Queen's University

DEPARTMENT OF
GEOLOGICAL SCIENCES AND
GEOLOGICAL ENGINEERING

GEONews 2022

Photo of Dr. Christopher Spencer. Photo credit: Camille Spencer.

Greetings from the HEAD

It has been a year of embracing normal and taking inspiration from students, staff and faculty.

The spring and summer saw the return to field work. Faculty and students were excited to be back in the "field" in Canada and abroad (pictures page xx) in the spring and summer. For a uniquely Queen's story, undergraduate student researchers Emer and Sam, with the help of profs, Dr. Chris Spencer and Dr. Jenn Day, investigated the soils, bedrock and geomorphology at Principal Deane's farm (page 13). Principal Deane really enjoyed the opportunity to work with Emer and Sam, and has invited the Field Methods course to use his property as a field area. Thank you Patrick!

Other exciting news includes the announcement that Dr. Callum Walter (GeoEng 2016, Ph.D. 2021), supervised by Dr. Alex Braun and Dr. Georgia Fotopoulos, was awarded a prestigious and career-changing post doc with NASA. In this role, Callum will undertake "off world remote sensing" (page 19) in support of NASA's Artemis mission. And I suspect, a future head will report on the field work on the Moon undertaken by Queen's GEOs.

We welcomed two new faculty, both jointly appointed with other units, Dr. David McLagan and Dr. Christopher Omelon. Chris describes his research as seeking to understand the effects of climate warming on groundwater-surface water interactions in the Arctic, and the subsequent impact this will have on microbial activity and associated biogeochemical cycling. The focus of David's work is biogeochemical cycling and transboundary partitioning of metals and other pollutants and their impacts on human and environmental health in changing environment and climate.

August saw the RockEng conference, organized by Dr. Jenn Day, held at the breathtaking Isabel Bader Centre (page 14), the residential for the MEERL Class of 2024 (page 15) and two cohorts of field school. The RockEng conference was a sell-out, and was opened by Principal Patrick Deane and by the keynote featuring Dr. Jean Hutchinson reprising her 2017 Glossop lecture. MEERL students jumped into their first courses with both feet, in addition to meeting MEERL faculty in person and virtually. As always Program Manager Brittany Jennings managed everything seamlessly! Undergrad students experienced mapping the Ore Chimney property, and it was a terrific experience to be in the "real field" instead of the virtual one! There were a few glitches of course– a case or two of Covid and a wind storm that took out one of the canvas shelters, but harmed no one nor any of the tents, and the instructional team and students took it all in stride. I did hear of a student who missed the bus and took a cab to Field school by the way! Thanks to Paul Bass, Anne Sherman and Kyle Durocher who provided logistical support for field school.

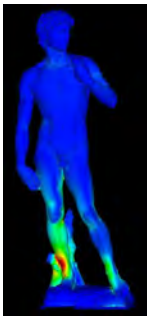
In late August we learned of the passing of alumnus Bradford Cooke, B.Sc.'76, founder of Endeavour Silver. Our condolences to his family and friends, and our sincere thanks to Brad who supported a graduate scholarship, a named TAship, and, gave the gift of his time to students at PDAC in March of 2020.

September arrived and so did all our undergrad students, eager to have an in-person experience. Second years were welcomed by a pizza lunch; and introductions to members of the department, and to the highly effective TA's receiving the Named TAship awards for their work in the Winter of 2022 (pictured above). Named TAships donated by alumni remain an important support for our program, thank you!

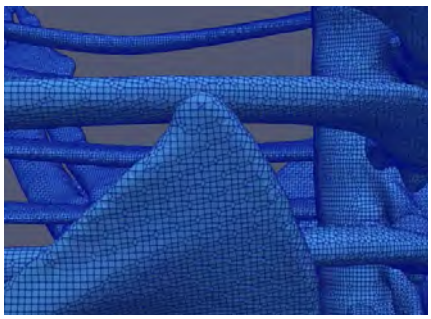
October was book-ended by alumni events: on October 1 we named Miller 403 the Carol Ellis Laboratory for Digital Earth Sciences with the keen participation of Carol, and members of the Class of '82 (ish). They heard from Dr. Hom Nath Gharti about his work and how this lab will support senior undergrads and graduate students in their research. On October 29 the Reading Room was filled to bursting with GeoSci and GeoEng grads for our Homecoming Event. Meeting Tom Frisch, Class of '62 with his "Bedrock" neck tie (page 17), and Jim Decker (Sci '70 Mining, and friend of the department) with his pedicure reflecting the Queen's colours (page 24) and catching up with the Class of '97, the first group of students I knew from 2nd year to 4th, were all memorable. Thank you to our staff, Kelly McCaugherty, Bec Dew, Lorna Dumond, Paul Bass and Kyle Durocher for their efforts behind the scenes. And a special thank you to Lorna for her hard work on this newsletter!

In mid-October many upper year students enthusiastically embraced field courses. In upstate New York, Drs. Elisabeth Steel and Guy Narbonne helped students understand the sedimentary rock successions using stratigraphic, sedimentological, and paleontological data. Drs. Laurent Godin and Peir Pufahl traveled from Kingston to Quebec City with students eager to learn more about the shallow and deep-marine rock successions of North America. Drs. Jean Hutchinson and Bas Vriens traversed parts of Northern Ontario with geological engineering students learning about underground and surface mine works, site remediation, and long-term monitoring and maintenance. Field trips and courses remain essential to geosciences and geoengineering and we are grateful for our generous alumni who support this learning by donations to the field funds!

November 10th saw faculty, staff, students and alumni of both Geological Sciences and Geological Engineering and the Robert M. Buchannan Department of Mining Engineering join together to celebrate the research and career of Dr. Heather Jamieson, now Professor Emerita. It was the start of what I know will be productive conversations about future collaborations in teaching and research. Many of our faculty are very involved in the life cycle of mining, from exploration for critical minerals and metals (Dan Layton-Matthews, Matt Leybourne, and Gema Olivo) to the critical infrastructure (Mark Diederichs, Jenn Day, and Jean Hutchinson) to the evaluation of impacts of legacy mines (Heather Jamieson, David McLagan and Bas Vriens).



In early December, 4th year students in both GeoEng and GeoSci presented elevator pitches (five minutes, one slide!) of their impressive work, and many of which are supported by industry partners and our terrific alumni. December 8th – Whale Day, as it has come to be known, saw presentations by Drs. Hom Nath Gharti and Mark Diederichs on their work assisting artist Edward Burtynsky to realize his dream of the Standing Whale sculpture. Mark showed us how various massive sculptures, including Michaelangelo's David, rely on the carefully engineered, and often invisible supports to remain upright. Hom Nath showed us how this rendering of the Whale Skeleton in a 25 million element, 26 million node hexahedral mesh is necessary for modeling the various loads that will need to be supported by the foundation. Mark and Hom Nath wrapped up the day with drama and finesse and a very excited audience, including the artist and his team.



Detailed Connection Meshing for Accurate Mechanical Analysis

As the earth sciences change, we see a growing interest in courses like Rob Harrap's World Building studio course (page 9). This combination of geology, computer science and imagination, enables students to create realistic visualizations of worlds. While none of our students worked on the recent movie "Dune", where the geology of the planet counts as a character, one of our Master's students has recently interned at a company that does world-building. A new course by Chris Spencer introduces students to the rocky planets that make up our solar system, and shows how the geological models of earth help us elucidate the geology of Mars, for example. Another frontier, the ocean, is examined in GEOL 200, taught by Christa Pufahl. Just last week I overheard a group of students in the Reading Room, teaching each other about Oceanography,in preparation for their upcoming exam. They were really pleased to have their picture taken!

The last few years I've described my position as head as "log rolling" – trying to support students, staff and faculty in their endeavours under difficult circumstances, gritting my teeth and smiling when we find out that the renovations to the roof of the Bruce Wing will be 8 months instead of 6 weeks, and dealing with the puzzle of courses, TA's, profs and classrooms. The fantastic and dedicated staff in the offices and labs, the outstanding faculty, and the eager and gifted students in classrooms, labs and the field, and all supported by the thousands of generous and thoughtful alumni make this job "doable". And another thing that makes it doable, is a break – so I want to be sure to thank Dr. Dan Layton-Matthews in advance for agreeing to be Acting Head from January 1st to June 30th to allow me a break that I hope will include time abroad and many adventures away from my laptop.

Vicki Remenda
Head of Department

Photo from GEOL/E 301/401 by Dr. Edward Matheson

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LAND Acknowledgement

Queen's University is situated on Anishinaabe and Haudenosaunee Territory. To acknowledge this territory is to recognize its longer history, one predating the establishment of the earliest European colonies. It is also to acknowledge this territory's significance for the Indigenous peoples who lived, and continue to live, upon it – people whose practices and spiritualities were tied to the land and continue to develop in relationship to the territory and its other inhabitants today. The Kingston Indigenous community continues to reflect the area's Anishinaabek and Haudenosaunee roots. There is also a significant Métis community and there are First Peoples from other Nations across Turtle Island present here today.

DEPARTMENTAL UPDATES

Mining and Sustainability – a joint GEO and Mining Engineering Event

Dr. Heather Jamieson

On November 10th, and before a large and enthusiastic crowd, members of three departments, Environmental Studies, GEO and Mining explored research and education on the topic of Mining and Sustainability. Introduced by her long-time colleague and collaborator, Dr. Michael Parsons of GSC Atlantic, Professor Emerita Dr. Heather Jamieson gave the keynote address for the event. Heather told the story of her early influences in geology, and her more than 25 years of characterizing the mineralogy and geochemistry of mine waste. Following Heather, Drs. Anne Johnson, and Qian Zhang of Mining shared how Mining Engineering is expanding the their degree programs to include facets of sustainability. Finally a panel with several new members of each GEO and Mining, and the Director of the School of Environmental Studies briefly described their areas of research, and responded to questions from the facilitator. GEO profs Drs. Bas Vriens (Metal Mobilization and Contamination) and David McLagan (Contaminant Biogeochemistry) and Mining profs, Drs. Charlotte Gibson (Concentration of Critical Minerals, Mineral Flotation, Re-processing and Re-Purposing Mine Tailings) and Dr. Asli Sari (Mine Planning, Data Analytics, Machine Learning in Mine Optimization and Mine Automation), and the Director of the School of Environmental Studies, Dr. Ryan Danby (Ecosystem Change, Biodiversity Conservation) discussed further areas for collaboration in research and teaching.

Some themes that were explored included 1. Critical metals/ minerals crucial for Canada's green economy, but their discovery/ development/mining needs to take place through a lense of sustainability, reconciliation, and collaboration, and with a particular emphasis on Canada's framework for implementing UNDRIP (United Nations Declaration on the Rights of Indigenous Peoples), 2. That for progress on sustainability, costs must be internalized, that is paid for directly, instead of externalized to be borne by society, at every stage of the mining life cycle, 3. research collaborations among many disciplines and sub-disciplines must be beyond just the "technical", and include Indigenous knowledge, 4. As educational leaders, we have an obligation to better prepare engineers and scientists for this future 5. Better paths forward can best be mapped by listening carefully to Indigenous Peoples, and be open to reconciliation.

vice Dean Research Dr. Amir Fam (Engineering and Applied Science), and Associate Dean Dr. Stéfanie von Hlatky (Art and Science), contributed to the excitement generated by the discussions.

The presentations and discussions were followed by a social in the Miller Museum of Geology to celebrate the retirement of Dr. Heather Jamieson. Although she is no longer teaching full time, she continues to supervise graduate students.

The purpose of the event was to showcase existing and encourage new collaboration between our departments, and with the School of Environmental Studies. Of our faculty, who better to represent that ongoing collaboration than Dr. Heather Jamieson, now Professor Emerita? Heather was jointly appointment by Geological Sciences and Geological Engineering and the School of Environmental Studies back in the late 90's. She developed numerous collaborations in GEO, in Mining, and in the GeoEngineering Centre over the past 25 years and furthermore developed lasting collaborations nationally and internationally. Much of her work has focused on the environmental impacts of mining.

"Standing Whale" Collaborative Project

Edward Burtynsky's conceptual design for Standing Whale.

The Faculty of Arts and Science, and the Faculty of Engineering and Applied Science at Queen's, are both partnering with world-renowned Canadian photographer and Queen's Honorary Degree recipient, Edward Burtynsky, to help realize his new public art piece titled, Standing Whale.

The piece will be Edward's first large-scale public sculptural work, and will be a life-size, artistic re-imagining of a whale skeleton. The Department of Geological Sciences and Geological Engineering will be heavily involved with this exciting project. A design team for course GEOE 446/447 is currently working on the foundation for the structure. The team consists of undergraduate students Deeana Reynolds, Naomi So, and Tommy Tweedie, with technical advisors Dr. Hom Nath Gharti, Dr. Mark Diederichs, and David Didur of Think2Thing Inc., a colleague of Edward Burtynsky's.

Dr. Hom Nath Gharti, Assistant Professor of Digital Earth Sciences, and his team successfully created the fully hexahedral mesh of the whale skeleton, which can be seen in a recent video about the project. Dr. Gharti says, "One of the most challenging tasks of this project is the geometrical discretization of such a unique and complex structure. Now that we successfully tackled the meshing challenge, we can perform the sophisticated structural analysis with unprecedented accuracy and efficiency using high-performance computing." He adds, "This will need a tool that can harness the power of modern computing technology, and we have a versatile tool at our disposal."

The video and more information about Standing Whale can be found in the Queen's Gazette article titled, "Edward Burtynsky to collaborate with Queen's on unique work of public art".

Mistaken Point - 100 Top Geological Sites

As part of the celebrations of its 60th anniversary celebrations, IUGS initiated a search to determine the 100 top geological sites in the world, a great landmark to designate geological sites from around the world that are iconic and recognized by all geoscience community as a reference for their impact in understanding the Earth and its history. More than 250 specialists from 40 nations and ten international organisations participated in this collaborative process of selection. The published list results include the Grand Canyon in North America, Ordovician marine rocks at the top of Mount Everest in Asia, the Namib Sand Sea in Africa, and Uluru in Australia. Mistaken Point in Newfoundland was also selected to join these iconic sites as Site 24 of the "First 100 IUGS Geosites". All sites will receive a two page entry in the book.

Canada fared very well in this competition, with six entries on the list. Two of which –are from Newfoundland - Mistaken Point and the Mohorovičić discontinuity in the Tablelands at Gros Morne National Park. The complete list and a download of the book "The First 100 IUGS Geoheritage Sites", are available at the website of the IUGS International Geological Heritage Commission: https://iugs-geoheritage.org.

Mistaken Point was discovered in 1967 and reported in a paper in Nature a year later, but prior to Queen's University's involvement in 1998 no one had ever named a fossil from Mistaken Point. Over the following two and a half decades, Queen's University professors and students described, named, and interpreted most of the 25 species that make up this iconic biota "when life got big" after nearly 3 billion years of microbial life on our planet. Well-cited papers in Science described the fractal organization of these early experiments in animal life and their first appearance during a rapid rise in deep-sea oxygen levels after a major ice age. Mistaken Point was inscribed on the UNESCO World Heritage List in 2016, one of only a dozen ancient fossil sites on the World Heritage List, and today it is wonderful to see it also listed as one of The First 100 IUGS Geoheritage Sites.

Dr. Guy Narbonne, Dr. Jean Hutchinson, Dr. Bob Dalrymple, and Dr. Herb Helmsteadt are among the group from Queen's Department of Geological Sciences and Geological Engineering who made the positive developments in this quest possible.

FACULTY UPDATES

Faculty ACCOMPLISHMENTS

Dr. Jenn Day Awarded Richard Wolters Prize

Dr. Jennifer Day was awarded the 2022 Richard Wolters Prize, from the International Association for Engineering Geology and the Environment. Dr. Day was nominated by the Canadian National Group and is the third woman, and first Canadian to receive this award. Candidates are nominated for their meritorious scientific achievements and contributions to engineering geology.

Dr. Matthew Leybourne, Selected as Mental Health Champion

Dr. Matthew Leybourne was selected as a Mental Health Champion by the Queen's Student Mental Health Network. With the Classroom Champion for Mental Health project, Queen's is showcasing educators who demonstrate a commitment to supporting and enhancing student mental health and wellbeing.

Dr. Georgia Fotopoulos Co-Chairs Geodesy and the United Nations Sustainability Goals Session

Dr. Georgia Fotopoulos and Calvin Klatt (Director and Chief Geodesist, Canadian Geodetic Survey, Surveyor General Branch, NRCan), chaired a scientific session at the 2022 Canadian Meteorological and Oceanographic Society (CMOS) 56th Congress, the Canadian Geophysical Union (CGU) Annual Meeting and the 78th Eastern Snow Conference (ESC). The theme of the joint conference was "Science Serving Society". The session was entitled "Geodesy and the United Nations Sustainability Goals" which explored the interconnected aspects of geodesy and the UN Sustainable Development Goals and highlighted geodetic tools and observations that help further our understanding of the Earth and the Earth System from monitoring to mitigation.

Dr. Nicholas Vlachopoulos Made Fellow of Engineers Canada

Cross Appointed Professor, Dr. Nicholas Vlachopoulos, was named a Fellow of Engineers Canada (FEC) upon recommendation from Professional Engineers Ontario (PEO) for "Having given noteworthy service to the engineering profession".

Dr. Mark Diederichs and Dr. Jean Hutchinson in Iceland witness the birth of a volcano Geldingadalir Eruption - 7 hours old on Aug 3rd, 2022.

Dr. Alexander Braun Interviewed for a New Podcast

Dr. Alexander Braun was interviewed about a special issue on Planetary Geophysics in "The Leading Edge", for a new podcast. Listen to the podcast now, Seismic Soundoff: 167: Exploring other planets with geophysics. Dr. Braun talks about planetary geophysics, including why Jurassic Park gives a poor impression of geophysics and how geophysical techniques on the moon helped turtles on Earth.

Dr. Christopher Spencer Featured in Nature Goesciences

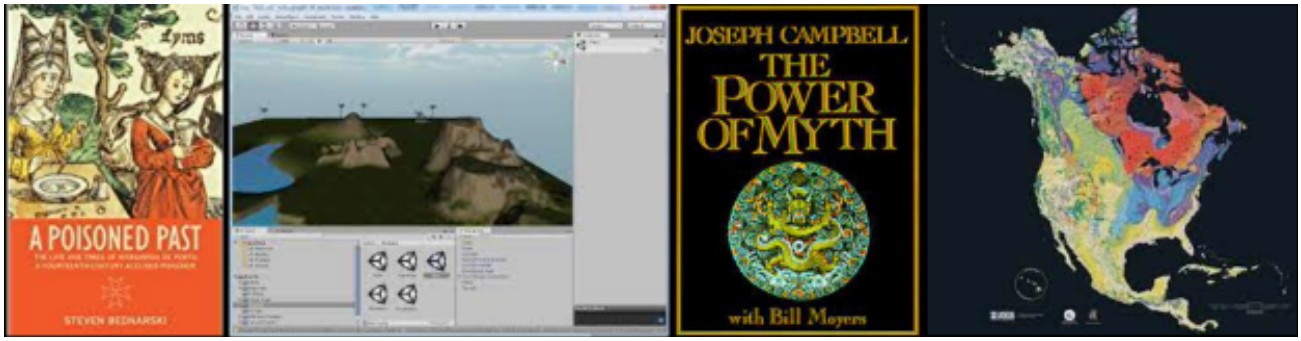
Dr. Christopher Spencer, along with with colleagues at the University of Southampton, the University of Cambridge, the University of Aberdeen, and the China University of Geosciences, Wuhan studied the effects of land plant evolution on Earth's chemical composition over the past 700 million years.The findings are published in Nature Geosciences, and were chosen for the cover of the magazine.

Read the article on the Nature website.

Dr. Guy Narbonne Chairs Deep-Time Digital Earth Forum

Dr. Guy Narbonne chaired the Deep-Time Digital Earth (DDE) Open Science Forum co-organized by UNESCO, the International Year of Basic Sciences for Sustainable Development, the International Union of Geological Sciences (IUGS) and DDE. The forum took place November 8-9, 2022 in Paris, France.

Geology as Worldbuilding: Broadening The Scope of the Geosciences



When I watch a movie, for example The Martian, I can't not see the geology (and often the errors). Geology is all around us, but a lot of people see it as a niche and not connected to what they are doing – to their lives – though of course climate change is changing that perspective quite rapidly. But geology in stories – movies, books, videogames – is a niche within a niche. With strong interest in speculative fiction, games of all sorts, and creative writing I decided to introduce a course on Worldbuilding, an interdisciplinary, small classroom experience modeled on art studio courses. The process is the point, and the instructors are guides. As I have a background in the geosciences, in spatial information, and in game design, I clearly have nowhere near the background to teach such a course – where is the history, bioscience, art, media, literature, physics, music, sociology… all the elements that make up a world?

What do these things have in common? They happen to be about worlds and perspectives.

As a result, each session of the course has five or six guests from some 'other' perspective, and these visits are recorded so that they form a growing library of 'guest experts' who challenge students to think differently about what a world is, and argue that their disciplinary background is perhaps relevant, perhaps essential. The students themselves come from all across the University and so each also brings diverse personal perspective and is encouraged to be vocal about it. With only 20 students each year in the course, people quickly realize the space is safe for suggestions and perspectives.

So despite being the 'sole instructor' of the course, really, everyone is an instructor and the emphasis is on collectively building the course each time. Creative outputs have included games (board and computer), academic papers (on the physics of magic), artwork, interactive and traditional fiction, film scripts, photography, and music. The challenge for me is to come up with the guests each time and shape the overall experience; the challenge for the students is to share everything, to 'create out loud.'

- Rob Harrap
(Faculty, and Sci '86)

Principal's Impact Courses

Dr. Alexander Braun (left), and Dr. Hom Nath Gharti (right), were awarded Principal's Impact Courses grants. The two proposals were among ten courses selected from across the university.

According to the Queen's Gazette, "Ten 'blue sky' courses have been selected for the Principal's Impact Courses (PIC) initiative this year. The programs will use funding creatively to support the development of educational experiences that push the boundaries of teaching and learning."

Dr. Alexander Braun, and Dr. Dorit Naaman (Film and Media), will be offering a course entitled, Belle Park: Exploring (UN) Sustainable Reality. The description reads, "Exploring (UN) Sustainable Reality explores interwoven environmental, socio-economic, and arts and cultural issues related to the United Nations (UN) sustainability goals and attempts to find solutions using inter- and cross-disciplinary perspectives. It also exemplifies past and present Indigenous approaches to the environment, and as such can model sustainable principles beyond Western paradigms. The course is based in the field, in the classroom, in labs, and various archives, as well as community venues. Real world problems require multi and interdisciplinary teams in the broadest sense, to find solutions. Students from across the university – engineering, sciences, social sciences, humanities, arts and planning – form groups that focus on a burning question and will approach inquiry-based learning with much autonomy in planning, executing and presenting their projects."

Dr. Hom Nath Gharti's course will be titled, Computation and machine learning in geosciences through music. The description reads, "With the rapid advance of computing technology, computation and machine learning have become indispensable tools in many fields. This course combines the beauty of music with the power of advanced computation and machine learning to inspire next-generation scientists and engineers to tackle a vast array of problems in geosciences and related fields. Musical or sound data, both instrumental and natural, will be collected, computed, and analyzed, and later applied to solve real-world problems in geosciences."

More information about the Principal's Impact Courses Initiative can be found by reading the full article in the Queen's Gazette.

STUDENTS

GEOL 301/401 field trip

STUDENT Accomplishments

Geological Engineering Student Wins WiE Undergraduate Summer Research Award

Undergraduate student, Marie-Helene Lapointe, was awarded the Women in Engineering (WiE) Undergraduate Summer Research Award for 2022. Her project focuses on the determination of gravity rates across Canada from FG5 measurements and GRACE/GRACE-FO missions.

Undergraduate Student Receieves Indigenous Student Trailblazer Award

Undergraduate student, Nicole Julien, received the 2022 Indigenous Student Trailblazer Award from Women in Mining Canada. The Women In Mining Canada Trailblazer Awards Series recognizes women who embody the trailblazing spirit, which refers to the leadership mindset needed to make extraordinary personal strides to navigate the Canadian mining industry.

Graduate Student Wins Capturing the Art of Research Contest

PhD student, Ruqaiya Yousif, placed first in the Queen's "Capturing the Art of Research" contest, in the Climate Action Category. View the winning photo, and all winning photos on the Queen's Gazette website. https://www.queensu.ca/gazette/stories/capturing-art-research-photo-essay

PhD Student Wins Two Poster Awards

PhD student, Collette Pilsworth, won the PhD Category for the 2022 Keating-Boyle Award, given out by the Mineral Deposits Division of the Geological Association of Canada, during the 2022 GAC MAC conference in Halifax, Nova Scotia. Collette also won the PDAC- SEG student minerals colloquium PhD poster prize, and placed first during the 2022 PDAC conference in Toronto, Ontario.

Geophysics Students Awarded Over $50,000 for Their Excellence in Research

Graduate and undergraduate students in the Geophysics & Geodesy lab were awarded 11 scholarships/awards totalling over $50,000 this year (excluding NSERC and OGS scholarships). The research contributions of these students cover a wide range of topics and demonstrate the breadth of our department's academic approach and the appreciation of professional societies (Society of Exploration Geophysicists (SEG), Canadian Society of Exploration Geophysicists (CSEG), Canadian Exploration Geophysical Society (KEGS)). A complete list of awardees and awards can be found on the GSGE website. https://wp3.its.queensu.ca/geolwww/geophysics-students-awarded-over-50000-their-excellence-research

Greetings from Miller Club!

As the primary source of all undergrad events in the geology department, we would like to share some of the highlights of this semester's department activities, as well as some of our plans for the upcoming semester. This term was filled with fun events such as pumpkin carving for Halloween, class photos, merchandise planning, weekly intramural sports games, a bake sale to raise money for Winter Gronch, and of course, Winter Gronch, a long-time tradition of the geology department where faculty and students (grad and undergrad) come together for a semi-formal potluck event. It has been a few years since this event had been run, so it was a very special and fun opportunity for Miller Club to bring Gronch back to the department!

Next semester we have many more fun items planned, such as PGO info nights, trivia nights, a Mining vs Geology hockey game, an open mic night, merchandise orders, and many more! This year, Miller Club has also been expanding our role in the department's EDII committee, and we are planning an EDII movie night / resource talk this coming semester. Miller Club is working hard to enrich the university experience of the undergraduate students in geology, and events like these make being part of Miller Club and Queen's Geology an exceptionally fulfilling experience.

If you have any thoughts, questions, or ideas you would like to share, please feel welcome to email Miller Club: millerclub@queensu.ca or to reach out to one of our co-presidents directly: Piper Friesen 18pnf@queensu.ca and Marie-Hélène Lapointe 18mhl2@queensu.ca.

2022 Kyser Scholarship Award Receipient

The Department is pleased to announce that the 2022 receipient of the T. Kurt Kyser Memorial Scholarship Fund Award is Emer Mcconnell-Radford. This award was established in loving memory of Kurt and his deep commitment to education and Queen's University.

More details about the fund are available on the Queen's giving website.

Congratulations, Emer!

Field School 2022

Two cohorts of students partcipated in 10 days of field school at the "ore chimney".

The trip was led by Dr. Jennifer Day and Dr. Christopher Spencer.

The Principal's Farm

On June 28th, 2022, Samuel Woodland and Emer McConnell-Radford, two undergraduate students in the Department of Geological Sciences and Geological Engineering, had the opportunity of accompanying Dr. Christopher Spencer, and Dr. Jennifer Day to explore and evaluate the geology of Principal Deane's farm.

After almost two full years of online learning, it was so great to be able to get back into the field, and what better place than at Principal Deane's farm! It was such a great experience to not only explore the geology of the area but get a peek into the life of someone so important to Queen's University. Most people only get to interact with Principal Deane when they graduate, so it was truly special to get to chat with him and see his wonderful home and farm, not to mention all of the lovely animals! The principal was kind enough to make us a beautiful map of his property, along with some possible areas of interest. We saw various limestone outcrops and did some soil augering, something which I (Emer) had never gotten to do because of online school.

We analysed several auger holes, at an upper and lower section of the property. The soils observed included both stiff and soft clay with varying colour, sandy soil, and silty clays. There were also some mineral pink feldspar rich lenses observed in the soil, in addition to black and bronze coloured minerals. Once we had completed the soil analysis at a given auger hole, Principal Deane would drive up to us on his tractor, eager to hear about our findings. He was very interested and got up close to the soil samples, asking plenty of questions!

From looking at and discussing the geology, chatting about our own personal projects, and saying hi to all the farm animals, it was overall a very fun experience. We are so grateful that the principal invited us. Here's hoping it won't be the last time the geology department gets invited to explore the geology of the principal's farm!

- Samuel Woodland and Emer McConnell-Radford

22nd Canadian Rock Mechanics Symposium
Canadian Strengths & Future Directions

RockEng 22in22

Kingston August 8-10, 2022

RockEng22, the 22nd Canadian Rock Mechanics Symposium was hosted on Queen's University campus this year, August 8-10, 2022.

The Department of Geological Sciences and Geological Engineering's Dr. Jennifer Day was the Chair of the symposium, and Dr. Mark Diederichs was the Technical Chair.

Principal Patrick Deane brought greetings on behalf of the university.

Learn more about the conference in the Queen's Gazette (https://engineering.queensu.ca/news/2022/08/RockEng22-Symposium-gets-off-the-ground.html), or the Brockville Recorder & Times (https://www.recorder.ca/news/local-news/experts-thrilled-at-tunnel-visit).

(Photo from the Brockville Recorder)

The conference group attended dinner at the Brockville Railway Tunnel

A student's perspective

I attended the RockEng'22 conference in August. The conference was the first major event for Canadian rock mechanics professionals in many years. Over 150 rock mechanics professionals gathered in Kingston for the event! Hosted at the Isabel Bader Center, RockEng'22 was held at a beautiful venue, and the perfect place for attendees to network and discuss the future of rock mechanics. The format of the conference was TED talk style for presenters to really connect with the audience and discuss important advances in rock mechanics research as well as case studies shared with peers. The expertise present at this conference was unparalleled and those who went were able to gain so much knowledge. As a student, the conference was an amazing opportunity for me to network with fellow students and industry professionals. The networking events included a spectacular visit to the Brockville tunnel for a banquet dinner, as well as a boat cruise dinner through Kingston's Thousand Islands.

I was also on the organizing committee for the conference, and I had the opportunity to work alongside other Queen's Geomechanics and Geohazards Group (QGGG) students, and QGGG professors Dr. Jennifer Day, Dr. Mark Diederichs, and Dr. Jean Hutchinson, who put so much effort and time into ensuring the conference ran smoothly.

-Evan Dressel,
PhD Student

MASTER OF EARTH AND ENER

Welcome MEERL '24

Join us in welcoming the MEERL Class of 2024 who travelled to Queen's University for their first residential session! We are delighted to bring together another group of diverse students, representing many areas of the natural resource industry - geology, engineering, sustainability, indigenous consultation, and law.

To kick off their program, students took part in workshops, started their first courses, attended networking events, and explored the Kingston community.

Economics in Calgary

In April of 2022, we were finally able to bring our MEERL students together for an in-person residential session. This session brought two cohorts of MEERL ('22 and '23) students to Calgary for workshops, an alumni event, and an entire economics course, taught by Professor Bahman Kashi. After spending close to 2 years learning online.

Graduation

For the first time in three years, students were able to attend in-person convocation events. It was wonderful to bring together students from across three cohorts. Congratulations to MEERL '20, '21 and '22.

RGY RESOURCES LEADERSHIP

Get to Know MEERL

55 Students Alumni & Current	45% from the Mining Sector	9 Average Years of Work Experience	Canada, US, Peru, Argentina, UK, Ghana
1/3 Female 2/3 Male	55% from the Energy Sector	34 Average Age (Range 22 – 47)	Engineering, Geology, Finance, Policy, Economics, Law

Student Feature

Neil Price, MEERL '22 Alumni
Energy Consultant
London, GB

Why the MEERL program at Queen's University?

I joined MEERL to broaden my skill set into fields such as economics, business strategy, and stakeholder management. My advice for new students is to challenge their perspectives on the Energy sector. MEERL offers a wealth of knowledge, and a smorgasbord of world views that will prompt you to re-examine the future of energy.

What's next for you?

Having recently finished MEERL, I decided that I wanted to deliver meaningful change for society and the environment by helping the energy resources sector decarbonize. My goal is to develop decarbonization strategies, founded upon sustainable business models, which place profit, people, and the planet at their core.

Final Thoughts

If you have ideas, suggestions, or questions about the MEERL program we would love to hear from you. We are always looking for guest speakers, project ideas and new ways to grow the program. Reach out to the Program Manager, Brittany Jennings at meerl@queensu.ca

ALUMNI UPDATES

Class of 1983

Alumni REUNIONS

Thank you to everyone who attended GEO events in 2022. We were so happy to welcome everyone back for our first in person alumni receptions since 2020. It was great to reconnect with so many of you!

Join us in 2023!

2023 Vancouver RoundUp Alumni Reception: Tuesday, January 24, 2023
2023 PDAC Alumni Reception: Tuesday, March 2, 2023
Geoconvention - May 15-17, 2023

Homecoming 2022

Carol Ellis Lab Opening

It was with tremendous excitement that we named the Carol Ellis Digital Earth Sciences Laboratory, aka Miller 403, on October 1. The lab will support work by the first ever Digital Earth Scientist, Dr. Hom Nath Gharti, grad students and senior undergrads, and it is named for Carol Ellis, Class of ’82. We had an enthusiastic group of the Class of ’82 (ish), and emeritus professors in attendance to celebrate this wonderful gift. With its high tech equipment like the Smart Board, it is the perfect place to hold hybrid (virtual and in-person) meetings as we did on December 2 when 4th year students and their supporters met for presentations.

A Funny Story about the Class of ‘82

Sometimes it’s a matter of a few minutes or even seconds! I was checking into a hotel near YYZ on the evening of October 2, for my very early morning flight out. It had been such a long day – caught in a river of triumphant Blue Jays fans as I tried to catch my train to the airport, waiting and waiting for a shuttle, caught in a front desk throng, and finally an elevator in sight. A nice couple held the elevator door for me. They told me they had just arrived by car from Kingston where Hugh (of Hugh and Jan) had his Class of ’82 reunion and I said, “funny coincidence, I just arrived by train from Kingston”. It turns out that while they are not geologists, they had been carousing with the wonderful Geo Class of ’82 over the weekend. They were explaining how sorry they were to have missed the opening of the Carol Ellis Digital Earth Sciences Lab in Miller Hall, and how much they enjoyed meeting the alumni from that group. They were astounded to learn that I had been at the lab opening, and was indeed the Head of the department. And wouldn’t you know it, Jan and Hugh’s daughter Sophia is a 3rd GeoScience student. I wish I could have spent a bit more time with Hugh and Jan, but it was a wonderful experience to connect with parents of a member of the Class of 2024, and certainly a coincidence.

Join us on Social
Join the alumni Facebook and LinkedIn Groups for alumni updates throughout the year.

Post-Doc with NASA

Congratulations to alumnus Dr. Callum Walter, BSc'16, PhD'21, who will be joining the USGS and NASA for an exciting postdoctoral opportunity.

Dr. Walter will begin this new venture as a postdoctoral research scientist in January 2023 where he'll join the USGS - National Innovation Center and the NASA - Ames Research Center for Planetary Science, both based out of Moffett Field, California.

According to Dr. Walter, "This is an opportunity of a lifetime, where I'll be working to develop innovative geophysical techniques for off-world, in-situ resource surveying in support of NASA's upcoming crewed Artemis missions to the Moon, Mars, and possibly beyond! The research will involve the development of novel geophysical techniques and technologies to map the distribution and concentration of near-surface water-ice deposits in the permanently shadowed regions (PSRs) of the Lunar South Pole. This research is in support of NASA's crewed Artemis missions to the Moon throughout the late 2020's, and potential future missions to Mars in the 2030's. The first Artemis mission, Artemis I, was successfully launched on November 16, 2022, and will be the first time NASA has sent a human-rated spacecraft in orbit around the moon since the end of the historic Apollo program 50 years ago. This is the start of my generation's Apollo program, and I couldn't be more excited to contribute to the science and engineering goals of the program through my background in geological engineering and applied geophysics. I'd like to thank everyone in the Department of Geological Sciences and Geological Engineering that has helped to shape and support my academic career over the past 10 years leading up to this amazing opportunity. I can wait to see where I go from here!"

The Artemis I launch originally scheduled for August 29, 2022, was postponed multiple times due to numerous technical and environmental factors such as Hurricane Ian. With the planned successful re-entry of the Artemis I, Orion Crew Capsule on December 11, 2022, the next Artemis mission (Artemis II) will send a crew of astronauts in orbit around the Moon and slashing back down on Earth in May 2024. Soon after this crewed Lunar fly-by mission, Artemis III (Artemis III) will once again see astronauts step foot on the moon, the first time since Apollo 17, back in December 1972. Through the Artemis program, NASA plans to setup a continuously crewed Lunar base by the end of the decade and use the knowledge they gain achieving this feat to make the next giant leap out into the solar system - landing humans on Mars of the first time. This sequential and increasing complex string of Artemis Lunar missions will pave the way and provide the necessary experience for a successful Mars landing mission. This process will be similar to the Apollo 1-10 missions that laid the technical foundation for the First Lunar Landing in July 1969 (Apollo 11). More information about the Artemis program and future research goals can be found on the CBC website and NASA website (https://www.nasa.gov/specials/artemis/).

The official description for Dr. Walter's post-doctoral position reads, "The USGS is partnering with NASA and the Office of the Under Secretary of Defense (OUSD) for Research and Engineering to increase capabilities in off-world resource surveying. We propose to explore the utility and feasibility of geophysical techniques to characterize potential resources in the near subsurface of the Moon and Mars, improving our ability to detect, map, and characterize in-situ resources on planetary bodies in the Solar System. In particular, we are looking to test three hypotheses pertaining to the form and distribution of potential off-world in-situ resources: (1) water-ice, (2) metal-oxides, and (3) shallow subsurface stratigraphy"

Congratulations, Dr. Walter, on this incredible accomplishment!

Fossil DISCOVERY

Queen's University alumnus, Laura MacNeil, BSc'13, has spent the last few years making headway promoting Earth science education and the potential for important fossil discoveries on Prince Edward Island.

Although the Island contains the largest and most complete record of the Permian Period anywhere in Canada, it is also the only province without a provincial geologist, paleontologist, university geology department, or natural history museum. Prince Edward Island is famous for its numerous beaches that stretch along 1,100 km of shoreline, many of which Early Permian terrestrial sediments are outcropping. Fossil discoveries are occasionally made by the general public while they're walking the beach but many likely become exposed and subsequently washed away because many beachgoers don't know what to look for.

In 2018 Laura moved from Alberta back home to PEI after working at the Royal Tyrrell Museum as a science educator for three years, with the hopes of fostering interest in the Island's important fossil record. She soon discovered the first-ever set of Dimetrodon trackways in one of PEI's National Parks along the North shore. The site has since revealed at least seven trackways from other Early Permian vertebrates and quickly became one of PEI's most important fossil sites.

Prior to 2020 there were no venues in the province where you could learn about its geologic history, however in 2020 Laura saw an opportunity and founded Prehistoric Island Tours, a geotourism business that educates participants on its geoheritage and teaches how to spot fossils as they're walking the beach. She conducts tours along one of PEI's most significant fossil sites, where 300-million-year-old coniferous trees are outcropping as 1 to 10-metre mineralized columns. The tour ends with a good portion of fossil hunting where Laura helps participants identify fossil material amongst the regular rock that litters the beach.

With more residents learning the potential for fossils in the last couple of years, the Island has seen an upsurge in discoveries. Earlier this year in August Laura received an email from an Island resident, Lisa Cormier, with a picture of a fully-articulated fossilized skeleton that she recognized as being only the second ever discovered on PEI. She contacted the province as well as a maritime paleontologist, Dr. John Calder, who confirmed that this was a highly-significant find and quickly put together a team to remove the specimen. Calder suspects that it is an Early Permian Period reptile and potentially a new species. News of the discovery spread across North America, with reporters from locations like Florida and Utah looking to put together articles on the discovery. The specimen will soon undergo CT scanning and potentially be housed at the Smithsonian Institution for further study.

Laura MacNeil (left), and Lisa Cormier (right) who discovered the recent skeleton .

Read the article about the fossil discovery on the CBC website. https://www.cbc.ca/news/canada/prince-edward-island/pei-300-million-fossil-found-pei-1.6564455

In Memory of Bradford Cooke 1954-2022

"It was really sad to receive the news of Bradford Cooke's passing.

Brad was one of our most prestigious alumni, graduating with a Bachelor of Science (Geology) degree in 1976. Following graduation he started working with various exploration projects, and eventually co-founded the Endeavour Silver Corporation in 2003.

I heard of his very good reputation as an exploration manager in the early 2000's, but got to know him personally, many years later. We shared a passion for providing the best education to our students, and considering the real challenges of the industry and in academia.

Since then, Brad has been a great supporter of our department's programs, sharing his enthusiasm and vision about the exploration and mining industry in each opportunity he had interacting with our students.

Brad was also very generous in providing funding through Endeavour Silver Corporation for scholarships and field training. His commitment and passion for his work and life, determination to achieve his goals, and generosity will be always remembered by those who crossed his path."

- Dr. Gema Olivo

Photos taken from the Endeavour Silver website: https://edrsilver.com/blog/articles/in-loving-memory-of-bradford-cooke/

Quotes from Past Endeavour Silver Named TAship Award Recipients

"I was honoured to have been awarded the Endeavour Silver Named TAship Award in 2013. As an undergraduate TA at the time, being acknowledged for my teaching provided critical validation that pushed me to pursue teaching in higher education. I am now a Lecturer at Clemson University and still reflect on my time as a TA at Queen's University, and the skills I gained and exposure I received there."

- Dr. Emily Scribner, BSc'14

"Being a TA in Analysis of Rock Structures was a real pleasure and a fantastic opportunity to develop and share my passion. It was an important step towards my career as a professor of structural geology! Thank you, Bradford and Endeavour Silver."

- Dr. Renaud Soucy La Roche, PhD'18

"The untimely passing of Brad Cooke means Queens' has lost a great alumni and the economic geology community a great geoscientist. Their involvement with Queen's made Endeavour Silver a common and respected name among the economic geology grad students. I was fortunate to receive the Endeavour Silver Named TAship in "Petrology Applied to Ore Deposits." This award bolstered my confidence early in my teaching career and continually serves as a reminder to keep working hard and be engaging with students. My condolences to the friends and family of Brad. To the past, present and future Endeavour Silver TA awardees...congrats and remember, the award means you are doing a great job!"

- Dr. Paul Slezak, MSc'12

"The Endeavour Silver Named TAship Award has funded many teaching assistants over the years for arguably the most important course we offer in the Queen's University Department of Geological Sciences and Geological Engineering: GEOL104: The Dynamic Earth. This first-year undergraduate course is the first exposure to the geological sciences for many students and is ultimately what convinces them to pursue this wonderful field of study. I know this first hand because it certainly convinced me. By supporting TAships for this introductory course, the Endeavour Silver Award is providing prospective geoscientists with additional support in practical exercises from highly knowledgeable and, most importantly, passionate upper year undergraduate and graduate students who have chosen to walk this path. I was honoured to receive the Endeavour Silver Award in Fall 2015, and it still makes an impact for me to this day as a demonstration of my teaching abilities in my pursuit of an academic career. I offer my condolences to the family and friends of Bradford Cooke. I hope that it provides some comfort in knowing some of the impact that this award has on the lives of the teaching assistants and students it supports."

- Dr. Kaj Sullivan, BSc'15, PhD'21

GARNET

Geo-Alumni Resource Network

The Queen's University, Geological Sciences & Geological Engineering GARNET program was launched in January 2020 to support the need for growth between young alumni and current students and to provide a learning environment for career development. It also provides a way to reinforce the relationship that must exist between industry and academia to achieve a relevant academic program and to keep it current.

Despite the continuing pandemic challenges in the 2021-2022 academic year, the willingness by young alumni to support this program continued. Our GARNET mentors offered career advice and guidance to student participants. Many positive comments about this program have been received and some of which are reflected in this newsletter.

The GARNET 2022-2023 program is underway and students in second, third and fourth year have all signed up. All student mentees have been introduced to mentors in their area of research/career interests. Geo-alumni are a generous group, and we thank them for their willingness to participate in this program. As more students sign up, we will continue to reach out to alumni for their assistance.

The GARNET program is looking for volunteers to give presentations about their company and career path. You can join us in-person or virtually.

Please email: garnet@queensu.ca for more information.

Quotes from GARNET Mentors

"It has been a great experience being a mentor as part of Queen's GARNET program. I have really enjoyed meeting with my various Geology student mentees to discuss the numerous facets of the exploration and mining industry. This helps to set undergraduates up for success!" - Michaela Kuuskman

"The GARNET program was invaluable to me as I started out my career. It helped me find my first position as an engineer in training through its job fair, featuring a variety of geo engineering companies from all over Canada. I was able to meet with recruiters face to face. While unfortunately I graduated before the program was fully up and running, it's easy for me to see how valuable having a mentor in third and fourth year would have been in starting my career. Having someone to review my resume, give me tips on how to apply to positions, and guide me through the P.Eng licensing process would have made my transition into the working world so much smoother. With the experience I have now, I'm excited to become a mentor to provide that guidance I could have used in my fourth year and be someone a student can turn to with questions at any time. - Kayla Larocque

"The GARNET Program offered great insight into the modern student experience, especially during times of virtual classes and an education experience very different from my own. In talking with my Mentee, I gained an appreciation for the challenges faced by the current cohort of students coming out of the pandemic, as well as a lens into the types of skills and experiences that they had to learn in order to adapt. In my role as a manager who hires junior staff right out of school, it has assisted me in adjusting my expectations and giving me an idea of the types of additional support or training new grads may require when entering the workforce that differ from those that I required." - Alex Wood

Give to Queen's Geo

Advancement Priorities

As always we thank you for your donations that allow us to provide our students with the best possible learning environment. For the coming year our priorities are:

Field Funds – we want to continue to provide our students with many excellent field experiences.

Named TAships which support additional TA's for courses, and enhance students learning.

Student-ships supporting undergrad research which employ students in the summer so they can experience the excitement of research and help young faculty establish their research programs.

Geology Trust – as always, the Trust gives flexibility to support a variety of endeavours from events to lab renovations.

Alumni Highlights

Dani Delaloye, BSc'09, MASc'12, was awarded the 2022 Young Professional Award from the Association of Consulting Engineering Companies British Columbia.

Shelby Yee, BSc'16, was awarded the Young Mining Professionals award, in association with the Northern Miner.

Dr. E. Maria Skordaki, MSc'01, was named this year's recipient of the Athabasca University Distinguished Alumni Award.

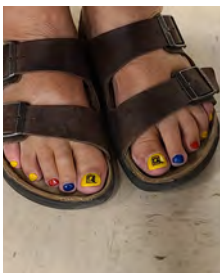
Dr. Mike Kendall, BSc'84, PhD'92, was made a fellow of the Royal Society of Canada.

Dr. Kyle Larson, MSc'04, PhD'09, received UBC Okanagan's Researcher of the Year award for Natural Sciences and Engineering.

Photo credit: Pasang Tamang

Dr. Caolyn Anglin, BSc'82, received the 2022 Canadian Professional Geoscientist Award from Geoscientists Canada

A team of researchers in Canada, say they have discovered two new minerals – and potentially a third – after analysing a slice of a 15-tonne meteorite that landed in east Africa. Dr. Chris Herd, BSc'97, is the curator of the collection, and is helping to analyse the minerals.



A fun photo of alumni tri-color toes from Homecoming!

Geophysics & Geodesy Lab Mascot "e" travels the world with students on their field and research excursions. Seen here at Fagradalsfjall, Iceland, discovering its personal lava tube.

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