



# Mineralogical Association of Canada

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## MAC FOUNDATION SCHOLARSHIP WINNERS

We congratulate Matthew Izawa and Melissa Anderson, the recipients of the 2011 MAC Foundation Scholarships (\$5000 each).



**Matthew Izawa** completed a BSc in the Department of Physics at the University of Western Ontario in 2006. He then moved on to an MSc degree in geology (completed in 2008) with Dr. Roberta Flemming and Dr. Penny King. He is currently working towards his PhD, supervised by Dr. Flemming and Dr. Neil Banerjee. An important objective of his PhD research is to better understand

the shock and thermal metamorphic history of the enstatite chondrites (EC), an important class of primitive solar system material that may be analogous to the precursors of Earth. He aims to quantify shock metamorphic effects in EC minerals at scales ranging from a few unit cells to features visible in the optical microscope. Thus far, he has helped to develop an X-ray diffraction-based technique to quantify the degree of misorientation within shocked mineral grains and has investigated a meteorite that may represent a partial melt residue of EC parentage. His ongoing efforts include mapping the distribution of lattice misorientation within individual mineral grains using electron backscatter diffraction and focused ion beam sample preparation for transmission electron microscopy. He has always had a fascination for the fundamental nature of “stuff,” and he is happy to have found a niche in mineralogy where he can explore some of nature’s little puzzles.



**Melissa Anderson** completed a BSc degree in geology (Hon.) with a minor in physics at Brandon University, Manitoba. She then enrolled in a master’s program in geology at the University of New Brunswick, Fredericton, under the supervision of Dr. Dave Lentz and Dr. Chris McFarlane. Her MSc study comprises a detailed examination of the Moose II pegmatite, located 115 km southeast of

Yellowknife, Northwest Territories. This zoned pegmatite forms a north-trending dike, approximately 430 m long and up to 61 m wide, and belongs to the spodumene subtype of the rare-element pegmatite family. This pegmatite was selected for detailed geochemical investigations due to its accessibility, exposure, and production history for lithium and tantalum (1946–1954). Melissa is examining how the pegmatite formed, the mechanisms of emplacement, and the processes leading to mineralization. In addition, she is using the trace element geochemistry of muscovite to develop a geochemical exploration tool for pegmatites in the area. Rare-metal granitic pegmatites are important hosts for the rare lithophile elements, including Ta, Li, Cs, Nb, Be, and Sn. These elements are fundamental for current and emerging technologies. Melissa loves doing geological field work and has found a passion for economic geology.



## NEW COUNCILORS

At its last meeting, the MAC Council welcomed three new councilors:



**David London** is the Stubbeman-Drace Presidential Professor, the Norman R. Gelpman Professor of Geology, and the director of the electron microprobe laboratory at the University of Oklahoma. London also acts as chair and managing editor for the Pegmatite Interest Group of the Mineralogical Society of America. London’s research pertains to the chemical evolution of silicic magmas. His work combines experimental studies with research on the chemical attributes

of common and rare minerals in granites and pegmatites. He is the author of *Pegmatites*, which was published in 2008 as Canadian Mineralogist Special Publication 10, and he received the Hawley Medal in 2010 for his paper “The Origin of Primary Textures in Granitic Pegmatites” (Canadian Mineralogist 47: 697-724). London is a member of the Mineralogical Association of Canada and the American Geophysical Union, and a fellow of the Mineralogical Society of America. He is the namesake of the mineral londonite,  $\text{CsAl}_4\text{Be}_4[\text{B}_{11}\text{Be}]\text{O}_{28}$  (Canadian Mineralogist 39: 747-755).



**Christopher G. Weisener** is an associate professor at the Great Lakes Research Institute for Environmental Research (GLIER) at the University of Windsor and is cross-appointed to the Department of Earth and Environmental Sciences at the same university. He received his undergraduate degree in geology (1998) and his PhD (2003) from the University of Western Ontario. From 2002 to 2004 he was a postdoctoral fellow at the University of Waterloo, where he investi-

gated metal-contaminant transport in groundwater from mine waste sites. From 2004 to 2005 he continued his postdoctoral training at the University of Windsor, studying microbial metal cycling and applying synchrotron and high-resolution transmission electron spectroscopies to elucidate microbe–mineral interactions. In 2005 he joined the faculty of GLIER as an assistant professor. In 2010 he was awarded an Early Researcher Award by the Ontario Ministry of Research and Innovation for his research into microbe-catalyzed metal mobility associated with mine-impacted watersheds.



**Yulia Uvarova** received a BSc in geology (2001) from Moscow State University, Russia, and a PhD (2008) from the University of Manitoba. Her PhD research was on the mineralogy, petrology, and geochemistry of rocks from the Kola Superdeep Borehole, Russia, the deepest borehole ever drilled. While working on her dissertation, she was involved in projects that resulted in the description of 8 new minerals. Yulia is currently an NSERC postdoctoral fellow in the Department of

Geological Sciences and Geological Engineering at Queen’s University, Kingston. Her research focuses on the geochemistry, mineralogy, petrology, and genesis of economic mineral deposits, uranium in particular; the development of new tools for uranium deposit exploration; the behavior of high-field-strength elements in high-temperature systems; and the geochemistry of nontraditional isotopic systems and the application of these systems to the elucidation of processes responsible for deposit formation.

## 2011 TRAVEL AND RESEARCH GRANT WINNERS

MAC awarded 12 travel and research grants in 2011, for a total of \$8800. We congratulate these deserving students and give highlights of their reports. Several presented their research results at the GAC-MAC-SEG-SGA joint meeting held in Ottawa (GAC-MAC 2011) in May 2011.



**Pedro Acosta** is a PhD student at the University of Alberta, supervised by Dr. Sarah Gleeson. His project deals with iron oxide–copper–gold (IOCG) mineralization in the Great Bear Magmatic Zone, Northwest Territories. He aims to characterize the nature and geochemistry of the fluids responsible for the multiple mineralizing episodes through detailed petrographic, electron microprobe, fluid inclusion, isotope, halogen, and trace element analyses. He presented his preliminary results at GAC-MAC 2011.



**Donnelly Archibald** presented a poster at GAC-MAC 2011, related to his MSc thesis at Acadia University, Wolfville, Nova Scotia. The poster was entitled “Revised Bedrock Geology of the Southern Antigonish Highlands, Nova Scotia, Canada.” The purpose of the project is to characterize a recently recognized Ordovician plutonic suite in the Avalonian of northeastern Nova Scotia. Interacting with specialists in his field was the most beneficial aspect of attending the conference.



**Neil Fernandes** is an MSc student at the University of Alberta. His research on the geology and geochemistry of “barren” barite sequences in the Selwyn Basin, Canada, and their relationship to sediment-hosted lead–zinc occurrences in the same region has resulted in the definition of new exploration vectors. He presented his research at the “Economic Potential of Northern Canadian Sedimentary Basins” session at GAC-MAC 2011.



**Anna Hicken**, an MSc student at Queen’s University, attended the International Applied Geochemistry Symposium in Rovaniemi, Finland. She presented her research on the glacial dispersal of indicator minerals at the Izok Lake volcanogenic massive sulfide deposit, Nunavut, Canada. She is using till and bedrock to establish a suite of indicator minerals for an amphibolite grade metamorphosed VMS deposit.



**Steven Holland**, an MSc student at McMaster University, presented a poster at GAC-MAC 2011. He is investigating the influence of iron-reducing bacteria on copper, cadmium, and arsenic sorption to bentonite clays, as well as the bacterial influences on the long-term stability of sorbed metal(loid)s. With the help of the MAC travel grant, he learned much from discussions with other geoscientists.



**Darren Lefort**, an MSc student at St. Mary’s University, Halifax, attended GAC-MAC 2011 to deliver his talk “Subepithermal Au–Pd Mineralization Associated with an Alkalic Porphyry Cu–Au Deposit, Mt. Milligan, Quesnel Terrane, British Columbia, Canada.” Based on his undergraduate thesis, his presentation discussed the link between alkali porphyry and subepithermal (epithermal-like deposits occurring outside typical epithermal regimes) deposits as revealed through bulk rock analyses and fluid inclusion studies.



**Rhea Mitchell**, as part of her MSc thesis at the Memorial University of Newfoundland, conducted nanoscale imaging of granulite facies symplectites and partial melting microstructures using transmission electron microscopy at the GFZ German Research Centre for Geosciences. She found conclusive evidence for static partial melting at the nanoscale, thus increasing understanding of the internal structure of these high-temperature metamorphic minerals and the mineral reactions that took place at grain boundaries.



**Daniel Petrash** attended the 2011 Goldschmidt Conference in Prague, where he presented preliminary results of his PhD research at the University of Alberta. He is evaluating the likely contribution of microbial activity to geochemical signatures preserved in the stromatolitic rock record. This conference fostered motivating exchanges with researchers at all levels working in geochemical modeling of microbe–mineral interactions.



**Jared Shivak**, an MSc student at the University of Western Ontario, traveled to the University of Alberta to perform electron microprobe analyses on a suite of Martian meteorites. Martian meteorites provide the only samples of Martian bedrock available for study on Earth. The geochemical work performed with the help of this grant will be integrated with other analyses to provide a full characterization of these meteorites and a clearer picture of the habitability of the Martian subsurface.



**Katie Smart** attended the Goldschmidt Conference in Prague, where she presented results from her PhD research in the session “Mantle Redox and the Deep Carbon Cycle.” Her presentation dealt with the formation mechanism of diamonds in the cratonic mantle lithosphere and the potential carbon sources involved in diamond growth. Part of Katie’s research at the University of Alberta focused on determining the process of diamond formation in eclogite xenoliths from the Jericho kimberlite, Nunavut.



**Michelle Thompson**, of Queen’s University, attended GAC-MAC 2011. She presented the results from her undergraduate project on brecciated ordinary chondrite NWA-869 from the collection of the Royal Ontario Museum. Her travel grant provided her a first opportunity to give a presentation at a scientific conference. Being able to listen to and share ideas with other researchers was invaluable experience and has encouraged her to continue on to graduate studies.



**Anne Westhues**, a PhD student at the Memorial University of Newfoundland, traveled to Stockholm to carry out analyses at the NordSIMS facility. She collected U–Pb dates of zircon, monazite, apatite, and titanite from the Kiruna iron ore deposits of northern Sweden. Combined with Sm–Nd and Lu–Hf isotope systematics, these dates will give a better understanding of how these deposits form in nature. Her goal is to develop a predictive model for the exploration of similar deposits throughout the world. These deposits are considered to be an end-member of the IOCG class of deposits and are a potential source of rare earth elements.