

# Statistical Hazard Assessment and Modeling of Mining Seismicity

This project will derive the quantification of mining induced microseismicity in Saskatchewan potash mines. It is desired to gain a better understanding of what “normal” and “abnormal” microseismic patterns are in potash mines, and whether they have any predictive value with respect to mining activity.

Mining industries in Canada can benefit significantly from the in-depth understanding and mitigation of risk associated with induced seismicity. For example, induced microseismicity associated with potash extraction is an expected but poorly understood phenomena. To assess the safety and efficiency of potash mines, operators must quantitatively discern between normal and abnormal seismic activities. The proposed research program comprises two major projects, in which a research team from Western in collaboration with the industrial partners at Nutrien Ltd. and the International Minerals Innovation Institute (IMII) will advance further an understanding of the processes that trigger mining microseismicity.

To accomplish this, the seismicity data from several Nutrien Ltd. operated potash mines in Saskatchewan will be studied in order to infer statistical characteristics of mining microseismicity. The proposed research program will accomplish the following objectives: 1) quantification of the statistical aspects and clustering properties of mining seismicity; 2) development of a probabilistic approach for spatio-temporal modelling and the evolution of mining seismicity by using the Bayesian framework. Nutrien Ltd. requires a knowledge of mining seismicity from which it can develop sound policies and protocols for the safe and efficient operation of its mines.

**Proponent:** Nutrien & Western University

**Project Duration:** May 2021 to June 2023

**Project Cost:** \$240,000

IMII Contribution: \$120,000

Mitacs: \$120,000



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IMII is a unique innovation supporting network of mining companies, government departments and agencies, and post-secondary and research institutions, jointly funded by industry and government. It exists to deliver innovations that matter to mining in Saskatchewan.

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