

## A new Canadian research initiative seeking support from the CANADA FIRST RESEARCH EXCELLENCE FUND

### WHAT IS METAL EARTH?

**Metal Earth is a Canadian \$55 million applied R&D program led by Laurentian University.** With funding from the Canada First Research Excellence Fund, this initiative will be a strategic consortium of outstanding Canadian researchers from academia and allied Canadian and international research centres, government and industry. Metal Earth will transform our understanding of the genesis of base and precious metal deposits during Earth's evolution. It will make Canada a world leader in metal endowment research and world-class innovator through open source delivery of new knowledge and the implementation of new technology.

*Metal Earth will contribute to the economic growth of Canada and the sustainability of Canada's Far North while firmly placing Canada as a global leader in mineral exploration research.*

### Keys to Understanding Our Planet

Metal Earth will initially focus on the Precambrian era to answer fundamental questions related to how secular changes in Earth's evolution have resulted in differential metal endowment in space and in time. Research will seek to determine the geological, geochemical and geophysical differences between metal endowed, less endowed and the more common barren areas that appear geologically equivalent.

Defining the key characteristics that differentiate endowed versus less endowed crust will transform our understanding of the processes responsible for Earth's differential base and precious metal endowment.

Research will seek to answer fundamental questions including:

1. Current metal endowment models emphasize modern geodynamic environments and processes. Precambrian geodynamic environments and processes are controversial. If they differed from those operating today, what are the processes that resulted in early Earth's metal endowment and how can they be recognized?
2. Can we recognize subtle differences in the mantle, the subcontinental lithospheric mantle, the crust and in the deep crustal structures between endowed and less endowed areas, which may explain metal endowment localization?

Through this new knowledge, Metal Earth will transform our understanding of Earth's evolution and the fundamental processes that govern metal enrichment through time, as well as increase our understanding of the evolution of our planet's hydrosphere and atmosphere. It will aid government to assess Canada's resource potential and to develop strategies for Far North growth and sustainability.

## Unlocking Earth's Mineral Wealth

The Precambrian era spans 90% of Earth's evolution and much of the Earth's timeframe for development of precious and base metal endowment. This includes the Canadian Shield, which represents 30% of Canada's Far North. While 48% of Canada's total known base metal wealth is derived from Precambrian base and precious metal deposits, **90% of this wealth comes from mines located south of the 60°N latitude.**

How can applied research help unlock the vast, virtually untapped mineral wealth of Canada's Far North?

New knowledge and technology generated by Metal Earth will become principal drivers to support Far North development, sustainability and sovereignty and will firmly place Canada as a global leader in Mineral Exploration research. The resource sector will benefit through direct application to geoscience surveys to focus exploration and increase discoveries. Recognition of key, measureable and validated criteria defining metal endowed areas is **essential for the discovery of Canada's next generation of mines.**

*Through academic, government and industry research partnerships, Metal Earth will **build the scientific capacity** to be responsive to Canada's and the world's current and future metal needs **and the needs of those who explore for metals.***

## NEXT STEPS AND IMPORTANT DATES

**Metal Earth is a \$55 million applied R&D program** offering significant opportunities for national and international collaboration. **Laurentian University** is seeking letters of support for this initiative from Canadian researchers in academia, allied Canadian and international research centres, government and industry who recognize the value of this world-class Canadian initiative.

Letters of Support from Industry and Academia Deadline: **October 22, 2015**

Laurentian University's Letter of Intent Deadline: **November 9, 2015**

Final Application Deadline: **March 29, 2016 (project starts fiscal year 2016 – 2017)**

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## CANADA FIRST RESEARCH EXCELLENCE FUND

The Canada First Research Excellence Fund is a tri-agency initiative of the Social Sciences and Humanities Research Council (SSHRC), the Natural Sciences and Engineering Research Council (NSERC) and the Canadian Institutes of Health Research (CIHR). The Fund's objective is to *help Canadian postsecondary institutions excel globally in research areas that create long-term economic advantages for Canada*. Up to \$950 million in funding is to be awarded. For details, [www.cfref-apogee.gc.ca/home-accueil-eng.aspx](http://www.cfref-apogee.gc.ca/home-accueil-eng.aspx)

## MINERAL EXPLORATION RESEARCH CENTRE

Laurentian University is the only university in Canada where geology and mineral exploration are integral components of the university's strategic plan. The Mineral Exploration Research Centre (MERC), established by the Department of Earth Sciences at Laurentian University, is an internationally recognized and industry-funded hub for exploration science and education. MERC will provide the scientific and administrative nucleus for Metal Earth. Visit [merc.laurentian.ca](http://merc.laurentian.ca)

## MORE ABOUT METAL EARTH

Earth's metal content is not homogeneous. Its economic metal deposits are extreme examples of localized and concentrated metal endowment where elements are enriched by several orders of magnitude compared to their average crustal abundance. Metal deposits are rare. They are comparatively small, are not uniformly distributed throughout the Earth's crust and did not form continuously during Earth's evolution. **Metal Earth** will undertake collaborative, international research on determining the factors and processes that resulted in differential metal endowment and metal deposit localization. Research findings will be substantiated through integrated, 4-D, geological, geochemical and geophysical research that will produce new MRI-like images of the near surface, crust and mantle in metal endowed and barren areas.

**Metal Earth's** novel holistic approach will facilitate detailed comparisons between geologically equivalent endowed and less endowed areas in order to determine the processes and controls on metal endowment during Earth's evolution. Physical comparisons will be established at the deposit, district and belt scale and conceptually at the craton scale. Research will be conducted in past and presently producing metal districts and their barren equivalents that offer accessibility and excellent geological information.

The new science and technology generated by **Metal Earth** will be delivered to the Far North through partnerships with provincial, territorial and federal government geological surveys, the mining industry and the exploration service sector where it will be used to focus exploration on the most prospective areas containing Canada's next generations of discoveries.