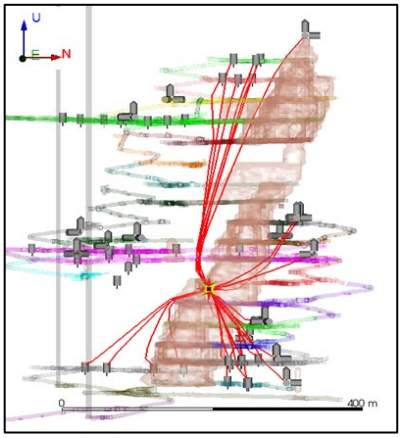
CSEG Foundation

2025-2026 Distinguished Lecture Tour

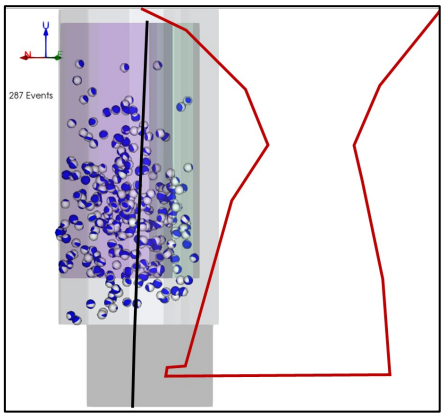
This national tour is sponsored by the Canadian Society of Exploration Geophysicists (CSEG) Foundation and presented by a distinguished member of the society. The goal of the tour is to promote the science and application of geophysics and to highlight a topic of current interest.

Doug Angus is VP of Mining at ESG Solutions, a company that provides world class acquisition and data services for real-time rock-mass characterization to improve mine safety and operational efficiency. He studied applied geophysics from Queen's University, gaining his MSc(Eng) in applied seismology focused on moment tensor inversion of mine seismic data and his PhD in theoretical seismology focused on wave propagation in anisotropic heterogenous. For more than 10 years he worked as an academic in the UK focused on integrating seismology with geomechanics, rock physics and multi-phase fluid flow; as a research associate at Bristol University (2006-2008) and subsequently Associate Professor of Seismic Geomechanics at the University of Leeds (2008-2016).

Seismic and aseismic tools for mine safety



The energy transition will require more critical minerals and many of these mineral deposits are deep underground, which poses significant safety and technological challenges. Underground mining operations generally encounter adverse stress conditions, and this response can be seismic, either very soon, or after sustained perturbation of the in-situ stress over several years. It has been recognized that closely monitoring and characterizing seismic response is non-negotiable for safety underground and therefore plays a key role in the operational success of mining operations.



While characterizing the rock mass can be as simple as monitoring seismicity rates and locating seismicity, evaluating the source parameters and mechanisms of seismicity, and mapping velocity and attenuation changes in the rock mass can assist in validating designs and adjust mine sequences and rates. Additional seismic-adjacent technologies, such as DAS fiber optic seismic, strain and temperature measurements are also contributing to cost-effective monitoring. Integration of seismicity with geomechanics allows validation and calibration of numerical models, improved understanding of the rock mass response as well as testing of hypotheses.

Date:
Time: