Earth Sciences Alumni Newsletter

Issue 4 www.earthsciences.laurentian.ca June 2012

MSc student Sean O'Hare was one of the winners of the 2012 DES Photo contest in the scenery category. This photo was taken in the Mackenzie Mountains, NWT.

In this issue

Message from the Department Chair

Dr. Daniel J. Kontak

Dear students, alumni and friends. Well, another academic year has rapidly passed and I am happy to say it was one full of lots of activity, including pleasant surprises, so on this note let us reminisce. Early in the year it was apparent that many new students had discovered the wonders of geology, as course enrollments soared – 2nd year field school exceeded 40 students, mineralogy was at an all time high, and for the first time optical mineralogy needed two labs. As luck would have it, we were able to handle the latter due to the acquisition of 10 new Olympus microscopes made possible by an anonymous benefactor with funds matched by the university.

Also in the fall another successful Hawaiian volcanology field trip was lead by Dr. Harold Gibson. The success of the department's modular courses was again evident with an overflow of students for Dr. Richard Smith's geophysics course in December and Dr. Michael Lesher's ever popular magmatic course in April. In the former, several participants even travelled from Australia to learn about the newest and latest in exploration geophysics! Maintaining our high academic standards is paramount, thus I am happy to say that our search for a replacement of the CRC in geochemistry culminated with the position offered to Dr. Joel Gagnon of Windsor, who is expected to begin in July 2013. The exploration community once again convened for the PDAC meeting in Toronto and DES was there to welcome alumni and court students. We again had a successful alumni night in a packed Royal York room – it was tremendous to be part of this ever growing gathering and witness the energy of those present. The 2nd annual DES banquet ended the academic year with the undergraduate honors students making their thesis presentations followed by an evening banquet and awards.

Finally, several students and faculty toured the gold rich Carlin Trend in Nevada at years end and DES made a contribution to this from the new Students Excellence Fund, which was initiated this year. At the time of this writing, our latest and perhaps largest graduating class prepares for convocation and we wish them well on their new journey. In a few weeks several PhD students will defend, itself a reflection of the success of the ever growing graduate program. In conclusion, DES continues to flourish as one of the premiere geology departments nationally, which is possible due to the hard work of faculty and staff and support of our students, alumni, adjuncts and friends. I thank all of you for your continued support and look forward to another successful year.

MERC
MINERAL EXPLORATION RESEARCH CENTRE

News and Update

It has been another successful year for MERC! Our membership is growing, and now includes HudBay Minerals Inc., Teck Resources Ltd and the Ontario Geological Survey as Foundation members, GoldCorp Inc., Gold Fields Canada Exploration, Osisko Mining Corporation and KGMH International Ltd. as Corporate Tier I members and Cliffs Natural Resources, Northern Superior Resources, Wallbridge Mining Company and Xstrata Nickel as Corporate Tier II members.

Five new NSERC and Industry funded base metal and gold research projects were initiated, and our modular course curriculum will expand to include new courses as we continue to educate graduate students from across Canada and around the world. Dr Richard Smith, our new NSERC Industrial Research Chair in Exploration Geophysics, is established and his research program involving 5 graduate students is well underway.

MERC is in the process of hiring an Associate Director who will help to move MERC initiatives forward. We are also creating a member's only website: that will contain PDF copies of recent MERC journal publications, reports, posters and presentations by ore deposit type and theme. In addition it will contain PDF copies of undergraduate and graduate student CVs. You can visit the current website at: www.merc.laurentian.ca.

Mineral Exploration and Mining research continues to be a strategic focus for Laurentian University, demonstrated by the creation of a new School of Mines. This will provide a focus on education and research covering the complete spectrum of the mining cycle, from exploration to environmental rehabilitation, including cultural and economic sustainability, management, Native studies, and occupational health and safety. This investment in geoscience and mining research is a clear indication of Laurentian University's strong commitment to the minerals sector. MERC and other mining- and environment- related research centres at Laurentian will play key roles within the new School of Mines. For more information about this initiative, please visit: www.laurentian.ca/mines/

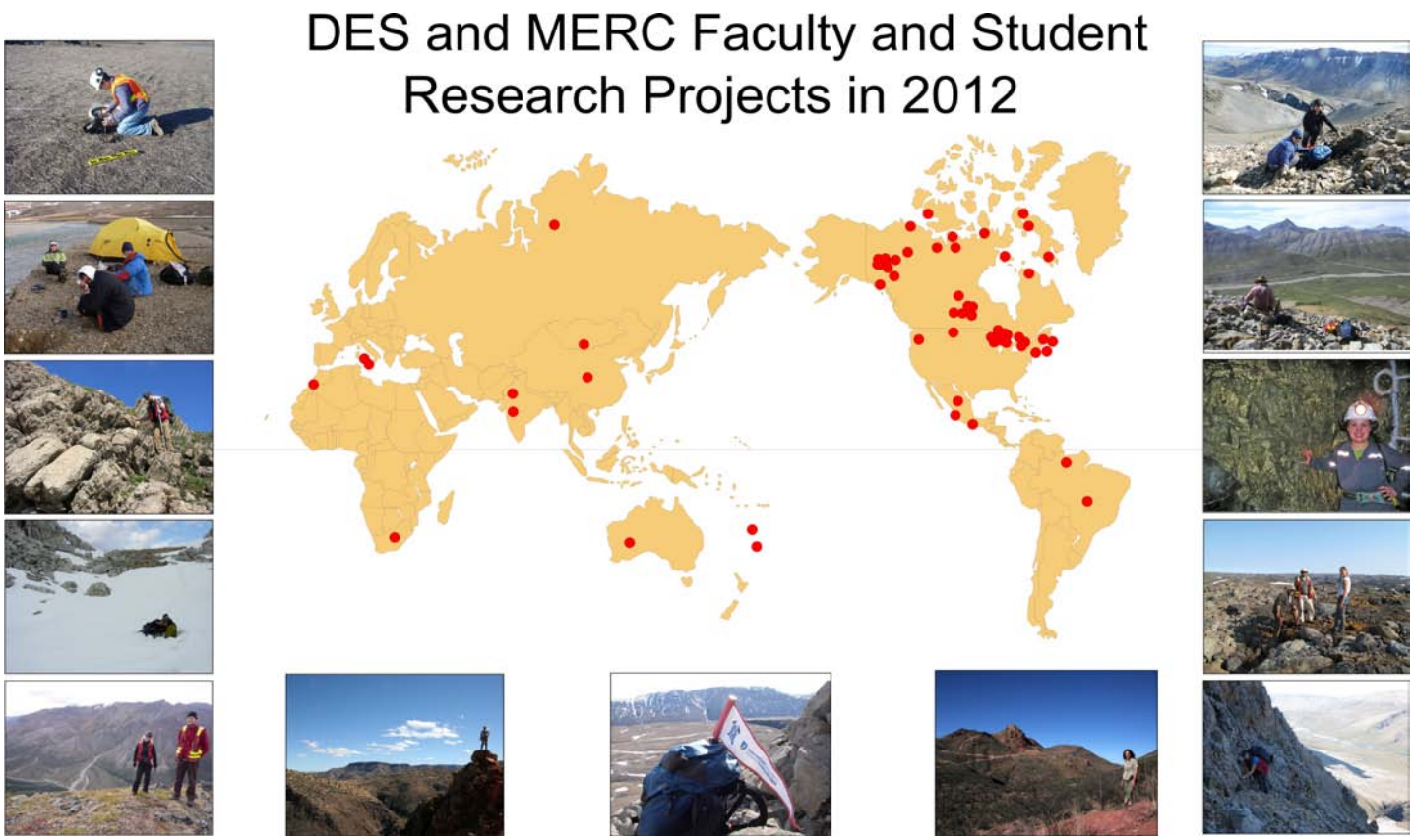
Upcoming MERC Professional Development Courses:

Mineral Exploration in Volcanic Terrains (Laurentian University)
August 17th-28th, 2012

Exploration Geochemistry (Laurentian University)
December 6th-16th, 2012

Hydrothermal Ore Deposits (Ottawa University)
February 2013

For more information, visit: www.merc.laurentian.ca



Environmental Geosciences: Black Coatings on Sudbury Rocks

New research in the Department of Earth Sciences (DES) attempts to understand the surface chemical reactions that produced the ubiquitous black coatings in the Sudbury area, as well as smelter-impacted areas at Rouyn-Noranda. Overseeing the study is Dr. Michael Schindler, an Environmental Mineralogist and an Associate Professor in the DES. He is conducting the study with Masters student Natalie Mantha and undergraduate student Jaime Caplette.

Results of the Sudbury study indicate that the black coatings were formed through the dissolution of the underlying rock by sulfuric acid. This weathering process resulted in the formation of a hydrous silica gel with a lower viscosity than other solid-state weathering products. This property allowed trapping and accumulation of airborne particulate matter. Samples of the black-coated rocks were sent to the Nanogeoscience Center at Virginia Tech for Transmission Electron Microscopy. High-resolution images of the coatings reveal the presence of smelter-derived nanoparticles, proving as suspected that these particles were probably released by smelters into the atmosphere. The rock surface is the only medium in the Sudbury area that was able to trap and preserve different kinds of nanoparticles commonly emitted by local smelters. Since the nanoparticles are so small and dissolve rapidly in soils or lakes, they are not easily preserved in such samples and have previously been undetected. The identification of these particles is important in assessing the grain-size dimensions of smelter-derived particles. This is significant in that the size of airborne particular matter may have different impacts on human health. Isotope and trace-element studies of the black coatings, completed at Queen's University and the Chemical Fingerprinting lab at Laurentian University, show that the coatings were able to preserve the signature of atmospheric processes in the smelter plumes. For example, the mixing of sulfate aerosols and the scavenger effect of rain towards certain atmospheric particles can be recognized when comparing coatings at various distances from the smelter.

Planetary science research groups are interested in this research as past-conditions in Sudbury (acidic sulfur-rich rain) may mimic processes on Mars. Mining companies are interested in this research project, as Cu and Ni-bearing nanoparticles have been detected as being emitted from European smelters. Knowing how various elements are chemically bound in the surface environment is the first step in understanding metal mobility. Schindler notes that "the chemical reactions that occur on the surface of minerals can form a barrier which can prevent contamination of the environment". He hopes that his research on Sudbury soils will be of great interest to the local community, because there are still many open questions with respect to the long-term effect of metals in the environment. For more information on this project, please contact Dr. Schindler (Mschindler@laurentian.ca).

Dr. Michael Schindler and MSc student Natalie Manta sitting on black coating outcrop in Sudbury.

The Department of Earth Sciences is among the top departments at Laurentian for the number of faculty who receive individual NSERC Discovery grants (an external measure of academic and research strength)

Distinguished Awards for DES Professors Dr. Gibson, Dr. Long, Dr. Kontak and Dr. Smith.

The Department of Earth Sciences recently celebrated the success of Dr. Harold Gibson, Professor of Volcanology and Ore Deposits, and the Director of the Mineral Exploration Research Centre (MERC) who was awarded the 2011 Duncan R. Derry Medal by the Mineral Deposits Division of the Geological Association of Canada. The Association award recognizes Dr. Gibson's "outstanding contributions to research, teaching and administration in economic geology." Dr. Darrel Long, Professor of Sedimentary Geology, was named as recipient of the R.J.W. Douglas Medal of the Canadian Society of Petroleum Geologists. This award recongnises his "outstanding contributions to sedimentary geology in Canada." Dr. Daniel Kontak, Professor of Ore Deposit Geology and chairman of the Department of Earth Sciences, received both the 2011 Peacock Medal of the Mineralogical Association of Canada, and the 2011 Gesner Medal of the Atlantic Geoscience Society. In addition, Dr. Richard Smith, the NSERC Industrial Research Chair in Exploration Geophysics, was a co-recipient of the Barlow Medal for best paper published in the Canadian Institute of Mining and Metallurgy Bulletin. Congratulations to all of you!

Dr. Darrel Long

Dr. Richard Smith

Dr. Daniel Kontak

Dr. Harold Gibson

LU-SEG Student Chapter Field Trip: Nevada, USA

by: Mike Burns, MSc candidate

DES graduate students: Geoff Baldwin, Linette MacInnis, Mike Burns and Galen McNamara standing on the pit High Wall overlooking Allied Nevada's Hycroft Mine.

Building on the success of the 2011 SEG Student Chapter field trip to Chile in April, three Laurentian graduate students, an industry participant, and one professor flew to Reno, Nevada and embarked on another spectacular field trip. Organized by the LU SEG Student Chapter, tours were scheduled at seven major mines throughout the Carlin and Getchell trends within Nevada's Great Basin.

The tour began with an informative in-depth overview of Great Basin stratigraphy, mineralization and exploration history and models by Dr. John Muntean of the Nevada Bureau of Mines and Geology. From Reno, the group drove north east to Winnemucca, and toured Barrick's Turquoise Ridge mine where they had their first look at classic Carlin style gold mineralization in both drill core and in surface operations. Great Basin Gold's Hollister mine was the second stop, and was one of the many trip highlights. Tricia Evans, Great Basin's Senior Project Geologist took us underground into the roots of one of the youngest and best preserved low sulfidation epithermal gold systems in the world! Textbook examples of a high grade boiling zone, and spectacular surface outcrops of preserved scinters, mud pits and fumaroles linked the entire hydrothermal system together. As Tricia described, it is Yellowstone Park with the water turned off! Allied Nevada Gold Corp. hosted the third tour, at the Hycroft mine, a Tertiary to Recent, fault-controlled, low-sulfidation gold deposit with spectacular alteration. Allied Nevada's chief exploration Geologist, Don Harris, spent the entire day providing the group with an amazing core, surface, and pit tour of the Hycroft mine, including an overview of the heap leach process, a trip to exploration drill rigs, diatomaceous earth deposits, and historical native sulfur and silver mining operations, all contained within the mine property. The group then drove to Battle Mountain, and toured Barrick's world class Cortez Hills property. Highlights included a property wide surface tour by Mark A. Bradley, Barrick's Cortez District Exploration Geologist, with stops at stratigraphic type sections and a transect through carbonate sequences in the Great Basin. The next deposit, Newmont's Phoenix Mine, was a diversion from the previously visited Carlin type gold deposits. The group joined students and an eccentric professor from San Francisco State University's geology department, for a tour of the Phoenix Cu-Au porphyry deposit located just south of Battle Mountain. Excellent exposures of sulfide, skarn and Cu-oxide mineralization in addition to potassic and argillic alteration zones were observed in the open pits. The highlight of the tour included a mill tour by two of Phoenix's chief metallurgists, where we learned that coconut shell carbon is used to recover metals from the flotation cell slurry. The second last tour of Newmont's North Area Holdings was by far the most overwhelming in terms of scale. Pit after Pit and ore truck after ore truck, and to Dr. Turner's enjoyment, carbonate after carbonate were seen over the course of a full day tour. The North Area trip ended overlooking two simultaneous blasts in one of the active open pits. The final tour, led by Barrick's Ruby Hill mine Senior Exploration Geologist, Craig Mach, provided the group with an informative insight into both the geology of the deposit and some of the exploration and expansion plans that are currently under way. The group then drove West from Eureka to Reno, along the scenic U.S Route 50, the "Loneliest Highway in America".

The 2012 LU SEG Field Trip was an overwhelming success, made possible by generous donations from our sponsors. A special thank you is extended to Barrick Gold Corp., Claude Resources, Walbridge Mining Company Ltd., Mackevoy Geosciences Ltd. and the Laurentian University Department of Earth Sciences Student Excellence Fund, for supporting the LU SEG Student Chapter annual field trip. The LU SEG Student Chapter would also like to thank Great Basin Gold, Allied Nevada Gold, Barrick Gold and Newmont for in kind support and providing excellent tours for this year's participants. If you wish to help us with future field trips, please contact the DES to make a donation to the Student Excellence Fund.

The Department of Earth Sciences was the first department at Laurentian to obtain an MSc program (1972) and, in 2004, was the first to establish a PhD program (in Mineral Deposits and Precambrian Geology)!

DES in-house MSc and PhD graduate students

From left to right:
Back row: Robert Lodge, Mike Burns, Devon Parry, Jordan Mathieu, Craig Stewart, Kate Rubingh, Sonia Lanteigne, John Hechler, Oladele Olaniyan, Joe Petrus, Taus Jorgensen;
Front row: Linette MacInnis , Sean O'Hare, Laura Katz, Katherine Hahn, Lindsay Richan, Sarah Gordon, Mojgan Adibpour, Ladan Karimi Sharif;
Missing from photo: Geoff Baldwin, Fabio Cafagna, Michal Kolaj, Caroline Mealin, Joshua Mukwakwami, Kirk Ross, Jen Durocher, Josh Lymburner.

Hawaii – A Perfect Classroom by: Peter Van Walraven, DES Alumni

Posing in front of the steaming Kilauea Caldera.
From left to right: Back Row: Craig Green, Dr. Dougal McCreath, Dr. Ann Gallie, Peter Cecutti, Dr. Elizabeth Turner, Tiffany Chevrier, Olivia Nasielski, Gerald Riverin;
Front Row: Ben Gammon, Peter Van Walraven, Nadia St-Jean, Nicole Tardif and Karin Ostler.

You wake up with the sun just barely breaking over the horizon. The air is cool and damp, but even in this early hour it's restless with the hum of life. You peel open your eyes to an unfamiliar room that smells of booze, cigarettes and overwhelmingly of damp wood and rainforest. In the dim light you can make out your new found friends, still passed out from the night before. Sleep tugs at your eyelids and you can hear the drunken dreams calling you back into the blackness. But then something clicks in your brain. A tiny, electrical signal is fired off stringing together the thought, "Hey man; wake up you're in Hawaii and you're going to be seeing an active volcano today, a real… active… VOLCANO"!

It may not be exactly like this, but ask those who travelled on the 2011 Laurentian Hawaii trip, and you will hear similar morning stories. Day after day you wake to another day of adventure and marvel. One morning you're looking over the smoldering caldera of Kilauea, and then you're off walking on top of lava flows younger than your professors. If you're exceptionally lucky those flows just might be younger than you. Later in the afternoon, the vast Pacific Ocean lies out before you as you dig your hot feet into the cool waters off the shore of Black Sand Beach, with some local sea turtles for company. After hiking through a surreal desert of volcanic sand, frozen rivers of lava, and ancient footprints (all of this while en route to another old volcanic vent), nothing is more relaxing, and refreshing, than cooling off in the azure sea. Each place you stop, a plethora of information fills you ears and mind as Dr. Gibson, Dr. Turner, Dr. Gallie, Nicole and your own fellow students explain what lies before you. At the end of the day professors, alumni, TA's, guests and students alike gather together and share a great meal with a bottle of Hawaiian wine or beer, and converse about the day's events. After a while, and a few more bottles, there is no labeling and you become just a group of smiling scholars discussing the geological jargon you had the privilege to witness that day. This is an example of just one day. Nothing could be more thrilling than the mixing of vacation with the classroom. Being able to share that experience with friends who share your excitement and anticipation only magnifies the experience exponentially. It may sound like I am trying to sell you on this trip… well; yes that's exactly what I am trying to do. Whether you're a student, alumni, professor or just common traveler, this trip is definitely a once in life time experience. To sum it up in one word, it's epic!

Student Exchange Opportunity in France

Tiffany Chevrier, a 4th year Earth Sciences student at Laurentian, recently participated in an exchange program in France.

Tiffany wrote: "The most wonderful thing about geology is that it is worldwide. One can travel anywhere in the world and each place has its own geological history. This past semester I have been studying geology in France at the "Institut Polytechnique LaSalle". This French university is located approximately 1 hour north-west of Paris, in a small village called Beauvais. LaSalle offers a wide variety of earth science specialties including: geotechnology, environmental science, mining and petroleum. Learning geology in a different country has definitely been a change of pace and it has allowed me to view things from a different perspective.

Studying abroad has also presented unique opportunities such as a two week field school in the Alps. I really enjoyed meeting new people and experiencing the history and culture of another country. Thanks Laurentian for this great opportunity!!"

The Department of Earth Sciences has been hosting students from the "Institut Polythechnique LaSalle" since 2007. A total of 11 French students have taken courses in the Earth Sciences. Tiffany is the first student from Laurentian to go to France to take courses at LaSalle.

Tiffany visited the Imerys Argilite Mine. The company uses this industrial material to make roof tiles. This picture is taken at the site where they excavate the argillite.

The Department of Earth Sciences graduated its first undergraduate student in 1968 and has graduated more than 500 students since then!

DES-MERC Alumni Reception at PDAC

Thank you to all who attended our third annual DES-MERC Alumni Reception at PDAC in Toronto this year! It was a tremendous success, with over 200 people in attendance! We were pleased once again to connect with our alumnus (over 40 of them!) and friends. You are an integral part of Laurentian's history, its future and the Laurentian family. We hope to continue to see you at this event in the future!

LU President, Dominic Giroux, with Dr. Ramesh Subramanian (Director of the Bharti School of Engineering), Dr. Darrel Long (DES), Nicole Breng and Laura Beague (exchange students).

DES Alumni: Mars Napoli and Arnold Burton with Cameron Bowie.

DES Alumni: Matthew Pickard, Carole-Ann MacDonald and Ryan Post.

DES Alumni: Greg Huffman, Christine Devine, and Diana Mitchinson.

DES Alumni: Andre Ritna and Jerry Janik

DES Alumni: Lindsay Moss and Joshua Bailey with Dr. Phil Thurston.

Second Annual Year End Banquet

This annual event, held at the Italian Club in Copper Cliff, is where our undergraduate and graduate students are recognized for their outstanding achievements in Geology and Environmental Geosciences. It is held in conjunction with the final undergraduate thesis presentations, which are followed by an evening of socializing with students, alumni, professors, staff and friends, a dinner, and an awards ceremony. All Alumni are invited to this event and we hope to see more of you there next year!!

Undergraduate students who presented their honours thesis with their supervisors: Left to right: Dr. Dan Kontak, Kurtis Oman, Kristie Rioux, Genvieve Krasowski, Andrey Rinta, Dr. Michael Schindler, Olivia Nasielski, Kerann Hutchinson, Alexandra Gelinas and Dr. Pedro Jugo.

DES Alumnus Frank Racicot and his wife joined us for dinner.

Recipient of the best undergraduate thesis and most promising graduating student in Earth Sciences awards; Andre Ritna with Dr. Gibson.

Recipient of most promising graduating student in Environmental Earth Sciences; Kurtis Oman with Dr. Schindler.

Guest Alumnus speaker: Kristan Straub, Manager – Mine Technical Services in Raglan with Xstrata, and his wife Jennifer.

Recipient of 2012 best graduate student seminar award; Michel Kolaj with Dr. Turner

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If you have an item of interest, or any news of your activities (or those of your classmates), please let us know. Email submissions to ntardif@laurentian.ca

Upcoming Events

MERC Professional Development Courses:

Mineral Exploration in Volcanic Terrains (Laurentian University)
August 17th-28th, 2012

Exploration Geochemistry (Laurentian University)
December 6th-16th, 2012

Hydrothermal Ore Deposits (Ottawa University)
February 2013

PDAC 2013
March 3rd-6th

Visit us at booth 638

Join us at the 3rd annual Alumni and Friends Reception
Monday, March 4th, 2013
Confederation Room 3
Royal York Hotel, Toronto, ON

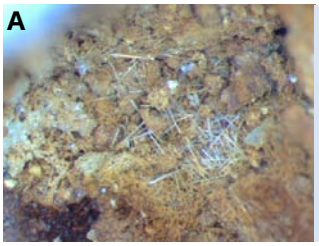
Earth Sciences Year End Banquet
April 2013 – Stay tuned for date and location!

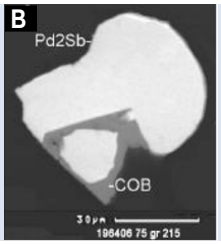
DES Students Set Up Seismic Monitoring Stations in Sudbury – USArray

Two students from the DES spent last summer driving around northern Ontario, speaking with property owners, and finding suitable locations to install seismometers. The instruments, part of a transportable array, are part of a study that will measure earthquakes, monitor the behavior of seismic waves, map movement of the Earth's surface, and create images of the crust and mantle of the North American continent. Stations have been installed across the United States and Canada, and will collect data for a period of two years, after which the equipment will be removed. Data from the stations is publically available and can be used by seismologists to monitor seismic risk associated with earthquakes and to better understand the structure of the earth. For more information about this initiative visit: www.earthscope.org.

New Mineral Research at LU

When one thinks about geology, it's often about volcanoes, fault zones and dinosaurs and only rarely does one consider the basic building blocks that our discipline is based on: the minerals themselves. Prof. Andy McDonald spends a good portion of his time focused on mineralogical research and such efforts sometimes lead to the discovery of new minerals, *i.e.*, those that have not been observed in Nature before. Dr. McDonald has been involved in the discovery of several new platinum-group minerals (PGM) from a variety of magmatic ore deposits including ungavaite (Pd_4Sb_3; named after the Ungava peninsula), naldrettite (Pd_2Sb; named after Prof. Tony Naldrett formerly at UofT) and skaergaardite (PdCu; named after the Skaergaard intrusion). He has also worked on a large number of new minerals containing high-field strength elements (Ti, Zr and Nb), including his most recent discovery, that of the new species laurentianite $[Na_3Nb_3(Si_2O_7)_2\{O/H_2O\}_6{\cdot}6H_2O]$. The mineral, which was approved by the International Mineralogical Association and named after the university, was the product of the undergraduate thesis of Ms. Monika Haring (currently completing a M.Sc. at UWO). With only ~4500 known mineral species and ~100 new species being added to this list every year, who knows how many more new mineral discoveries are waiting to be made? Stay tuned!





A: White needles of laurentianite intergrown with lepidochrocite (FOV: 2.0mm). Mont Saint-Hilaire, QC.

B: Naldrettite with cobaltite. Mexamax deposit, QC

C: Skaergaardite (SK) with bornite-chalcocite (BN-CC), epidote (EP) and plagioclase (PL). Skaergaard intrusion, Greenland.

Department of Earth Sciences Faculty, Staff and Students
September 2011