participants. It was run by Aaron Taylor, an archaeologist who is now a visiting researcher in E&ES. Summer 2019 remains busy with more lake coring, lots of field work and appearances on a TV show (more to follow on that next newsletter!).

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Peir and Christa Pufahl relocate to Queen's

Peir and Christa Pufahl are leaving Acadia to start new careers at Queen's University in Kingston, Ontario. Peir will be assuming the role of Professor in the Department of Geological Science and Engineering. He will also be the Co-Director of QFIR which stands for Queen's Facility for Isotope Research. At Queen's Peir will have the opportunity to expand his graduate research program that he developed at Acadia. He expects to maintain close ties with E&ES at Acadia as the Bermuda Field Course will continue to be offered jointly with Queen's.



Students working on carbonate rocks at the Bermuda Biological Station in Peir's Carbonate Geology Field School

Peir expects to continue research with his colleagues at Acadia and throughout the Maritimes. Peir is proud of his contribution to the soft-rock program at Acadia and the development of significant ties with industry that has resulted in support for field schools and funding of student research. He is grateful for the opportunity to have worked with so many great students. He is also proud of the relationships developed with the Joggins Fossil Institute and his involvement as Co-Editor of the journal *Sedimentology*. An important contrib-

ution has been the development of the CFI funded sedimentology lab in the basement of Huggins.

Christa will also be relocating to Queens where she will be developing a course in Natural Hazards and Environmental Geoscience. She will also continue as editorial manager for the journal *Sedimentology*. Christa has indicated that she will miss the students and the day-to-day interaction the most, especially teaching them that "building on a barrier Island is just not a good idea" 😊! The department will miss her too as she has taught many courses and influenced and mentored many students over the years.

Christa and Peir leave behind many great memories and will continue strong ties with Acadia as their older son Callum will attend Acadia in the Fall of 2019! Peir and Christa maintain their Acadia email addresses and look forward to hearing from Acadia Alumni. The E&ES department wishes them the best at Queen's!



Peir and Christa with a group of well-wishers at a farewell soiree.

Final Thoughts



When we wrote you a year ago, the renovations to Huggins were concluding and we were busy cleaning the displays and repurposing several labs and offices. A year later, we now appreciate the turmoil of living in a construction zone for 16 months – the building is warmer in the winter and cooler in the summer, the offices are no longer hanging out in space with frozen floors, and snow no longer blows in the cracks. The building even looks nice!

As we anticipate a change-over of professors in the department, and we look forward to a new year of students arriving in September, we know that there will be many challenges and opportunities in the year ahead.

We hope you are having a great summer and look forward to hearing from you! As always, if you are travelling through the area, do drop by and see us. We love to know what you are doing, and if you let us know in advance you are coming, we might even give you a chance to speak to a class!

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