

PDAC 2017 Short Course: New exploration methods for base and precious metal deposits: How to increase success in Greenstone Terranes

Organizer: Laurentian University, Mineral Exploration Research Centre

Sunday, March 5, 2017

9:00 AM - 5:00 PM

Greenstone terranes continue to be an important metal source worldwide, but the mining industry needs new ideas and models to focus scarce exploration funds to the most prospective areas containing the next generation of ore deposits. The Mineral Exploration Research Centre (MERC) at Laurentian University's Harquail School of Earth Sciences develops exploration methodologies by conducting cutting-edge, field and laboratory research on mineral deposits and large-scale ore systems. MERC's research is directed at: 1) developing a new understanding of the complex interplay of ore-system controls for volcanogenic Cu-Zn-Au, magmatic Ni-Cu-PGE and orogenic Au deposits; and 2) determining vectors to economic mineralization through integration of regional- and deposit-scale mapping with structure, stratigraphy (aided by geochronology), geophysical data (magnetic, electromagnetic, induced polarization and gravity) and geochemistry utilizing major and trace elements, fluid inclusion chemistry, and radiogenic and stable isotopes on rocks, minerals, ores and overburden samples. The short course will draw insights from development of the Metal Earth project, a new 7-year, \$104 million applied R&D program with government, industry and academic partners that will expand and accelerate MERC's ore system research and provide new exploration models for gold and base metal deposits. The course will be taught by experienced economic geologists using case studies and up-to-date exploration models for greenstone-hosted deposits. Experts in Precambrian Geology, Structural Geology, Geochemistry, Geophysics and Surficial Geology will provide insight on the use of exploration tools for vectoring to economic mineralization. Integration of the combined topics will offer better tools to focus limited exploration dollars on quality targets.

LEVEL OF COMPREHENSION: INTERMEDIATE. Participants should have an undergraduate level understanding of geology.

COURSE FEE:

(includes course material, continental breakfast, three-course lunch and refreshments)

Early rate

Member: \$399

Non-member: \$499

Regular rate

Member: \$599

Non-member: \$699

Student: \$199



Mineral Exploration Research Centre
AT THE HARQUAIL SCHOOL OF EARTH SCIENCES



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MERC PDAC Short Course, Sunday, March 5, 2017: Presentations and Bios:

Overview of Stratigraphic and Architectural Controls on Base Metal and Gold Deposits in Archean Greenstone Belts by John Ayer, Associate Director of MERC. John received BSc and MSc degrees from Carleton University and a PhD degree from the University of Ottawa. He worked for 28 years with the Ontario Geological Survey mapping Precambrian greenstone belts in the Wabigoon and Abitibi Subprovinces and 10 years with the exploration industry. He was leader for the OGS mapping group in NE Ontario, the Targeted Geoscience Initiative on the Abitibi and coordinator of the Greenstone Architecture project at Laurentian University (LU) under the Discover Abitibi Initiative. His academic interests include geochronology, stratigraphy, litho geochemistry and geodynamics with a focus on the controls of metal deposition in Archean Terranes.

Precambrian Greenstone VMS deposits: Volcanic, Tectonic and Temporal Controls by Harold Gibson, Professor of Economic Geology and Director of MERC and Metal Earth, a new \$104 million R & D project research on crust to mantle scale metal endowment in the Canadian Shield. Harold received a BSc degree from Queens University, and MSc and PhD degrees from Carleton University. Harold spent 10 years working with the exploration industry prior to joining the faculty at Laurentian University (LU) in 1990. As professor in economic geology. His research is focused on understanding and documenting interrelationships between magmatism, volcanism, tectonics, and the timing of volcanogenic massive sulfide (VMS) ore systems during the construction and evolution of submarine volcanoes through time.

Insights into Archean Gold Formation Processes from an Integrated Field and Microanalytical Approach by Daniel Kontak, Professor of Ore Deposit Geology. Dan's work focuses on characterizing a wide variety of ore deposit types (e.g., Sn-W, REEs, rare metals, Zn-Pb, Au) in Canada and abroad (e.g., Peru, Argentina., India, Mongolia, Alaska) by integrating field observations with a variety of micro-analytical methods to chemically finger print ore systems. After 20 years researching ore deposit settings with the NS Government, he moved to Laurentian in 2006. His work has been recognized with awards from a variety of societies, including the Atlantic Geoscience Society, Mineralogical Association of Canada, and Mineral Deposits Division of the Geological Association of Canada.

Structural Controls on Precambrian Gold Deposits by Bruno Lafrance, Professor of Structural Geology. Bruno graduated from the University of New Brunswick with a PhD in structural geology in 1991. He served three years as resident geologist in northern Saskatchewan, and joined Laurentian University in 1999, where he does research on structural controls on the formation and modification of ore deposits.

New Analytical and Isotopic Techniques in Surficial Geochemical Mineral Exploration in Greenstone Terranes by Matthew Leybourne, Associate Professor of Geochemistry. Matt has a BSc from Waikato University in New Zealand and MSc and PhD degrees from Acadia University and the University of Ottawa, respectively. He has worked in government (GSC, GNS Science), Industry (ALS Geochemistry) and academia (Texas, Laurentian). His research focuses on the geochemistry of fluids associated with ore deposits that formed various styles of mineralization, hypogene dispersion of elements into host rocks, supergene processes, and using modern fluids for mineral exploration (groundwater, soils, till). Matt uses a variety of geochemical tools, with an emphasis on trace metals, metalloids and stable, radiogenic and non-traditional isotopes. He also investigates the petrogenesis of the rocks that host Au, volcanogenic massive sulfide, and porphyry Cu mineralization. Part of this research also involves the development of new analytical tools, both in the field and the laboratory, in particular with laser ablation ICP-MS of minerals.

New Geophysical Tools in Greenstone Terranes by Richard Smith, Professor of Geophysics. Richard received a BSc and MSc from the University of Adelaide, Australia and an MSc and PhD from the University of Toronto. He has worked for Lamontagne Geophysics in Toronto, Macquarie University in Sydney and Pasminco Ltd in Melbourne. In 1993, He joined Geotrex Ltd, an airborne geophysical survey company, later purchased by Fugro. In May 2009, Richard took up an Industrial Research Chair in Exploration Geophysics at Laurentian University in Sudbury. He is a member of the SEG (Chair, Mining and Geothermal committee, 2008-2010), the EAGE, KEGS, the ASEG (Federal Executive 1992-1993), and the PDAC (conference organizing committee 2008-2011). Richard is the recipient of a number of awards for the "best presentation" at conferences and is a co-recipient of the award for the best paper in the journal *Geophysics* for 1997 and the best paper in *Exploration and Mining Geology* (2012). In 2009/2010 he was the CSEG Distinguished Lecturer.