

Queen's
UNIVERSITY

ARTS AND SCIENCE
Geological Sciences and
Geological Engineering

GEONews 2024-2025

Photo by Dr. Chris Spencer, Southern Alps, New Zealand

Greetings from the Head

It's hard to believe it's been 19 years since I arrived at Queen's in 2006. At that time, I was welcomed by Head Bob Dalrymple, and I learned a great deal in those first few years—how the University works, our department's traditions, and how to teach undergraduate and graduate students (I'm still learning!). Over the years I was fortunate to serve under three more Heads—Herb Helmstaedt, Jean Hutchinson, and Vicki Remenda—and as I look ahead to the next five years of my term, I can only hope to fill, even partly, the big shoes of those great mentors.

Much has remained the same. We still pride ourselves on a fundamentals-focused program with more than 350 hours of field-based experiential learning. We continue to offer two professional programs, graduating research- and industry-ready geologists and geological engineers. Just a few months ago, our engineering program again received the maximum six-year renewal from the Canadian Engineering Accreditation Board.



Our undergraduate and graduate students continue to feel the same sense of belonging, tradition, and community that many of you experienced as students at Queen's. Traditions like the Gronch remain a pivotal part of undergraduate life; last December's event was one of the largest, with more than 150 people in attendance. Miller Hall and the Bruce Wing are still full of "character"—with small, incremental improvements over the years—and they continue to provide GSGE with a wonderful home for teaching and learning. A retired professor from Dalhousie, and a proud Queen's alumnus, visited recently and was delighted to find the graduate student office in Miller Hall that he called home "for four glorious years."

Much has also changed during my time at Queen's. Over half of our faculty have taken on other roles (Drs. Thomson, Pratt, and Lee), retired (Drs. Archibald, Carmichael, Clark, Diederichs, Dixon, Helmstaedt, Hanes, Hutchinson, James, Jamieson, Narbonne, and Peterson), or sadly passed away (Drs. Kyser and Price). Our faculty complement has waxed and waned—from a low of 12 to a high of 18—and currently sits at 14. The austerity measures first seen in 2023–24 across many U15 schools have also affected our department and the broader Queen's community. Hiring freezes, staff reductions, and voluntary retirements have led to the recent retirements of Dr. Jean Hutchinson (January 2025), Dr. Mark Diederichs (January 2025), and Dr. Guy Narbonne (May 2025).

Change can create opportunity. Through targeted university hires—such as the Queen's National Scholar program—we've welcomed new colleagues over the past five years with exciting research strengths. For example, Dr. David McLagan focuses on contaminant biogeochemistry—how pollutants move, transform, and are stored across Earth's spheres (atmosphere, hydrosphere, lithosphere, biosphere). Dr. Hom Nath Gharti works at the intersection of computational geophysics, geomechanics, and applied mathematics/numerical methods. Dr. Chris Omelon's research in geomicrobiology and biogeochemistry explores how microbes interact with minerals and environments, particularly in extreme or Arctic settings. Rising workload pressures have also prompted us to streamline our course offerings and to double down

2006, field work and soon to be a professor at Queen's

on geological fundamentals and field teaching. Our alumni remain at the heart of our progress. Your timely support—whether course-specific gifts (including named TA funds), field-school contributions, or passion-driven donations to research—continues to make a tangible difference. Recent examples include the Louise Berlin AI & Machine Learning gift (\$1.15 million) and the Cheeseman Geoselenic gift. We are also in the process of receiving a very generous gift from the estate of Manfred and Eleanore Kehlenbeck.

We can plan our path through change. In my time years at Queen’s, I’ve witnessed three cycles of austerity—none as challenging as the present—and we’ve come through each one stronger. Our student numbers are higher than they have been in recent years (not quite at the levels of the classes of 1980 or 2015, but getting close!). Budgets and politics will improve. With our outstanding staff, faculty, students, and alumni, we are well positioned to become an even better department as we navigate these challenging times. Our programs are strong and here to stay, and our graduating geologists and geological engineers will be well prepared to tackle the Earth and societal challenges ahead.

Dan Layton-Matthews, Professor and Head



Table of CONTENTS

Head’s Note and Updates	2
Ray Price	4
Departmental and Faculty News	5
Carbonates Field Trip	6
Undergraduate Students	7
FEWA Lab	8
Grad Students	9
Master of Earth and Energy Resources Leadership	11
Our Miller Hall	14

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Raymond Price, in memoriam

Professor Emeritus Raymond Price, a long-time member and award-winning researcher in the Department, died on Oct. 16 at the age of 91.

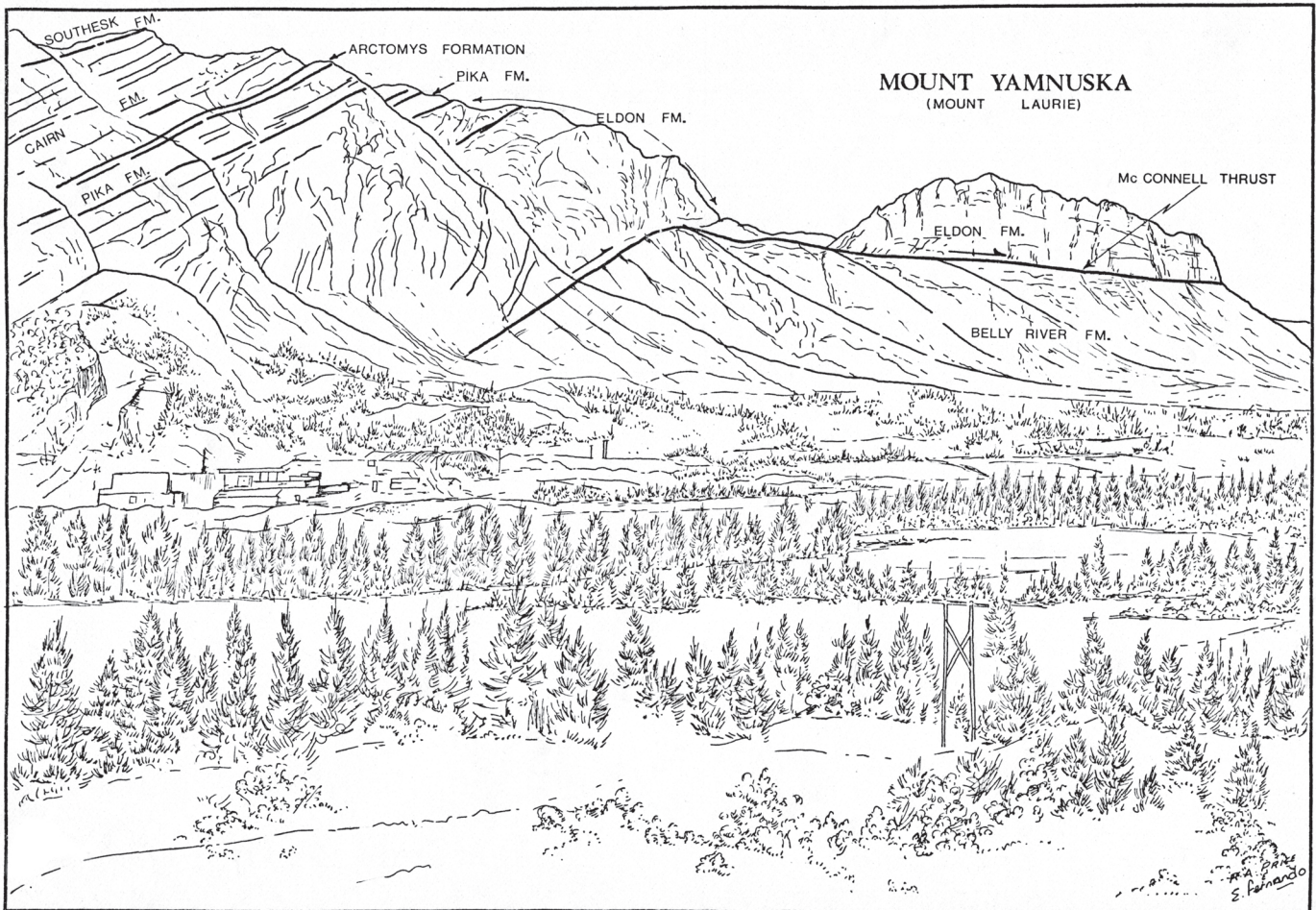
Dr. Price first arrived at Queen's University in 1968 after earning a Bachelor of Science at the University of Manitoba (1955) and a Ph.D. from Princeton University (1955-1958).

Ray was the Department Head from 1972-1977.

He also taught many courses during his time at Queen's, the most widely remembered likely being Energy and Water Resources, a course that really emphasized interdisciplinary thinking in addressing societal problems and directly reflected Ray's time at the Geological Survey as well as his time working on nuclear waste management in Canada. He supervised about 30 graduate students.

Ray also worked for the Geological Survey of Canada, first as a Research Scientist (1958-1968) and returning to take up the positions of as Director General and then Assistant Deputy Minister for the Earth Sciences Sector (1981-1991).

During this period, he served on a number of commissions and councils, including Chairman of the Board of Trustees of the Sudbury Neutrino Institute and President of the Geological Society of America. He received a number of recognitions and awards, including the Geological Society of America Penrose Medal and the Leopold von Buch Medal from the Deutsche Geologische Gesellschaft, and he was also named an Officer of the Order of Canada and Officier de l'Ordre des Palmes Académiques of France.



Labeled geological sketch of Mount Yamnaska, R.A. Price and E. Fernando. Ray had a rare ability to distill the essence of a very complex situation to the geological essentials.

Departmental Updates

We've tweaked the newsletter dates to align with the academic calendar, so this one covers a busy 18 months or so. That means there is lots to fit in. We'll be distributing this one both in print and digitally, and we're providing contact information if you'd like to flip how you receive it.

As has been widely reported in the news, Queen's Applied Science received a very large donation and is now Smith Engineering. The vision is to transform both what we teach and more importantly how we teach. A lot of time was spent and will continue to be spent on thinking about what an ideal (but affordable!) geological engineering program would look like, and how to incorporate our science program into that thinking. We're also looking at the details of how we assess students and where this can be improved.

We also saw invaders in the Department, architects and surveyors looking at how to modernize our elevators and make our spaces more accessible. The old Miller elevator is, alas, no more. While some may remember it fondly, it was unreliable at best and too small to meet modern standards. An integrated plan for a new elevator and for rethinking the foyer, offices and student lounge area of Bruce Wing is also underway.

The Miller Museum continues to be a lively attraction for public and high school students from the greater Kingston area and of course many tourists from near and far. It is now augmented by an installation of indigenous art and the front entrance has become a site for art/science projects from various local artists.

Faculty Updates

Jean Hutchinson won the Trailblazer Award from Women in Mining in February. She followed this up with a Golden Apple Award (teaching in Engineering) and with the John B. Storling Medal from the Engineering Institute of Canada in September. She converted to Adjunct and Emeritus status with her retirement at the end of the year.

Vicki Remenda stepped down from the Headship in September, after 7 years steering the ship! Dan Leighton-Matthews stepped in as Acting Head and has since been confirmed as the new Head of Geological Sciences and Geological Engineering.

Mark Diederichs was inducted as a Fellow of the Royal Society of Canada in September. He accepted this at a ceremony in November. He converted to Adjunct and Emeritus status with his retirement at the end of the year. His retirement from Engineering was celebrated with a special jacket bar for students who attended his last tunneling lecture in Geo 151.

David McLagan won the Emerging Researcher Award in Mercury as a Global Pollutant from the International Conference on Mercury as a Global Pollutant in September.

Chris Spencer was awarded the W.W. Hutchinson Medal from the Geological Association of Canada.

Lyn Anglin (class of 1981) was appointed Director the MEERL Program commencing in September.

Jenn Day received the 2025 Canadian Geotechnical Society CGS Colloquium award and will deliver a keynote and a cross-country lecture tour in 2025.

Bermuda Carbonate Sedimentology Field Trip



We're back in Bermuda! A group of 14 enthusiastic undergraduate and graduate students from Queen's and the University of Toronto – Mississauga participated in our Carbonate Sedimentology Field Trip from May 3, to 10, 2024. The trip was led by Drs. Peir Pufahl, Dan Layton-Matthews, and Marc Laflamme (UTM). Our base for the week was the Bermuda Institute of Ocean Sciences (<https://bios.asu.edu>) with its world-class facilities.

With a foot firmly in both modern and ancient environments, students explored the sedimentology, oceanography, and diagenesis of carbonate sediments and rocks of Bermuda. Contemporary concepts such as sequence stratigraphy and ecospace were used to interpret carbonate lithofacies and reservoir development. Anthropogenic effects on platform health also underpinned the trip.

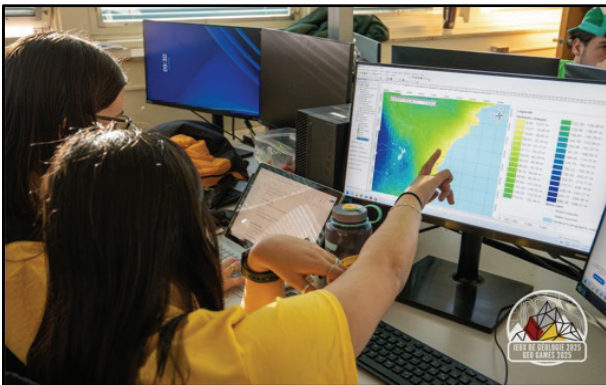
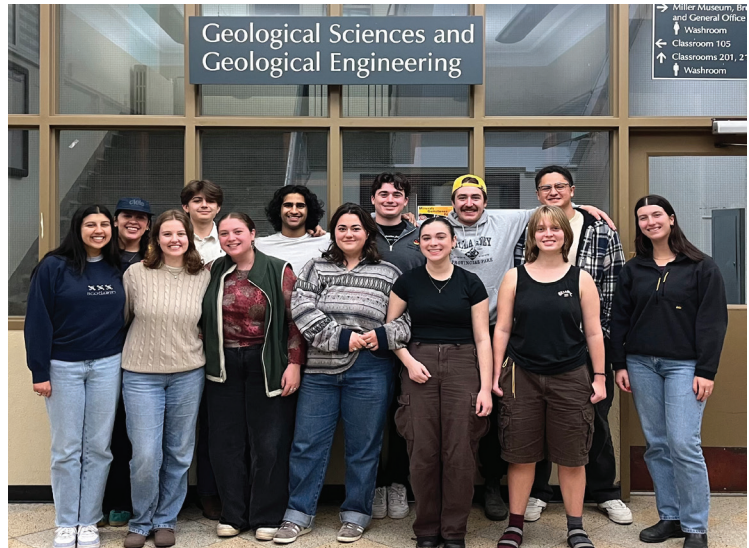
Alumni are always welcome so please contact Peir (peir.pufahl@queensu.ca) if you'd like to participate! Our students are eager to interact and learn from our alumni. The trip is running again this year with participants from Queen's, UTM, and Carleton from May 2 to 9, 2025.



Spot the students! A quick drone photo of students (centre of picture) exploring an algal cup reef during Bermuda 2024.
Photo by Dr. P. Pufahl

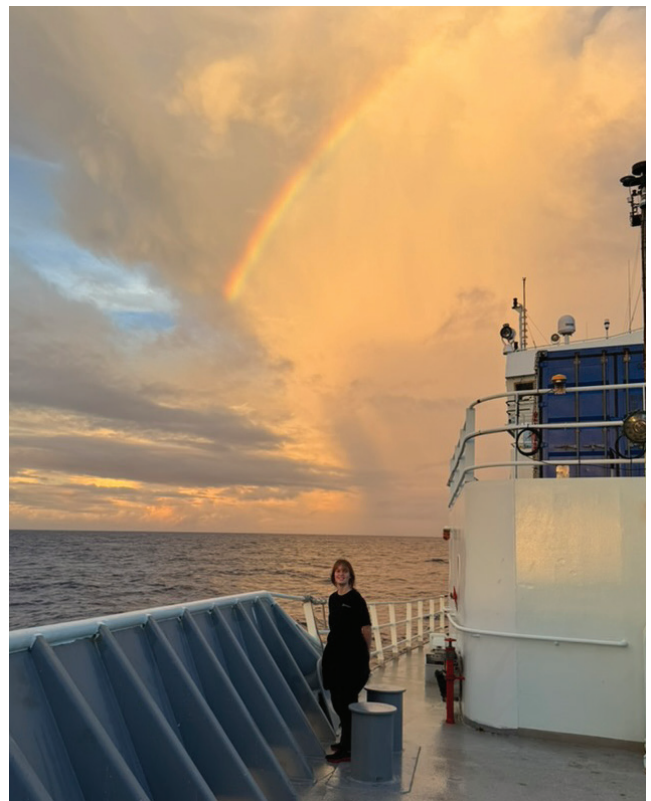
Undergraduate Students

The Miller Club, champions of all things undergraduate in the Department, had a busy year. They organized the spring graduation dinner and, of course, the annual Christmas Gronch. A keen group within the club prepared for the 2025 GeoGames event at Laval University in January and placed first overall at the event! Photos of the team below!



Undergrad Research Experience

Sasha Offin, a just-graduated 4th year Geology student, took part in a research trip to the Marianas Trench area with Dr. Matt Laybourne. As part of an NSF funded research project, she took part in directing a submersible to collect samples across the Marianas Trench, helped with catalogueing of samples, and found a few moments to enjoy an ocean rainbow. Photo by Dr. Matt Leybourne.



Sharing Memories

If you have a favorite undergrad experience photo that you'd like to share, please send it along to us along with a caption. If there is a story to go with it, all the better!

Send stuff along by Christmas or so if you want us to consider it for inclusion!

Fewa Lab Spotlight

David McLagan, cross-appointed with the School of Environmental Studies at Queen's, is PI of the Fire Earth Water and Air (FEWA) Contaminant Biogeochemistry Lab.

Here are some significant events in his group in 2024/2025.

Trying to solve monkey puzzles: David is working with MSc. Student, Nicolas Valenzuela Ortiz, using dendrochronology on Monkey Puzzle (*A. araucaria*) trees in Chile to understand historical Southern Hemisphere atmospheric mercury levels and inputs from volcanic sources. These trees are long-lived (up to 1000 years) and are also found at high elevation (2000-2500m above sea level). Since the mercury is stored within individual tree rings which have known ages, this allows a historical record and trends to be captured. Tree ring mercury concentrations mirror Chile's Colonial and industrial histories including an increase in concentrations during the Arauco War that essentially surrounded the location of these trees between 1550 and 1600.



Understanding the impacts of mercury use in Artisanal Small-scale Gold Mining (ASGM) on agricultural systems:

Graduated MSc student Excellent Eboigbe measured elevated mercury levels in soil, air, and crop tissues of corn, cassava, and peanut farms near an ASGM site in Nigeria. Results from the study are expected to be accepted in Biogeosciences within the coming days.

The Black Kite Project in the FEWA Lab examines wildfire and indigenous cultural burning smoke using a UAV-, lightweight sensor-based monitoring platform designed to evaluate smoke composition from different fires across Canada. This includes using the system to demonstrate the benefits of Indigenous “Cultural Burning” Fires to communities, ecosystem, and societal health.



Graduate Students

Jolliffe Club Update

Jolliffe Club serves as the graduate student council for the department's graduate students. The club is graduate student-run, with 11 members currently on the executive team for 2024-2025.

Jolliffe Club organizes academic and social events for graduate students within the department to offer support and build community. Past events have included a week-long writing bootcamp, Halloween pumpkin carving, attending a Kingston Frontenacs hockey game together, and a weekly writing group. The winning pumpkin at the pumpkin carving contest, held by Evan Dressel and Emer McConnell-Radford.

The Jolliffe Club is also the organizer of the department's Geo-Colloquium series, a speaker series that is designed for graduate students and faculty members to present their research in a friendly environment. A few talks from this last year are listed below.

The Jolliffe Club also recognizes the importance of Indigenization, Equity, Diversity, Inclusion, Accessibility, and Anti-Racism (I-EDIAA) in our learning and social environments, thus participating in the department I-EDIAA committee, and implementing related initiatives in the graduate student community.

Jolliffe Club is running a new program starting in 2025 called Grad Chat! Grad Chat will occur once a month, with a different professor from the department hosting an hour-long interactive meeting with graduate students focusing on different relevant topics, such as writing

and publishing, navigating academia and work-life balance, and different approaches to productivity. If you have any questions or want to get into contact with the Jolliffe Club, the email for the executive team is: jolliffe@queensu.ca.

Some Student Talks 2024 - early 2025:

Sarah Hatherly: "Perception doesn't match reality: unraveling gender disparities in Earth scientists' productivity during work-from-home initiatives"

Marc Rochette: "The behaviour of Pd during metamorphism in the East Bull Lake intrusion, Ontario, Canada"

Jack Fitzgerald: "Enhancing Earthquake Location through Neural and Numerical Approaches"

Ruqaiya Yousif: "Navigating the Challenges of the Biogenic Carbonate Clumped Isotope (D47) Thermometer"

Meghan Boyd: "Investigating Rhenium Biogeochemistry in a Heavily Enriched Wastewater Treatment Facility"

Anaëlle Mathy mapping in Brittany (Northwest France) for her PhD Fieldwork. Her mapping and sampling involves a study of migmatites and granites of the Cadomian orogeny (~580-540 Ma), supervised by Chris Spencer and Rob Strachan.



The winning pumpkin at the pumpkin carving contest, held by Evan Dressel and Emer McConnell-Radford.



Student Awards 2024:

Leandro Silva, Best student Poster with the Society for Economic Geology, Namibia for “Eolian Organic and Pyritiferous Siltstones as Redox Traps for Sediment-Hosted Ore Deposits”.

Maclean Trott, Best Paper Award – GEEA – International Association of Applied Geochemists. “Alteration assemblage characterization using machine learning applied to high-resolution drill-core images, hyperspectral data and geochemistry.”

Graduate Students Graduating 2024 - early 2025

Akinleye, Funmilade MSc.(supervisor, M. Leybourne) Trace Elements and Sulfur Isotope Variations in Endowed and Non-Endowed Porphyry Systems of the Dawson Range Mineral Belt, Yukon Territory.

Beckner-Stetson, Nathan MSc (supervisor, B. Vriens). Water Quality and Groundwater Discharge in the Halton Region.

Castillo Cardona, Emanuel MSc (supervisors, D.J. Hutchinson, J. Day) Identifying rockfall hazards in White Canyon, British Columbia: an approach to the development and analysis of dense point clouds from different remote sensors.

Dell, Kayla MSc (supervisor, M. Leybourne) Water-Rock Interactions In Geologically Diverse Regional Aquifers Of Northeastern Ontario.

Damavandi, Kiana MAsC (supervisor, H.N. Gharti) Electrical resistivity and induced polarization modelling using spectral-infinite element method.

Egoigbe, Excellent MSc (supervisor, David McLagan) Potential Human Exposures to Hb in Staple Crops from Agricultural Areas Impacted by Artisanal Small-Scale Mining Activities.

Fitzgerald, Danielle MSc (supervisors, G.M. Narbonne, P.K. Pufahl) The Mall Bay Formation (Ediacaran) and the protracted onset of the Gaskiers Glaciation in Newfoundland, Canada.

Guimarães da Silva, Leandro PhD (supervisors, P.K. Pufahl, N.P. James) The Neoproterozoic Bambui Group, central Brazil: an integrated view of basin evolution, tectonics, paleoclimate, and mineral systems.

Hyslop, Amanda MAsC (supervisor, J. Day) Shoreline Geomechanics at Hopewell Rocks Provincial Park: Stability of the Elephant Rock, Sentinel, and Lover’s Arch Formations.

Junqueira, Tassiane PhD (supervisors, B. Vriens, M. Leybourne, A. Harrison) Investigating trace element sourcing and biogeochemical cycling in the Great Lakes.

MacPhail, Ruairidh MAsC (supervisor, D.J. Hutchinson) Investigating the Occurrence and Effects of Fragmentation: Analysis of Rockfall Videos Captured During Slope Maintenance Campaigns.

McDonald, Mark MAsC (supervisor, M.S. Diederichs) Evaluation of ultrasonic pulse velocity measurements and resultant elastic moduli of hard rock core specimens.

Saberi, Nima PhD (supervisor, Bas Vriens) Reconciling Quantitative Mineralogy and Drainage Dynamics in Wathering Mine Waste Rock.

Souza, Marina PhD (supervisor, C. Spencer) Understanding secular changes in Earth’s surface through deep time.

Surette, Allison PhD (supervisor, H.E. Jamieson) Investigation of mineralogy and sulfide oxidation for filtered tailings storage design - case studies from the Cantung W mine, the Mactung W Project, and the Macmillan Pass

Szczyrba, Laura (supervisors, P.K. Pufahl, R.P. Mulligan) Complex morphologic controls on nearshore hydrodynamics and erosion on sandy beaches.

Trott, McLean PhD (supervisors, M. Leybourne, D. Layton-Matthews) Application of Computational Methods to Data Integration and Geoscientific Problems in Mineral Exploration and Mining.

Masters of Applied Geology

Alparov, Aslan MSc (supervisor, Gema Olivo)

Bates, Ben MSc (supervisor Gema Olivo)

Okewole, Kehinde MSc (supervisor Matt Leybourne)

Zhou, Zizun (supervisor Chris Omelon)

MEERL Program

Grads are listed in the MEERL section!

MASTER OF EARTH AND ENERGY RESOURCES LEADERSHIP

The Master of Earth and Energy Resources Leadership (MEERL) program at Queen's University is a transformative program designed to equip mid-career professionals with the skills, knowledge, and leadership qualities needed to navigate the complexities of the natural resource sector. MEERL prepares students to address critical global challenges while fostering meaningful change within their organizations and communities.

Welcoming Dr. 'Lyn Anglin, MEERL's Academic Director

In 2024, we were thrilled to welcome Dr. 'Lyn Anglin as the new Academic Director of the MEERL program. A proud Queen's alumna (ArtSci'82, Geological Sciences), Lyn brings decades of leadership experience spanning the geoscience, mining, and public sectors. She was the inaugural Chief Scientist of Geoscience BC and later served as Chief Scientific Officer at Imperial Metals.

She's also wearing another hat as an instructor in the MEERL field course. As a geologist, she couldn't resist getting involved!



MEERL includes field visits to integrate geological, geoenvironmental, and natural resource sector concepts. Here the MEERL 2026 cohort, with new director Lyn Anglin (green hardhat), visit the site of the former Sullivan Mine, Kimberley, B.C.

Welcome to MEERL '26

In August 2024, 15 new students joined the MEERL program, bringing with them diverse perspectives and global experience. One such student is Numbi Kabale, whose journey reflects the spirit of MEERL's mission.

Numbi Kabale

Growing up in the Democratic Republic of Congo (DRC), Numbi witnessed firsthand the disconnect between the country's vast mineral wealth and the socioeconomic challenges facing its citizens. This motivated him to pursue a degree in accounting in South Africa, where he successfully earned his Chartered Accountant designation while working in the mining sector. He has held key leadership roles at Kamoto Copper Company and Glencore and now oversees governance and reporting as a director based in the DRC.

Numbi is passionate about creating positive change in the DRC's mining sector through ethical, sustainable development.

"I believe addressing the challenges of the DRC's mineral sector requires more than technical and financial expertise — it demands visionary leadership. Queen's University's Master of Earth and Energy Resources Leadership program offers a unique opportunity to gain the strategic insights, ethical framework, and multidisciplinary collaboration skills necessary to achieve this mission. I aim to leverage the knowledge gained from this program to promote sustainable mining practices, develop critical infrastructure, and cultivate local talent, driving equitable growth and poverty reduction in the DRC."



MEERL 2025 class at the Icefields Parkway. Christa Pufahl, co-instructor, is second from the left, and Jean Hutchinson snapped the picture!

A Transformational Gift from the Rose Family

In May 2024, the MEERL program received \$1.1 million gift from Mike Rose, Artsci’79, and Susan Riddell Rose, Sc’86. This transformative contribution will allow MEERL to expand its impact, deepen its industry ties, and reach new levels of innovation in resource education.

The gift will support strategic initiatives aimed at raising awareness of the program, attracting high-achieving students, building industry partnerships, and enhancing the overall learning experience. Operated under the Department of Geological Sciences and Geological Engineering, MEERL has already trained 55 professionals across the globe and continues to prepare leaders who can navigate complexity with clarity and purpose.



Annual MEERL alumni event, June 2025, Calgary Petroleum Club.

A Graduate Reflection



"I joined MEERL because I wanted something different from a traditional MBA. The interdisciplinary structure let me explore everything from hydrogen and renewable natural gas to mine closure and stakeholder engagement. The flexibility in projects meant I could dive deep into topics I was passionate about, and the diversity in our cohort truly enriched the learning experience. My advice to new students: take the time to explore, challenge yourself, and lean into the conversations — that's where the real growth happens." - Luke Skaarup, MEERL '22

MEERL Grads

2024 Grads

Alvarez Calderon
Diana Iris
Bates, Carter
Dembele, Oumar
Englot, Cole
McDonald, Bruce
Opok, Efua
Payne, Meghan
Rock, David
Slavinski, Heather
Switzer, Chris

2025 Grads

Andrew Copeland
Calvin Mitchell
Elin Brown
Jonathan Njerere
Joshua Exner
Kyla Penney
Pierre Alain Ndong
Ryan Boesche
Sara Savoie
Sydney Zacharias
Tyler Riewe
Umair Gagai

Were We Work, Learn, Live

The photograph below, by local photographer Allen Tian (allensgallery.ca) was posted to Reddit recently, to the relatively serene and apolitical Queen's University SubReddit. That's a whole story, social media and the world we live in. But the Queen's discussions tend to be about student life and concerns, about what is going on, or not, about desperate pleas for missed notes or assignment due dates. It is a community, a self-policing place where people go to ask, to help, to laugh, and occasionally rant. I liked the picture a lot and Allen graciously agreed it could go here.

Online communities are a thing, but for 45 years (with a few short stints elsewhere) this has been my community, my place to learn, then to work and learn, to meet new faces and occasionally great returning old ones. Recently, for example, a student wandered into my office with a toddler and I had to make the mental adjustment that the familiar face was 15 years older and a parent. The time gap, to me, as an instant. Being a professor is something like Groundhog Day or a science fiction film - the students stay the same age, and my reflection in the

mirror clearly indicates I'm getting older, though apparently not wiser.

The time gap for me looking at this picture in terms of my own story is also an instant. I wandered through those doors in the fall of 1980 expecting that geology would be a first year course, required in Engineering, and nothing more. And John Hanes did his magic and, well, I ended up a geologist and back here.

"Here" is this building, these halls, these classrooms, this elevator which apparently is getting replaced! Sure, my office is in Bruce Wing, but the grey stones of Miller are really where geology is to me.

Of course our community is also online and at PDAC and everywhere we meet to reconnect, to share stories, to remember moments. Do drop by to say hello to our lovely limestone home if you get the chance, or drop us a line at the least!

Rob Harrap, Science 86, GSSE Faculty
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From Noel James' photo archive:

A bedding plane view of numerous large Pliocene pecten (Sectipecten sp.) shells. Chatham Islands, New Zealand.

He writes "pity no one was around to eat all those lost scallops"

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If you'd rather not receive it, that's fine too!*