Inside:

Field Education around the world

In “Digger’s” own words

New Professor joins Earth Sciences

Cornel de Ronde – Joubin James Visiting Scholar
Chair’s Message

Welcome to this year’s newsletter—I hope you enjoy catching up on the news of our dynamic department and the whereabouts and doings of our esteemed alumni.

This is an exceptionally busy time of growth and renewal in the department. We are very pleased to welcome Professor Xu Chu to the department starting January 2018. Xu is a petrologist who combines field-based studies, experimental petrology, and numerical techniques in research projects ranging from the Appalachians, to Corsica, to the Tianshan in western China. We look forward to Xu building his petrology research group here and lending his significant field, experimental, and theoretical expertise to our geology undergraduate and graduate programs.

In other very positive news, this winter we are in the midst of hiring two new tenure-track faculty members in ore deposits and economic geology. In addition, there are ongoing searches at UT M for a tenure-track faculty member in geophysics and a lecturer stream faculty member in geosciences. We have stellar groups of applicants and we look forward to these four new faculty colleagues joining us with anticipated start dates of July 2018. In a university environment where resources are under significant strain and priorities are shifting, I was very pleased we were successful in convincing the administration of the need for these positions. The in-progress hires and our recent changes (hires of Professors Chu and Zajacz; move of geophysics from Physics to Earth Sciences) help define a renaissance in hard-rock geology and geophysics in the department. I consider these areas as the core strength and identity of UofT Earth Sciences/Geology and now we will be well-placed to re-establish our research and teaching excellence there with this new group of young faculty members.

Our programs continue to flourish at both the graduate and undergraduate levels. Our strong emphasis on field education continues with the on-going generous support of our Explorers Annual Fund for Field Education. This year these included trips to Oman, New Zealand, Montserrat, Scotland, in addition to our regular field camps to Whitefish Falls, Deep River, and Benny Belt. Without the generous financial backing of alumni and friends for the Explorers Annual Fund, these trips would not be possible. Most sincere thanks also to new and ongoing donations for all of our graduate and undergraduate student scholarships—this support drives our ability to recruit and maintain our remarkable group of student researchers. As described in the Newsletter, we add to these scholarships two new endowed undergraduate awards: the Joseph Michael Housam Memorial Leadership Award and the Ed Spooner Undergraduate Scholarship in Mineral Deposits Geology/Exploration.

Our research and teaching excellence continue to fuel our status as a Canadian and global leader in the geosciences. In the 2017 Quacquarelli Symonds (QS) University Ranking, UofT ranks 14th in the world in Earth and Marine Sciences and in the 2018 Times Higher Education ranking we are listed as 22nd globally in Geology, Environmental, and Earth & Marine Sciences; again UofT being top-ranked among Canadian universities in both rankings. In such comparisons we are competing with the major private universities (Harvard, MIT) and national institutes (ETH Zurich) of the world and now also a host of rapidly growing Asian institutes where vast resources are being invested in research and education. As a regular public university the donor support through endowed research chairs, student scholarships, and investment in our undergraduate field training is critical for keeping us competitive among our global peers.

Russell Pysklywec

New faculty appointment: Xu Chu

Xu Chu is a hard-rock petrologist who arrived in the department in January 2018 as the newest faculty member in our Department, following a postdoctoral appointment at Rice University. His PhD thesis was awarded by Yale University, where he studied the bedrock that underlies Connecticut and New Hampshire.

Xu integrates classic field-based geology with petrological experiments and thermodynamic and kinetic models, in hopes of better understanding rock history and the tectonic evolution of orogenic belts. Garnet is a mineral Xu uses to derive the pressure-temperature-time-chemistry trajectories that crustal rocks have followed in response to mountain building and slab subduction. He is continuing his research into the behavior of electrolyte geo-fluids, fluid transport, and interactions with solid rock under the extreme conditions of Earth’s interior. Xu is particularly interested in the roles of orogenic metamorphism and magmatism as carbon sinks and sources that have profoundly influenced the carbon cycle and paleoclimate on geological timescales. He also plans to use a piston-cylinder apparatus in the high-pressure lab to investigate mineral phase equilibria, inter- and intra-crystal diffusion, and mineral growth kinetics.

Welcome, Xu! We all hope that you have a productive and enjoyable time in our department.
The 2017 Joubin James Scholar: Cornel de Ronde, GNS Science, New Zealand

Cornel de Ronde (PhD 1991; Spooner) is a world leader in the investigation of submarine arc volcanoes and their associated seafloor hydrothermal systems. Cornel was invited to the Department of Earth Sciences by Sandra Kamo. Research into volcanic activity along intra-oceanic arc systems (a consequence of subduction of two oceanic plates) has gained increasing attention over the last 20 years, much of it due to Cornel and his team’s research initiatives. Undersea volcanoes represent the main conduits through which volatiles (CO₂, SO₂ mainly), released from the deep oceanic crust, return to the ocean floor. These volcanic emissions represent a significant component of the oceanic volatile budget and help control the composition of the oceans.

Cornel has been at the forefront of these investigations having organized or participated in ~30 research cruises, many using manned submersibles, remotely operated vehicles and autonomous underwater vehicles. He shared his knowledge through 2-day short courses on intra-oceanic arc submarine hydrothermal systems that included high definition video of active black smokers, ponds of molten sulphur, and globules of liquid carbon dioxide, as well as tropical fish swimming next to 300°C venting fluids! The course was held November 2-3 and attended by over 30 participants, including students from Laurentian, McGill, Windsor, Carleton and as far away as Memorial University. Cornel also gave two departmental seminars, one a synopsis of his research on submarine hydrothermal systems, and the other on his extensive investigations (including high-resolution bathymetry, seismology, magnetics, heat flow and water column measurements) of Lake Rotomahana on the North Island of New Zealand. Here, the famed “Pink and White Terraces” once lay. Considered at the time to be one of the eight natural wonders of the world and largely destroyed during the 1886 eruption of nearby Mt. Tarawera, they were partially re-discovered by Cornel and his team.

Cornel interacted with several of our faculty during his 6-week visit. Those who were present for his presentations, which also included members of the mining industry community and several emeritus professors, were fascinated by the topics presented, which were reflected in the numerous questions after each presentation. Thank you, Cornel, for enlightening us on your exciting research programme.

The Joubin James Visiting Scholar program began in 1980 with an invitation by Professor Tony Naldrett to Dr Desmond Prentorius of the University of the Witwatersrand to present his research at the Geology Department. The purpose of the program is to bring internationally recognized scholars to our department for a period of 1-3 months to share their research and foster new collaborations with our students and faculty. The award was created by a former graduate, Lloyd Tough Chandler (UT1948), who donated to our department shares of his uranium properties at Elliot Lake, acquired during the uranium rush of the 1950s. Revenue from the sale of the shares in 1977 provides annual funds for the programme. Chandler chose to name the award after his mentors, Dr Franc Joubin and Dr William James, both of whom are in the Canadian Mining Hall of Fame.

Sandra Kamo

Participants at a two-day Hydrothermal Systems short course offered by Cornel as part of his Joubin James Visiting Scholar activities.

Au Revoir Georges!

Georges Lacrampe-Coulomb Retires

As another academic year draws to a close, we wish to pay homage to our dear colleague and friend Dr Georges Lacrampe-Coulomb (aka GLC) who retired in September 2018. GLC had a long and highly productive career with the University of Toronto, joining the Stable Isotope Laboratory (SIL) in 1998 as a Senior Research Associate under Professor Barbara Sherwood Lollar. From that time, and in more ways that can be stated here, our GLC enriched the lives of innumerable students and Post-Docs at the SIL by sharing his knowledge and wisdom of the mysteries of isotope ratio mass spectrometry (IRMS) for hydrogen, nitrogen and carbon, and gas chromatography (GC) for a wide range of geologic gases and contaminants. GLC served as a key resource for scientific principles, procedures, and for his uncanny ability to undo instrument problems when they arose. But more important were his patience, kindness and willingness to help every person in the SIL group and the department. GLC also had infamous views on what constitutes “true” music, art, literature and even love. For example, he would observe us listening to a song we considered good music, and proceed to offer in-depth analyses of why we may wish to re-calibrate our tastes! Politics was another passionate realm where GLC offered clever, critical opinions, sometimes clashing with ours, but always piercing to the core issues while removing extraneous noise. We are all ecstatic for GLC in his well-earned life of retirement leisure in France with his darling Helene. However SIL members greatly miss his precise cologna and most importantly his thoughts and guidance in helping us become better scientists and people.

Miriam Diamond’s research highlighted at NSERC funding announcement

Canada’s Foreign Affairs Minister Chrystia Freeland announced $52.6 million in NSERC funding to 350 U of T scientists. Earth Sciences Professor, Miriam Diamond, represented research scientists, describing her work into toxic contaminants in our environment and emphasising the importance of public funding for researchers.

“The reason why so many Canadian researchers are effective in their fields of expertise is that the NSERC program provides us with relatively stable funding for exploration.”

https://www.miriamdiamond.com/lab.html

Stable Isotope Lab research earns a Guinness World Record!

“Oldest, non meteoritical, water”

On 13 December 2016, a team of scientists led by Barbara Sherwood Lollar (Canada) presented results at a meeting of the American Geophysical Union that showed the discovery of two-billion-year-old water 3 km below the Earth’s surface in Kidd Creek Mine, Timmins, Ontario, Canada. Ancient water that becomes trapped at this depth in the crust can preserve evidence of the conditions at the time it became trapped. Dissolved elements including helium, neon, krypton, xenon and argon allowed analysis of the age of the water, which is also around eight times saltier than sea water.

www.guinnessworldrecords.com
Donald H (Digger) Gorman at the age of 94 is the oldest surviving faculty member of the Department of Geology (now Earth Sciences) at the University of Toronto where he taught mineralogy until his retirement in 1988. He served in the Canadian Navy during WWII and in 1947 came to the University of Toronto to study mineralogy from the University of New Brunswick. He was the Head of the Department of Mineralogy, maybe in the back of it ‘The Department of Mineralogy’. It seemed quite interesting because here I am entering the Mining Building as a young guy from UNB, a very small university, and I am kind of a novice here in the big city at the great University of Toronto. Dr McKenzie, one to Dr Moore explaining a bit about my career and my interest in mineralogy, and the other to Dr Peacock thanking him for taking me and asking him that I would do my best. It is quite interesting because here I am entering the Mining Building as a young guy from UNB, a very small university, and I am kind of a novice here in the big city at the great University of Toronto. I will give it your best shot and that you are going up there to learn something. However, when I arrived, I had my eyes wide open as to just how advanced U of T was over UNB. I didn't (and couldn't!) object. I did so well in the courses that Professor Peacock said it wouldn’t be necessary for me to take the courses that I prescribe and that you will give it your best shot and that you are going up there to learn something. However, when I arrived, I had my eyes wide open as to just how advanced U of T was over UNB. I didn't (and couldn't!) object. I did so well in the courses that Professor Peacock said it wouldn’t be necessary for me to take the courses that I prescribe and that you will give it your best shot and that you are going up there to learn something.
Undergraduate Student Awards*

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<th>NSERC Undergraduate Student Research Awards</th>
<th>Bachelor of Science (BSc)</th>
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<td>Parham Adibian</td>
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<td>Sophia Alexandra Zamaria</td>
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<td>Yepin Zhang</td>
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*2016/17 academic year
Fundraising Update

Great students deserve great scholarships, and the Department has been working hard to increase the pool of funding available for awards. Here are some highlights:

Ed Spooner Undergraduate Scholarship
Professor Ed Spooner, who taught immensely popular courses in Economic Geology, retired last year, after 39 years in the department. His students and colleagues have endowed a scholarship in his name, which will be awarded to an undergraduate student taking a fourth-year course in Mineral Deposits Geology/Exploration.

Joseph Michael Housam Memorial Leadership Award
Joe Housam (BSc 1964; MSc 1965) was a popular student in the department—serving as President of the UGA and Social Secretary of AGES—and a brilliant young geologist. Tragically, he passed away this year, at the age of 30. The department has established an award in Joe’s memory, with gifts from his employer, Agnico Eagle Mines, his family and friends, and other donors. The scholarship will be awarded to third-year undergraduates demonstrating outstanding leadership qualities. The inaugural recipient(s) will be announced in the spring of 2018.

Dr. E.T. Tozer Scholarship
Edward Tozer was a paleontologist who spent decades exploring Canada’s North, and was the world’s leading authority on Triassic stratigraphy and ammonite taxonomy. This award was established in his memory by his children, Sally and Paul Tozer, to be awarded to an undergraduate student studying Triassic Stratigraphy or Paleontology.

Explorers Annual Fund for Field Education
Field study is an essential element of any education in the Earth Sciences. The Department is expanding this component of our programs, and offering excursions to geologically significant regions of the world. Our goal is to ensure that all students have access to these critical educational opportunities.

To help make this possible, we are turning to our alumni and friends. The Explorers Annual Fund for Field Education gives you an opportunity to support the field training of the next generation of geoscientists. Your contribution will help to make these re-charging opportunities accessible to more students.

We acknowledge, with thanks, the donations made to support students by the following individuals and organisations in 2017

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March 2017, marked the 40th anniversary of the Jack Satterly Geochronology Laboratory (JSGL). Originally established by Tom Krogh at the Royal Ontario Museum through a joint agreement with the Ontario Geological Survey, the JSGL re-established itself in the Department of Earth Sciences in 2004. Methods developed by Tom in the 1970s and 1980s positioned our lab as the world leader in the precise measurement of time using uranium-lead geochronology. Throughout its history, personnel of the JSGL have dedicated themselves to developing new methods and applications and improving precision.

Research partners such as the Ontario Geological Survey have provided continuous financial support for the JSGL, most recently through a 4-year $1M collaboration. A new partnership with Laurentian University’s successful ‘Canada First Research Excellence Fund’ (CFREF) ‘Metal Earth’ grant, seeks to better understand the nature and origin of metal endowment in the Canadian Shield. The JSGL will provide critical geochronological and isotopic support for new, craton- and transect-scale mapping initiatives. This 7-year multidisciplinary project is funded jointly by CFREF and industry. Mike Hamilton is on the Scientific and Technical Management Committee for Metal Earth. It is through such productive collaborations that the JSGL has been able to sustain itself.

Don Davis presented a paper at the 7th International Conference on Clays in Natural and Engineered Barriers for Radioactive Waste Confinement in September at Davos, Switzerland. It gave results of U-Pb dating of calcite veins (photograph) a through 1 km deep section of the carbonate platform beneath the Bruce nuclear power station. The results support the hypothesis that the deepest part of the section, where a repository has been proposed, has been stable to groundwater movement for the past 430 Ma. Veins concentrated at surface throughout southern Ontario record ages of around 100 Ma. We propose that the New England hot spot, which passed beneath the region at 125 Ma, caused uplift and erosion to the presently exposed level at around 100 Ma. These data, along with other research, demonstrate that deep-level (~400 m) clay-rich strata can be suitable hosts for confinement of radioactive waste even during major tectonic and seismic events.

A February field trip, led by undergraduates Danielle Shirriff and Josh Nguyen and Professor Emeritus Ed Spooner, took a party of twelve people to Montserrat in the Caribbean. This island has been the site of major eruptions of the Soufriere Hills volcano (SHV) since 1995 when the central volcano was destroyed and which ultimately led to over 50% of the original 10,500 residents abandoning the island. A further trip was then made to a neighboring island, Antigua, to see volcanic activity associated with an eroded and long abandoned 28 my volcanic arc. On Montserrat, the Soufriere Hills volcano is dominated by lava dome development producing debris aprons, pyroclastic flows, lahars and ash falls. The volcano is offshore limits within a police-enforced Exclusion Zone. However our group went in twice, once led by the Director of the Montserrat Volcano Observatory (MVO), and the second time by a MVO volcanologist. A guided tour of the MVO showed the group one of the most sophisticated volcano monitoring systems in the world.

The SHV has been erupting episodically since 1995 and is presently in Pause 5. It has inflated by about 20 cm from GPS measurements. The catastrophe for the residents, which even included losing their airport, has been immense. Visitors are urged to visit for exceptional adventure tourism and to spend some money!

High points of our subsequent trip to Antigua included an exceptional columnar jointed lava dome, overlying sediments packed with echinoids, giant forams and silicified palm trunks; a planation surface indicating about 400 m of vertical uplift and finally, excavated jadeite axes probably originating in the Matagua plate boundary in Guatemala—the source of Mayan jade—about 2700 km away!

The field trip was one of the most exceptional that I have ever been on and went very smoothly. Space does not permit a full acknowledgment of all the people who helped us but we would like to mention: our Department and the Dean’s Office, FAS (International Programs) for excellent financial support, Rod Stewart (Director) and Adam Stinton (volcanologist) from the MVO for their excellent guidance.

Ed Spooner

Graduate Students at Killarney

This year, the Grad Trip took place from October 20-22 in Killarney Provincial Park.

We had a great turn out for the trip, including new and returning grad students, faculty and staff. We were lucky to have warm and sunny weather that complemented the beautiful fall colours in the park.

The trip was led by Professor Mike Hamilton and Emeritus Professor Pierre Robin (front row centre in photo). On the drive up, we stopped to look at Ordovician carbonates, Precambrian deformed gneiss and the French River that follows a 590 Ma old basaltic dyke, at least 100 km long, that was eroded out by glaciers to form a gorge. Throughout the trip we saw a variety of geological features, deformed gneisses and quartzites, and enjoyed the beautiful scenery of the region.

We were also able to take advantage of some of the hikes in the area, including the Chikinishing Trail with stunning views of Georgian Bay. A group also hiked to “the Crack” one of Killarney’s most well known sights. On this hike we even saw a bear!

In the evenings, we relaxed by a campfire with discussions of geology and favourite superheroes over roasted marshmallows, together with card games, lots of laughs and songs.

Liz Philips

Field Trip to the islands of Montserrat and Antigua

The Soufriere Hills andesitic volcano, Montserrat, from the west in Zone V of the police-enforced Exclusion Zone. The image shows a major flow route for pyroclastic flows and lahars (centre left); two pale olive areas of strong hydrothermal alteration (left centre); and legally abandoned houses on the edge of Plymouth. Photo: Yining Wang.

Sandra Kamo was an Invited Keynote Speaker at the 14th Biennial SGA 2017 Meeting (Society for Geology Applied to Mineral Deposits) in Quebec City in August. She presented her work on the timing and development of Ni-Cu-PGE deposits at Raglan, Quebec, and the Bushveld Complex, South Africa. In both cases, refinements in U-Pb geochronological methods led to unprecedented levels of precision and accuracy, which in turn led to an improved understanding of the development of the mineral deposits. At Raglan, the data suggest a sharp onset of komatitic volcanism and mineralization at ca. 1882 Ma, an identical age to that for the Thompson district, suggesting that craton-scale processes drove mineralization. Results from the enormous Bushveld layered intrusion, with increased age precision by an order of magnitude over what is typically reported, resolved the ages of individual peridotite layers. This demonstrates an age inversion in part of the sequence that cannot be explained by the prevailing theory of continuous cumulate aggradation, and instead supports development by silt intrusion.

Sandra Kamo

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The Soufriere Hills andesitic volcano, Montserrat, from the west in Zone V of the police-enforced Exclusion Zone. The image shows a major flow route for pyroclastic flows and lahars (centre left); two pale olive areas of strong hydrothermal alteration (left centre); and legally abandoned houses on the edge of Plymouth. Photo: Yining Wang.
Iceland & Scotland

“Go to the mountains and read the immeasurable course of time that must have flowed from these amazing operations [of the Earth] which the vulgar do not see and the learned seem to see without wonder.”


Scotland is particularly important for the science of geology. The angular unconformity at Siccar Point is arguably the most famous rock exposure on the planet as it is linked to James Hutton and his thoughts about deep time. George Barrow interpreted zones of progressive metamorphism from maps he produced in the Scottish highlands. Thin sections were produced first to look at Scottish rocks, analogue modeling was done first to recreate complex geologic structures seen in the North-West highlands, and the idea of a biozone was first conceived using fossils from the Southern Uplands. George Barrow interpreted zones of progressive metamorphism from maps he produced in the Scottish highlands. Thin sections were produced first to look at Scottish rocks, analogue modeling was done first to recreate complex geologic structures seen in the North-West highlands, and the idea of a biozone was first conceived using fossils from the Southern Uplands. George Barrow interpreted zones of progressive metamorphism from maps he produced in the Scottish highlands. Thin sections were produced first to look at Scottish rocks, analogue modeling was done first to recreate complex geologic structures seen in the North-West highlands, and the idea of a biozone was first conceived using fossils from the Southern Uplands. George Barrow interpreted zones of progressive metamorphism from maps he produced in the Scottish highlands. Thin sections were produced first to look at Scottish rocks, analogue modeling was done first to recreate complex geologic structures seen in the North-West highlands, and the idea of a biozone was first conceived using fossils from the Southern Uplands. George Barrow interpreted zones of progressive metamorphism from maps he produced in the Scottish highlands. Thin sections were produced first to look at Scottish rocks, analogue modeling was done first to recreate complex geologic structures seen in the North-West highlands, and the idea of a biozone was first conceived using fossils from the Southern Uplands. George Barrow interpreted zones of progressive metamorphism from maps he produced in the Scottish highlands. Thin sections were produced first to look at Scottish rocks, analogue modeling was done first to recreate complex geologic structures seen in the North-West highlands, and the idea of a biozone was first conceived using fossils from the Southern Uplands. George Barrow interpreted zones of progressive metamorphism from maps he produced in the Scottish highlands. Thin sections were produced first to look at Scottish rocks, analogue modeling was done first to recreate complex geologic structures seen in the North-West highlands, and the idea of a biozone was first conceived using fossils from the Southern Uplands. George Barrow interpreted zones of progressive metamorphism from maps he produced in the Scottish highlands. Thin sections were produced first to look at Scottish rocks, analogue modeling was done first to recreate complex geologic structures seen in the North-West highlands, and the idea of a biozone was first conceived using fossils from the Southern Uplands. George Barrow interpreted zones of progressive metamorphism from maps he produced in the Scottish highlands. Thin sections were produced first to look at Scottish rocks, analogue modeling was done first to recreate complex geologic structures seen in the North-West highlands, and the idea of a biozone was first conceived using fossils from the Southern Uplands. George Barrow interpreted zones of progressive metamorphism from maps he produced in the Scottish highlands. Thin sections were produced first to look at Scottish rocks, analogue modeling was done first to recreate complex geologic structures seen in the North-West highlands, and the idea of a biozone was first conceived using fossils from the Southern Uplands. George Barrow interpreted zones of progressive metamorphism from maps he produced in the Scottish highlands. Thin sections were produced first to look at Scottish rocks, analogue modeling was done first to recreate complex geologic structures seen in the North-West highlands, and the idea of a biozone was first conceived using fossils from the Southern Uplands. George Barrow interpreted zones of progressive metamorphism from maps he produced in the Scottish highlands. Thin sections were produced first to look at Scottish rocks, analogue modeling was done first to recreate complex geologic structures seen in the North-West highlands, and the idea of a biozone was first conceived using fossils from the Southern Uplands.

New Zealand

Support from the Dean’s ICM fund and the departmental Explorers Field Education Fund enabled students (led by Professors Russell Pysklywec and Grant Henderson) from the ESS445-Global Tectonics class to travel to New Zealand during the 2017 winter reading week to explore the active tectonics of the North Island. Since New Zealand straddles the Australia-Pacific plate boundary (a dextral transpressive system), it shows a remarkable diversity of geology that reflects active plate tectonics. One of the highlight field stops on the trip included White Island (Whaakari), an active andesite stratovolcano island 50 km offshore in the Bay of Plenty and at the northern extent of the Taupo Volcanic Zone (TPZ). It is the most active volcano in New Zealand and the steaming fumeroles and main crater vents were sufficiently active that respirators were required to assist breathing in the SO₂-rich environment. At the southern end of the TPZ, the group hiked the Tongariro crossing to explore the massive volcanic complex of Mount Tongariro and Ngaruhoe, a less active andesitic stratovolcano formed through a sequence of eruptions over the last ~275,000 years. In between, a visit to the Wahi Gold Operation (owned by OceanaGold Corp.), including the Martha pit and open examination of the operation’s regional drill core, allowed the group to tie the concepts in tectonics to economic geology related to the formation of the Epithermal Au-Ag deposits. These, and many other field stops throughout the field trip allowed students to understand the surface thermal, compositional, and structural manifestation of the North Island crust within what is essentially an active back-arc environment of Pacific plate subduction—plate tectonics at work!

Russ Pysklywec

Oman, Arabian Peninsula

A once-in-a-lifetime opportunity to study the Northern mountains in Oman was funded by the Dean’s office. Oman has the best-known ophiolite (a piece of oceanic crust) with exposed pillow basalts and Moho (crust-mantle boundary) which 15 students from the beginner and advanced structural geology classes where able to explore in November 2017. But that’s not all this dry country has to offer. Rolling down sand dunes gives more meaning to cross-bedded sandstones, karst features—with caves one can swim and crawl into—become a fun classroom, and mullion structures in context are better than a photo on a screen. In addition, our outfitters shared with us wonderful food and local culture, and showed us the grandiose mosque and beautiful old market in Muscat.

Charly Bank

Funding from the University and through donations to the Explorers Funds have made a meaningful impact on the future prosperity of Canada and the natural resources sector around the world by providing field education excursions to Earth Sciences students. To learn more about the funds and how to help visit https://donate.utoronto.ca/earth sciences
From the Archives

A life of adventure: Edward John Chapman, Our first Professor of Geology

Gradually drifted into Algiers which was held by France at the time only by constant fighting. He entered the army of occupation and took part in several skirmishes in a hotly-contested passage through the Atlas Mountains in Algeria. He was severely wounded and hospitalized. His soldiering career ended when he was brought out of the service by a relative.

Back in England, he studied Civil Engineering and worked for a time on railway and water problems. But professional work opportunities turned slack and so he applied for the vacant chair of Mineralogy at University College, London, and was successful, having made a favourable impression with a preliminary course of lectures he had been called upon to give. At University College he published a small work on Determinative Mineralogy and many papers. He relinquished his post in 1853 and immigrated to Canada to take up the new Chair of Mineralogy and Geology in Toronto. He arrived here in October of 1853 after nearly a month’s voyage on one of the earliest Canadian steamships, the Sara Sands. This vessel was lost a year or two later in the Mediterranean where she served as a troop-ship.

Professor Chapman was only 32 years old when he reached Canada. Apparently some of his thirst for adventure had been slaked because he remained here until he retired in 1895 when he returned to England to live near Hampton Court, London, on the Thames, until he died in 1904.

Chapman received his PhD from the University of Göttingen in 1862 and in 1867 the LLD degree was conferred on him by Queen’s University, Kingston. He was appointed Head of Mining Engineering in the School of Practical Sciences (now Applied Science and Engineering), when the School began instruction in 1878, but continued to occupy the Chair in University College.

During his tenure in Toronto, Chapman published a number of text-books, including "Minerals and Geology of Canada", "Blowpipe Practice" and "Assaying" plus a considerable number of publications ranging from mineralogy to paleontology (he was responsible for teaching the full range of geological subjects). He also published 30 to 40 reports on mineral occurrences in Colorado and in Canada, extending from Lake Superior to Cape Breton. He was one of the 80 original members of the Royal Society of Canada.

Although normally an amiable and cheerful person, Chapman could express himself forcefully when his principles were challenged. On one occasion he assailed the President-designate of University College “in the most violent language” for thrusting himself, in Chapman’s opinion, onto the Board of the School of Practical Science. A colleague was heard to remark in the course of forecasting the outcome of the vote on a hotly-disputed academic issue: “There’s no counting on Chapman. He’ll vote as he thinks right”.

He was an accomplished fencer and enjoyed describing a bout he had had at the London Fencing School with Prince Louis Napoleon, later Napoleon III. He was a talented amateur actor and once volunteered on the spur of the moment to play Laertes in a production of Hamlet, until a dispute arose in the company. Chapman had a number of poems published in Canada and he continued to write poetry after his retirement. An early work relates his impressions of the Canadian bush from the vantage of a swiftly moving canoe:

A short video can be viewed at this link: https://youtu.be/LF2jWOFwyeo
The Emeritus Corner

SEG Penrose Gold Medal awarded to Emeritus Professor Steve Scott

On September 19, 2017 at a banquet in Beijing attended by 300, the Society of Economic Geology (SEG) presented its highest honour, the Penrose Gold Medal, to Steve Scott in recognition of his outstanding and multifaceted contributions to the science and profession of economic geology throughout his career. The medal was presented by SEG President Laurence Robb following the citation by Jan Peter, one of Steve’s former graduate students and now a senior scientist at the Geological Survey of Canada. In his citation, Jan pointed out that, in addition to Steve’s research accomplishments for which he has received many honours, he chaired Geological and Mineral Engineering and, later, Geology (now Earth Sciences) at the University of Toronto.

In his acceptance, Steve commented what a wonderful honour, first to be awarded the Penrose Gold Medal, and then to receive it at China University of Geosciences in Beijing where he has taught as an honorary professor and has many friends. In fact, he has a Chinese name – Gao Di Wen (“big intelligent plant”) – given to him by CUGB senior professor and academician Mo Xuenxue.

Many in attendance were former students and a professor, Tony Naldrett, a former awardee. Both Jan Peter’s citation and Steve’s acceptance will be published in SEG’s journal “Economic Geology”.

Third edition of “Thermodynamics of Natural systems” published!

The third edition of Greg Anderson’s highly-regarded book “Thermodynamics of Natural Systems” was released by Cambridge University Press in June, 2017. Key features of this new textbook are summarized by the publisher: “Fully updated, this streamlined new edition begins at an elementary level, explaining all necessary concepts via a simple graphical approach with more advanced chapters from the second edition provided online. The importance of field observations is emphasized, using new examples to highlight the connection between the idealized theory of thermodynamics and real-world geological and environmental problems. Exercises with answers are provided at the end of each chapter, encouraging students to test their own understanding of the material”. Our congratulations to Greg!

The Best Little Ore House In Teck


As many readers will know, Norman Keevil (BSc 1959) is an alumnus of the Geological Engineering program at U of T, leading eventually to a PhD from UC Berkeley. His book is in part a family memoir, partly an autobiography, partly a corporate history, partly a history of mining in Canada, and partly a Who’s Who in the mining world. This rather mixed approach is nevertheless written extremely well and reads very compellingly, covering the period from the early 1900s until 2005, particularly since the 1950s. It’s a real page turner.

The book traces the origins of Teck Corporation from the mining of smaller gold/silver/copper ore deposits in northern Ontario in the early 1900s to its becoming one of the largest diversified mining companies – precious metals, base metals, metallurgical coal, oil (for a while), niobium, fertilizers and so on – with interests not only in Ontario, Quebec, Alberta and British Columbia but also in Alaska, Peru and Chile.

Characters abound in this book; the Preface giving names and employment status of almost one hundred people in order of appearance – prospectors, developers, miners, geologists, geophysicists, geochemists, financiers, promoters, lawyers, politicians, entrepreneurs, academics, and a few rogues along the way. A comprehensive index is also provided to navigate the complexities of the book. Readers will be gratified to see the names of Digger Gorman, Bill Gross, and Gordon Smith mentioned as influential Geology faculty members at U of T who early on piqued Norman Keevil’s interests in mineral genesis, ore deposits and economic geology.

The book documents the ebb and flow (and sometimes interdependence) of: prospectors and developers; financiers and companies; miners and refiners; free marketers and socialist politicians; shysters and straight shooters; and above all ore reserves and exploration strategies to find more of the same. The pervasive theme of the book is the need to keep on exploring for minerals as reserves are steadily and surely depleted by economic demands, a message that most earth science departments would support unreservedly in their quest for students. Norman Keevil puts his money where his mouth is – all royalties accruing from the sale of his book will be donated to support two charities that provide programs that raise awareness among students and the general public about the importance of rocks, minerals, metals and mining. So please support this worthy cause; buy the book; you won’t be disappointed.

Goff Norris

On your Ores. Building a Mining Company, One Stone at a Time

Professor Don Davis and Emeritus Professors John Westgate, Fried Schwertner and Dick Bailey at the Faculty Club Pub at a farewell lunch for Jim Mungall.

President Robb presenting Steve with SEG gold medal.

A group of distinguished former members of our department. Left to right front row: Jan Peter, Steve Scott, Joan Scott; back row: Bruce Gemmill, James Macdonald, Neil Banerjee, Jeremy Richards, Tony Naldrett, Anne Thompson (Brackman), Eric Grunsky, Chua Li. Missing: Stephen Barnes.

Norman B. Keevil, BASc 1959
Alumni News
Oğuz Göğüş Receives Young Scientist Award

Oğuz H. Göğüş (PhD 2010; Pysklywec), otherwise known as Oz, is currently an Associate Professor at the Eurasia Institute of Earth Sciences, Istanbul Technical University in Turkey. On December 17, 2017 he received the Young (<40 years) Scientist award from the Turkish Academy of Science (TÜBA). The award was presented to him by Turkish president Erdogan on Dec, 15 2017 (see photo) and the ceremony took place at the presidential palace in Ankara with participation of the minister of education, university rectors, academics and the families of the awardees. The award includes a ~ CAD$30,000 prize for three years to support research activities (e.g. conferences, field studies, etc) of the awardee and his students. The award is considered to be one of the most prestigious for young scientists in Turkey in which the winner is selected by an expert committee drawn from a wide spectrum of scientific disciplines.

Since his PhD he has been continuing his research in quantitative modelling of lithospheric-crustal scale processes, such as rift basin formations, plateau uplifts, and melt production in volcanic fields. Before his faculty appointment at Istanbul Technical University (2013) he followed postdoctoral work at the University of Leeds (UK) and Uni Roma Tre (Italy). Oz completed a research project on the lithospheric deformation of the Anatolian plate and Uni Roma Tre (Italy). Oz completed a research project on the lithospheric deformation of the Anatolian plate for which an award of ~ CAD$80,000 from the Turkish Research Council was granted and three MSc students graduated under his supervision. Over the last four years he has produced several papers in high ranking journals, Geology, Tectonics and Nature Communications. The work in Nature (Göğüş et al., v. 8, 16 Nov 2017) was conducted in collaboration with Russ Pysklywec while he was on his sabbatical in Turkey. Their modelling based work suggests the hotter portion of the deeper earth (mantle) has warmed up the top ~ 40 km of Central Anatolia while surging magma bodies are pushing up the surface locally. Such an event is caused by the 'dripping' of the lithosphere (crust and the upper mantle) since the last ~ 10 Ma. The dripping earth process may be common in the hotter earth environment of Archean times (4 to 2.5 Ga).

Ted Reeve Receives PDAC Distinguished Service Award

Ted Reeve (PhD 1972; Anderson) worked as a geologist in the United States, Chile, Australia and other parts of the world before returning to U of T and completing an MBA in 1979. In his new career as a mining analyst in Toronto, he became known internationally for his authoritative reviews of hedging trends in the gold mining industry.

In 2002 Ted founded Haliburton Mineral Services to become an independent researcher and consultant. He has served on the Board of Directors of junior mining companies involved in exploration and development worldwide and began devoting much of his free time to help PDAC draw high quality speakers and exhibitors to its annual convention.

Did you know?

We’ve been teaching earth sciences at U of T for 170 years!

Stewart Jackson (see last year’s issue number 26) who was recommending investment in Pine Point mines which had made a major lead-zinc discovery. The stock went from 70c to $30 in two years. While Stu invested his entiresummer salary in the stock, David, regretfully in hindsight, held off. However he became hooked on the immense possibilities that investment in the mining stock market could bring.

The first half of his career he worked for Cominco, on and off from being a Mining Consultant. During this time he experienced an almost-drowning off the coast of Labrador when he and three colleagues were in a canoe when a storm blew up, and later in BC when the helicopter he was in crashed! From 1983 onwards he returned to being a consultant and remained one for the rest of his career. He became a promoter of mining properties, raising venture capital and becoming part of various mining syndicates. This activity, which is still going on, involved staking properties, optioning them to junior mining companies for shares, cash payments, and exploration work. During this time he formed a monthly newsletter Market Talk which evaluated junior mining companies for 50 clients over a five year period. Throughout his consultancy he organized twelve exploration limited partnerships, eight of which were financially positive. His greatest exploration achievement was the discovery of the Kerness South copper/gold deposit in BC in 1984 which was mined from 1999 to 2011. Only 1% of exploration geologists can be credited with finding a commercially viable deposit!

Now retired in Surry BC with his wife Mavis, he is still involved in the Penny Mining stock market and continues to send out investment advice! He also enjoys sketching, especially portraits of friends and colleagues, a pastime he has enjoyed throughout his career.

Henry Halls
Barrie Clarke (BSc 1964, MA 1965; Fawcett)

The 1977 Geological Association of Canada meeting in Kingston, the Career Achievement Award of the Volcanology and Igneous Petrology Division was presented to Barrie Clarke for his lifetime scientific contribution to the fields of Volcanology and Igneous Petrology.

Earlier in April, Barrie hit the newspaper headlines by discovering the exact provenance of the gabbro or “black granite” headstones in a Halifax cemetery housing victims of the Titanic. The investigation was prompted by the need to repair damaged gravestones. We now have the final conclusion of a story that was first featured in our Alumni News for 2013 (Issue 22). At that time a new U-Pb age on 1935 air photos, it was possible to further narrow the southwestern New Brunswick. With the combination models, employs a host of technologies including, 4D stratal containment and its conformance with reservoir monitoring the CO₂ provide a groundwater monitoring capability. FRS has a 500 m deep injection well that permits small containment with a strong focus on monitoring carbon storage in geological strata. Geological storage of CO₂ is a necessary action if Canada is to achieve its Paris climate commitments. The industrial market for carbon utilization, both for enhanced petroleum recovery and conversion to industrial products is small in comparison to the anthropogenic greenhouse gas emissions that need management.

Kirk Osadetz
(ConocoPhillips)

Kirk is a member of the CMCRi team, led by Prof. Don Lawton (UofC), that constructed the Field Research Station (FRS), 165 km SE of Calgary. CMC built the FRS in conjunction with the University of Calgary on lands donated by Cenovus Energy with the support of the Alberta and Federal governments. The purpose of the FRS, which opened this past October, is to accelerate research and development, leading to improved technology, for the safe long-term storage of CO₂.

FRS has a 500 m deep injection well that permits small amounts of gaseous CO₂ to be injected into Cretaceous sandstones at 300 m. The injection well is offset by a pair of deep (300 m) monitoring wells that employ various geophysical and geochemical techniques to detect and characterize the lateral and potential vertical migration of the injected CO₂ plume. This ensures the detection of a leaking CO₂ storage complex prior to it contaminating the groundwater protection zone. Shallow wells (<150 m) provide a groundwater monitoring capability.

Monitoring the CO₂ plume’s evolution after injection, its stratal containment and its conformance with reservoir models, employs a host of technologies including, 4D seismic surveys, digital acoustic sensing (DAS) cables, electrical and magnetic surveys and geochemical tracers. If you or anyone you know is interested to be involved in the FRS program and facilities, please contact either Kirk (kirk.osadetz@cmcgh.com) or Don (don.lawton@cmcgh.com).

Kirk Osadetz, Henry Halls

Brad Hayes (BSc 1978; PhD 1982 U. Alberta)

Last November I had the good fortune to return to U of T to give a guest lecture, after many years away in Western Canada. While I spoke to an Engineering class on St George campus, I toured around Erindale (just can’t bring myself to think of it as UTME) as well as cool on both campuses to see the old buildings I had classes in as well as all the new buildings in between!

I was recruited by Shell Canada for the summer after third year, and discovered that I wanted to do geology in the oil patch. After my PhD and 15 years with operating companies, I joined Petrel Robertson Consulting, where 21 years later I’m co-owner and President. I’ve enjoyed the challenge of understanding sedimentary basins around the world, applying the tremendous knowledge geoscientists have developed in the Western Canada Sedimentary Basin—probably the best-studied major basin in the world.

Highlights of my career include: discovering significant gas pools in NE BC with Canadian Hunter; working on field development in the giant Hibernia oil field (offshore Newfoundland) since first oil in 1997; and interpreting core in New Zealand, Tierra del Fuego (southern Chile), Kazakhstan, India, Venezuela, and in all major provincial core laboratories in Canada.

I’ve been very active in volunteer work for technical and professional societies – with CSPG (Canadian Society of Petroleum Geologists) throughout my career, and more recently with APEGA (Association of Professional Engineers and Geoscientists of Alberta), where I’m a Councillor, and with the Canadian Society for Unconventional Resources (CSUR), where I’m on the Board and am Outreach Director. A big push right now is to reach out to student groups, regulators and politicians to disseminate scientifically accurate information about unconventional oil and gas development and the associated environmental issues – particularly concerning hydraulic fracturing.

Henry Halls

Brad Hayes

Jeremy Richards (MSc 1986; Spooner)

At the U of T I did a Master’s degree between 1983–1986, an exciting if very competitive time in the Geology Department, when the triumvirate of Ed Spooner, Steve Scott, and Tony Naldrett and their students discovered sea-floor vents, Archean gold, and spied for the KGB (not necessarily in that order or in fact). I was in the Spooner camp, and perversely worked on Proterozoic copper. After a couple of false starts I succumbed to the allure of gold, and did my PhD with Ian Campbell at the Australian National University, studying the Porgera gold deposit in Papua New Guinea, finally getting my doctorate in 1990. After a post-doc with the late Rob Kerrich at the University of Saskatchewan (1990–1992), I returned to copper during my first faculty position as a lecturer at the University of Leicester, UK (1993–1997). Working initially in the Atacama Desert of northern Chile and then the Puna of Argentina, I learned about porphyry copper deposits and their relationship to arc tectonics and volcanism. Then, after moving back to Canada to join the University of Alberta in 1997, I was invited to visit Iran and Turkey by Rio Tinto in the early 2000s, and developed a keen interest in the region and its geology. My research is now broadly focused on the Tethyan orogen, with past and current projects spanning Turkey, Iran, Pakistan, China, and Indochina. This fascinating region includes everything from subduction- to collision-related tectonics and ore deposits, interesting food, wonderful people, history, and scenery, but a shortage of alcohol (unless one counts weak Chinese beer or mao-tai, or Iranian arak).

In 2016 I was awarded a Canada Research Chair in Metallurgy at Laurentian University, and so returned to Ontario in July 2017. While continuing my Tethyan research work, I will also be participating in Laurentian’s new Metal Earth CFREF project, which aims to understand the origins of metal endowment in Precambrian terranes. In this case, maybe the present (or well-preserved recent past) can help unravel some of the complexities of the messed up Precambrian?

Jeremy Richards

* A CFREF (Canada First Research Excellence Fund) grant is awarded to an institution to support a large-scale strategic research initiative led by the institution, as opposed to a grant awarded to an individual researcher or researchers to support a research project or projects.
Nicole Januszczak (PhD 2004; Eyles)

Nicolle passed through our department in February when she gave a talk entitled “Diamond Exploration in Canada”. She is now the Targeting and Review Manager for De Beers Group of Companies in Canada where she is responsible for the targeting and delivery of new economic diamond deposits. Nicolle has been with the De Beers Group of Companies since 2005. She obtained MSc and PhD degrees at the University of Toronto studying Cenozoic glaciation of Antarctica and Neoproterozoic “Snowball Earth” glaciation. Nicolle is a Professional Geoscientist with the AGPO. She enjoys sharing her enthusiasm and talking to students about the challenges, rewards and excitement of being an Exploration Geoscientist.

Henry Halls

Hawkin Hwang (MSc 2015; Wortmann)

After a spell with a local software company, I managed to get a job with Dahrouge Geological Consulting as a junior geologist. In the past 8 months, my job has taken me to the James Bay Lowlands, Sub-Arctic Quebec, the Quebec part of the Grenville Province, Northern Ontario, Northwest Territories and North Carolina. I’ve prospected, logged core, mapped as well as struggled through mud pools on a side-by-side, carried a 50 lb backpack in addition to a 25 lb rock saw and rode helicopters to and from work. I even found time to use some of the programming skills I learnt from my previous job to speed up the work flow within the company. Some of these were expected, but more challenges were unexpected. I have a solid academic foundation, courtesy of the many amazing mentors I’ve had while in the Department. But I also had to learn much about the courtesy of the many amazing mentors I’ve had while in the Department. But I also had to learn much about the reality of exploration geology by diving into the deep end of the department. But I also had to learn much about the reality of exploration geology by diving into the deep end of the department. But I also had to learn much about the reality of exploration geology by diving into the deep end of the department.

Phoebe Chan (PhD 2016; Jochen Halfar)

A stellar year for Phoebe! Two papers published, one in G-cubed and the other in Nature Communications; awarded the 2017 Best Early Career Scientist Oral Presentation Award at the Ecosystem Studies of Subarctic and Arctic Seas meeting in Tromso, Norway, and the 2016 Chemical and Physical Sciences Best Paper Award at UTM. A further feather in her cap was that she was awarded the VISTA (Statoil and Norwegian Academy of Science and Letters) 3-year Postdoctoral Fellowship, valued at approximately CAD $370,000 which covers salary, analytical and field research, and overhead costs. This spring she will take up residence in Bergen, Norway where she will be working jointly with the University of Bergen and the Bjerknes Centre for Climate Research. Our congratulations!

The Nature Communications paper on which she is lead author (https://www.nature.com/articles/ncomms15543) uses Barium-to-Calcium trace element ratios (Ba/Ca) in crustose coralline algae for the first time as a high-resolution proxy for marine productivity. This research further builds upon the Halfar et al., 2013 PNAS paper (looking at multicientennial records of Arctic sea-ice melt) by examining changes in phytoplankton productivity associated with the decline in Arctic sea-ice. The results presented show a broad relationship between ocean productivity and natural modes of climate variability superimposed upon a long-term trend of anthropogenic warming demonstrating a step-wise increase in productivity from 1910 to present that is unprecedented in the last 363 years. Increasing phytoplankton productivity is expected to fundamentally alter marine ecosystems, especially since seawater warming and freshening is projected to intensify over the coming century.

Phoebe Chan, Henry Halls

Photo: Phoebe with Claudiu Gradelani, Chair, Dept of Chemical and Physical Sciences, UTM

Joe Housam (1987 – June 2017)

The Department lost an exceptional member of our community when Joe Housam passed away in June.

Joe completed a BSc in Geophysics here in 2014 and a MSc in my geodynamics research group in 2015 and he was a student with a genuine academic curiosity and a passion for geoscience work. More than this, though, Joe was a singularly dynamic individual with an incredibly engaging, positive, and fun-loving personality that made him a good friend to all in the department—students, staff, and faculty, alike. As such, Joe was always in the middle of the social life of the department (incriminating photos from the famously out-of-control 2011 student Christmas party are still filed in the Chair’s office…), and took on a leadership role, for example serving as President of our Undergraduate Geology Association.

As a grad student Joe did a project on the complex tectonic evolution of the Eurekan orogeny in Canada’s high arctic that mixed computational modelling with geologic/geophysical analyses. He presented his MSc work at the AGU Fall annual meeting in San Francisco in December 2015. Even though he was a MSc student, he was fearless about approaching the leading figures in geophysics at the meeting in discussion on his work, and regaled us with these (and many other) stories at the research group’s raucous annual AGU dinner at the Tadich Grill.

With support from many of his friends, family, and departmental colleagues, as well as a major donation from Agnico-Eagle, we have been able to establish the Joseph Michael Housam Memorial Leadership Award in Earth Sciences. This major endowed award in Joe’s memory allows us to recognize and reward the outstanding leadership among our active student body.

I’m sure Joe would be very pleased to know of this recognition for our student leaders and it will be a tremendous way to continue to remember what Joe meant to all of us in the Department and University.

Russ Pysykiewicz

Rolf Ludvigsen (1944 – December 2016)

Rolf came highly recommended to the Department as a brilliant young scientist with an intense interest in invertebrate fossils, notably with a concentration on early Paleozoic trilobites and biostratigraphy of western and northern Canada.

His credentials were impeccable, but with one caveat that was variously enunciated in careful phrasing by referees: “outstanding paleontologist but somewhat prickly” or “unusual in his inter-personal communications” or “some find him difficult to get along with”. Many years later one of his truly admirers research students summed it up much more succinctly, honestly, and clearly: “Rolf was mercurial, confrontational, charming, demanding, maddening, entertaining, and tremendously intimidating. He challenged his students by expecting nothing but the best from us, and his approach got results.”

Rolf arrived in the Mining Building in 1975 as an assistant professor, establishing an unmistakable presence with his long hair, beard and fumy pipe. Rolf was a superb photomicrographer and his many photographs of trilobites – often tiny and not at all like the monsters so familiar in museum displays – were used to illustrate his scientific papers and monographs, of which he published over one hundred. In 1984 he was awarded the Geological Association of Canada’s Past-President’s Medal (now the W. W. Hutchinson Medal) for research achievements as a young scientist.

...continued on page 26
Concerning undergraduate teaching, he was distressed at the university policy of grading; he supported the recognition of excellence, but felt that poor grades could badly impact students for courses in which they simply were not interested. He struggled with this problem for years, and eventually resolved the dilemma by quitting the university system entirely, at the peak of his career, when he had successfully navigated all the academic hoops and hurdles of promotion to Full Professor in 1984.

By that time Rolf had established a strong cadre of trilobite graduate students – including PhD students Steve Westrop and Brian Pratt, and MSc students Pamela Tuffnell and Graham Young, not to mention Dave Rudkin who was Rolf’s first graduate student and collaborator on a paper for the Paleosceone series in Geoscience Canada which they wrote in a bar across the street from the Mining Building.

Rolf was professionally active outside the department, in national and international learned societies as a scientific leader, as an organizer/administrator and as an editor. He was instrumental in establishing the world-class monograph series on paleontology, Palaeontographica Canadiana and was its first editor.

He was a lot of fun at conferences and in the field. However, for many, he was a daunting, driven and distant personality, and not everyone appreciated his wicked – often sarcastic – wit and his tenacity in problem solving.

To those who met him outside the workplace he was a different personality. He was a gracious and attentive host, albeit in between biting and often hilarious repartee with guests. With strong political views, he was often merciless in attacks on those who held opposing ones; one of the first fossil species he named, in 1972, was the tentaculitid Guerichina lenini!

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Without doubt, Rolf was one of the greatest single contributors to trilobite paleontology and biostratigraphy in the world. His taxonomic expertise ranged across the Paleozoic from lower Cambrian to Middle Devonian faunas. His science was always exacting; he named or co-named many new species in dozens of papers and no fewer than 13 monographs.

Rolf remained active through most of his career, publishing, attending conferences and field trips nationally and internationally, and making presentations from his base in DIRT. In the late 2000s, however, he was experiencing difficulties in speaking and maintaining concentration. He sought medical help and eventually was diagnosed with Lewy body dementia, a disease that progressively robs the body of its mental and physical capabilities. Rolf died peacefully on 16 December 2016.

Following his resignation from U of T in 1987, Rolf founded the Denman Institute for Research on Trilobites (DIRT), just offshore from Courtenay on Vancouver Island. He built his own log home on Denman Island, which also housed DIRT. From there he continued his work on trilobitology – and published several monographs. Rolf started an annual newsletter The Trilobite Papers which published essays and research news submitted by contributors from around the world. It ran for 19 years, until 2007.

Rolf was very interested in public education and helped establish programs with local museums covering various aspects of paleontology. He offered advice to many local amateurs in the Vancouver Paleontological Society.

Several of his colleagues noted that daily Bending exploration often involved extensive journeys in sub par vehicles or sketchy light planes to reach a destination, sometimes in the dark. Dave, undeterred, would continue his analysis of the days field work well beyond the attention span of his compatriots!

From 1985 to 2008 Dave worked for Homestake Mining as Exploration Manager, prior to which he held positions with Texasgulf Sulphur and Rio Tinto. He created a number of private and public companies over his career to explore in North and Latin America. One of these, Mahdia Gold, was testing the depth of the Omai deposit in Guyana. Dave’s exploration thesis was proven correct although the company did not complete the mining mission. After leaving Mahdia in 2013, Dave became CEO of Horizon Minerals in 2017, following a stay as Senior geologist with USA Graphite. As President of Mahdia, see his 2013 interview at the PDAC: https://www.youtube.com/watch?v=rlfHFVjC6fw

Dave was a keen swimmer and loved the water. While he was taken too soon, it is fitting that he spent his last day by the sea doing one of his favourite water sports - fishing.

Dave was the beloved husband of wife Ginette Bourdeau and father of Michael and Katherine.
Alumni News

Editor: Henry Halls
Assistant Editor: Karyn Gorra

Comments and contributions are most welcome – especially news of former students.

Special appreciation to the many faculty, students, staff and alumni who provided articles, ideas, photos and all forms of assistance and input to help create this newsletter.

Send your contribution by e-mail to:

alumni.newsletter@es.utoronto.ca

or by regular mail to:

The Editor, Alumni News,
Department of Earth Sciences
University of Toronto,
22 Russell St.
Toronto, ON, M5S 3B1.

www.es.utoronto.ca

Alumni & Friends Reception

in the

Library and York Rooms

at the

Fairmont Royal York Hotel

in Toronto

Tuesday, March 6, 2018

5:00pm to 7:30pm

We hope to see you there!