



**POLYTECHNIQUE
MONTREAL**

TECHNOLOGICAL
UNIVERSITY



RIME
UQAT-POLYTECHNIQUE
Research Institute on Mines and Environment

PhD Project Offer

Hydrogeotechnical and geochemical stability of filtered tailings storage facilities

Polytechnique Montreal, Quebec, Canada

RIME – Research Institute on Mines and Environment

RIME-Polytechnique is presently looking for a PhD candidate in mineral engineering to study the long-term hydrogeotechnical behaviour and geochemical stability of filtered tailings storage facilities.

Project description

One of the most critical issues faced by the mining industry is the management and safe disposal of the large quantities of mine wastes generated during the operation phase. Despite technical developments in the last decades, geotechnical instabilities of storage facilities still regularly occur. Although reasons for failures are numerous, they typically involve water. Dewatering improves the geotechnical properties of tailings and reduces the needs for confinement structures and, thus, the risk for instabilities. Filtered tailings present many advantages over traditional slurry tailings, such as an improved water recovery and recirculation, and a reduction of the geotechnical risk and consequences of dam failures. However, the long-term evolution of the water content in filtered tailings subject to climatic conditions, the exposure to oxygen and the risk for contaminated mine drainage generation raise some questions about the applicability of the technique in humid climates.

This research project aims to evaluate these risks, and the performance of an innovative solution based on the use of waste rock inclusions (WRI) in filtered tailings storage facilities to improve their geotechnical long-term stability and control contaminant transport. The proposed research program includes field work, physical models in the laboratory and numerical simulations. The outcomes will include practical solutions to improve long-term stability of filtered tailings storage facilities and will be of great interests for mining companies considering filtered tailings disposal, in Canada and elsewhere.

Research fields: Mine wastes management, hydrogeology, mining geotechnics, geochemistry.

Candidate profile: Master's degree in civil, mining or geological engineering, or any other relevant field.

Scholarship: 22 000 \$/year (not subject to income tax).

Duration: 3 years. **Location:** Polytechnique Montreal and field work at Eleonore Mine (James Bay, Qc).

Project start: Autumn 2019.

FOR MORE INFORMATION OR TO APPLY:

Prof. Thomas Pabst, Eng. Ph.D.

Polytechnique Montreal, Department of Civil, Geological and Mining Engineering

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Application deadline: March 31, 2019



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<http://www.irme.ca/en>
<http://www.polymtl.ca/en>



POLYTECHNIQUE MONTRÉAL

MISSION : Respectful of the principles of sustainable development and attuned to the needs of society, Polytechnique Montréal, in accordance with its values:

- educates engineers and top-level scientists to meet the challenges of an evolving world and make them key agents of change;
- conducts research that addresses major societal issues; and
- influences its environment intellectually, economically and socially.

POLYTECHNIQUE AT-A-GLANCE

Founded in 1873, Polytechnique Montréal, technological university, is one of Canada's largest engineering teaching and research institutions and first in Québec for the scope of its research activities.

Polytechnique offers courses and programs in several engineering specialties and accounts for nearly one-quarter of university research in these fields in Québec. The university also conducts some of Canada's most intensive research activities through its approximately 60 research units and a faculty comprising world-renowned experts.

Polytechnique Montréal is a world-class centre of science and technology. The university has agreements with more than 200 institutions from all over the world and international students account for more than one-quarter of Polytechnique's student body.

Polytechnique's Lassonde buildings, the first Canadian university buildings to be awarded LEED (Leadership in Energy and Environmental Design) Gold international certification, have become a benchmark in sustainable construction.

BACHELOR'S, MASTER'S AND DOCTORAL ENGINEERING PROGRAMS

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BIOMEDICAL	GEOLOGICAL	MECHANICAL	ENGINEERING MATHEMATICS
CHEMICAL	INDUSTRIAL	MINING	METALLURGICAL
CIVIL	COMPUTER	PHYSICS	MINERAL

POLYTECHNIQUE BY THE NUMBERS

- Almost 8,600 students (28% women)
- 2,200 graduate students
- More than 120 programs
- 1,630 diplomas awarded in 2017-2018
- 49,200 graduates since 1873
- 260 professors
- 1,525 employees
- Annual budget of \$215 million

RESEARCH

- \$81-million annual budget
- 16 Industrial Research Chairs (including 9 NSERC)
- 21 Canada Research Chairs
- 1 Canada Excellence Research Chair
- 103 Technologies in commercialization
- 56 Patents held
- 25 Active spinoff companies

Update: November 2018



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