



Mineral Exploration Research Centre

Department of Earth Sciences, Laurentian University
Graduate and Post Graduate Opportunities

Sudbury Footwall, Low Sulfide PGE-Rich Mineralization: Development of an Exploration Model
PhD Research Opportunities (Starting May 2015)

Project 1: Characterization of the precious-metal minerals (PMM) and associated base-metal sulfides (BMS) and oxides associated with low sulfide PGE-rich mineralization to evaluate whether different subtypes exist, and to establish a base line for mineral processing. Project will initially focus on assayed drill core, moving to field-based sampling once sufficient knowledge has been garnered. Heavy-mineral concentrates will be produced using a combination of electric-pulse disaggregation (EPD) and hydroseparation (HS), then characterized using microscopy and SEM imaging. Major and minor element chemistry will be characterized using SEM (EDS), EPMA (WDS) and image-analysis techniques. Trace-element mineral chemistry and elemental mapping will be conducted by LA-ICP-MS.

Project 2: Characterization of low sulfide PGE-rich mineralization environments. A multi-year Ontario Geological Survey (OGS) mapping project in the Sudbury area provides an opportunity for a collaborative thesis project between the Mineral Exploration Research Centre (MERC), Laurentian University, and the OGS. Students with an interest in a mapping-based thesis that focuses on structural, metamorphic, and lithologic controls on PGE mineralization are encouraged to apply. The goals of the project are to better define how these deposits formed by integrating their structural and lithologic setting and the relative timing of mineralization with respect to the structural and metamorphic evolution of their host rocks.

Project 3: Characterization of alteration associated with low sulphide PGE-rich mineralization. to define the alteration assemblage(s) associated with mineralization, to define the scale of alteration, and to assess what, if any, physical and chemical signatures can be recognized for low-sulfide ore systems. Work will include detailed mapping and petrography (SEM) coupled with whole rock geochemical and mineral chemical studies using the EMPA, and LA ICP-MS. Possible fluid-chemical signatures will be explored using in situ SIMS isotopic analysis ($\delta^{18}\text{O}$) and fluid inclusion thermometric and chemical and mineralogical analysis (LA ICP-MS, SEM-EDS mound chemistry, XRD, TEM).

Project 4: Characterization of the surficial expression for buried low sulfide PGE-rich mineralization. A multi-year Ontario Geological Survey (OGS) mapping project in the Sudbury area provides an opportunity for a collaborative thesis project between the Mineral Exploration Research Centre (MERC), Laurentian University, and the OGS. Students with an interest in a mapping-based thesis that focuses on glacial sedimentology, surficial geochemistry, and the geochemistry of heavy minerals in till are encouraged to apply. The goals of the project are to better understand glacial dispersion of metals associated with low-sulfide PGE mineralization, the detailed chemistry of associated heavy minerals, and development of glacial sediments as a mineral exploration tool. This project will involve mapping, and detailed geochemical analysis using solution and laser ablation ICP-MS.



Mineral Exploration Research Centre

**Department of Earth Sciences, Laurentian University
Graduate and Post Graduate Opportunities**

Abitibi Thematic Gold Project

1) Three M.Sc. projects: Gold studies on Abitibi gold deposits including Cote Gold (Chester Township area) and the Matheson area (Hislop Township) .

Students with an interest in a 2-year thesis on either intrusion-related or orogenic-type gold deposits within Archean greenstone belts are encouraged to apply. The focus of the studies will be to better understand these Archean gold deposits based on their lithological and structural setting, timing of mineralization, alteration mineralogy/chemistry, fluid chemistry and stable isotopes. The projects will involve field-work during the summer as paid employees of the supporting mining companies with accommodation and meals provided. The student will also receive a Laurentian University Graduate Teaching Assistant stipend to help cover tuition and lodging costs over the school year.

Background required:

The successful applicants will have mapping experience, petrology and geochemistry, and some background in structure and ore deposit studies. The projects will commence in 2015. Applications should include a letter describing the reasons for their interest in this research project, a complete CV, and three references.

2) One PhD or Post Doctoral Fellowship (3-4 years): Thematic gold deposit studies in the Archean of northern Ontario

This position will be funded through an NSERC-CRD matching the company funding from ongoing gold projects in the Abitibi Greenstone Belt (currently 4 mining companies). The work will complement other ongoing studies on Archean gold systems (see above) by undertaking other deposit studies and also by compiling existing data with a focus on regional gold metallogeny.

Background required:

The successful applicants should have a strong background that integrates field studies with some or all of petrology, geochemistry, fluid chemistry, isotopes, and fluid inclusions along with a strong foundation in mineral deposit studies. The post-doc position would also be expected to share a supervisory role in the mentoring of graduate students involved in other projects and be part of applications for further project funding.

To apply please send a letter outlining your interest in one of the projects, accompanied by a CV, which should include the names of 3 references. Applications should be **sent before April 15th** to Dr. John Ayer, MERC Associate Director (jayer@laurentian.ca) and Ms Chantal Duval (cduval@laurentian.ca).