November 27, 2023, MERC Short Course, Saskatchewan Geological Open House

New insights into crustal-scale influences on gold and base metal endowment in the Archean Superior Province

The one-day short course will highlight results from Laurentian University's Metal Earth program where in excess of 1,000 km of reflection seismic, magnetotelluric and gravity surveys have provided some of the highest resolution imaging across transects with differing mineral endowment in granite-greenstone terranes across the southern Superior Province.

The presentations will provide large-scale crustal architecture, metallogenic comparisons and radiogenic isotope characteristics of endowed versus less endowed areas and include focused studies on mineral deposits camps, structural, stratigraphic and geochemical controls. The contributions will emphasize the integration of field and laboratory geological, geochemical and geophysical studies providing new insights into the geological and metallogenic framework of endowed terranes, and the architecture of the structural conduits controlling the upward migration of melts and mineralizing hydrothermal fluids.

Program:

9:00-9:40**: Dr. Ross Sherlock;** Overview of crustal architecture and endowment from the Metal Earth transects across the Southern Superior Province.

9:40-10:20: **Dr. Mostafa Naghizadeh;** Geophysical and Seismic Prospecting of the Southern Superior Province: Overview of Metal Earth Project

10:20-10:40: Break

10:40-11:20: **Kristine Nymoen;** Isotopic mapping and its application to understanding craton architecture and localization of mineral systems.

11:20-12:00: **Dr. Taus R.C. Jørgensen;** Crustal Architecture and VMS Endowment: Insights from the Rouyn-Noranda Camp, Abitibi Greenstone Belt.

12:00-1:00: Lunch

1:00-1:40: **Dr. Bruno Lafrance;** Differences in gold endowment in dome-and-keel and linear accretionary greenstone belts of the Superior Province.

1:40-2:20: **Michael Herzog;** Multi-scale controls on orogenic gold precipitation and remobilization in the Malartic-Val-d'Or District, Québec.

2:20-2:40: Break

2:40-3:20: **Dr. Ross Sherlock;** Gold Mineralization in the Larder Lake Segment of Larder Lake-Cadillac fault.

3:20-4:00: **Dr. Jack Simmons;** Archean orogenic gold deposits associated with structurally-controlled metasedimentary belts of the Superior Craton.

Bios:

Dr. Ross Sherlock joined HES in August 2017 as a Chair in Exploration Targeting and the Director of MERC. Ross is a professional geologist with over 28 years of experience in the mining industry and academic research. His career has spanned junior and senior mining companies, consulting and government surveys working nationally and internationally. Most recently Ross was Vice President, Geoscience at Kinross Gold Corp. and Exploration Manager, North America at Gold Fields. Ross completed a Post-Doctoral Fellowship at the Mineral Deposits Research Unit at UBC, PhD at the University of Waterloo, MSc at Lakehead University, and BSc (Honours) at McMaster University, Canada. He is a member of the Professional Engineers and Geoscientists of BC and Association of Professional Geoscientists of Ontario (APGO).

Dr. Mostafa Naghizadeh received his Ph.D. in Geophysics from the University of Alberta in 2009. He worked as a postdoctoral researcher with CREWES at the University of Calgary and Signal Analysis and Imaging Group (SAIG) at the University of Alberta from January 2010 to September 2012. After five years of industry experience as a Processing Geophysicist in Shell Canada, he joined Laurentian University as part of the Metal Earth project. His interests are mineral exploration, geophysical inversion, seismic processing and interpretation, computational geophysics, and hard rock geophysics. Mostafa received the J. Clarence Karcher Award from SEG in 2011.

Kristine Nymoen is a Ph.D. candidate at Harquail School of Earth Sciences, Laurentian University working on the Metal Earth craton-scale project. She earned her B.Sc. and M.Sc. in Bedrock- and Resource Geology at the Norwegian University of Technology and Science (NTNU). The M.Sc. thesis was done in collaboration with the Geological Survey of Norway (NGU) on a project focused on tectonomagmatic evolution and crustal architecture of the southwestern margin of Fennoscandia and included an exchange program with Texas Tech University for the Green Management of Mineral Deposits (GEMMS) project. Her current research focuses on integrating whole-rock geochemistry with zircon U-Pb-Hf-O isotopes and zircon trace elements from Archean rocks, to look at the origin, petrogenesis and architecture of the southern Superior Craton in space and time, to better understand its implications for large-scale mineral endowment.

Dr. Bruno Lafrance is a structural geologist with the Mineral Exploration Research Centre and a professor at the Harquail School of Earth Sciences, Laurentian University. He specializes on the applications of structural geology to the study of ore deposits. His research focuses on the primary structural controls on the formation of ore deposits and their subsequent modification during orogenic events. Although most of his research has been on gold and volcanogenic massive sulfide deposits, Dr. Lafrance also research the structural controls on the formation and modification of Ni-Cu-PGE deposits in Sudbury, Ontario, and gold endowment on craton scale in the Archean Superior Province.

Michael Herzog received his joint undergraduate degree in geology from the Technical University of Munich and Ludwig-Maximilian University of Munich. He got an MSc. in geology at Ludwig-Maximilian University of Munich where he specialized in mineral deposit research and had the opportunity to spend a year at the Centre for Exploration Targeting at the University of Western Australia to work towards his joint masters project focused on the geochemical footprint of the epithermal intermediate sulfidation Farallón Negro deposit, located in NW Argentina, which investigated the nature of interstratified clay alteration minerals associated with vein alteration halos. He is currently a PhD candidate with the Metal Earth research group at Université Laval where he examines multi-scale controls on orogenic gold mineralization in the Malartic-Val-d'Or district of the southern Abitibi subprovince (Québec, Canada), with an emphasis on the geochemical characterization of individual hydrothermal events.

Dr. Jack Simmons is an Australian volcanologist that completed his undergraduate and PhD programs on the dynamics of caldera-forming eruptions. He has since worked as a Research Fellow at Monash University and as a Project Geologist at the Northern Territory Geological Survey, mapping a variety of sedimentary and volcanic terrains in remote northern Australia. His current research as part of Metal Earth's VMS thematic research project at Laurentian University aims to constrain the geodynamic setting of Neoarchean sedimentation and volcanism in the Superior Craton.