

# GAC CORDILLERAN SECTION

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## Exploration Series Morning Talks

Tuesday, September 10, 2019

**8:00 am: Registration – Networking**

**8:15 am: Presentation begins**

Discovery Center, Geological Survey of Canada  
1500 - 605 Robson Street, Vancouver, BC

Cost: \$5 – Pay at Door – Coffee & muffins provided

**RSVP: space is limited; please pre-register by email at: [talks@gac-cs.ca](mailto:talks@gac-cs.ca)**

## Artificial Intelligence in geology in support of improved exploration and mining outcomes

Discussion Leader: Samuel Cantor, Section Head – Geology,  
Minerva Intelligence Inc.



Artificial Intelligence (AI) is a broad field which encompasses machine learning, knowledge representation, robotics, probability, and a host of other disciplines and sub-disciplines. Fundamental to the successful application of AI in the mining industry is the establishment of clear communication and understanding between human beings using AI and the computers which deploy that AI. Humans need to clearly define what they provide as input to AI systems, and AI systems need to be able to explain in human-intelligible terms what they produce and how they produce it. Clarity of communication between these two groups requires shared terms to have an agreed upon meaning, which is achieved using standardized vocabularies of terms. These vocabularies can be international open source standards or internal corporate standards. Companies using their own terminologies need to map them to internationally-recognized terminology standards if they wish to interoperate with global knowledge.

The current focus for AI in geology is centered on machine learning, but it's important not to ignore the available human knowledge. Human knowledge can be used in places where there isn't enough data for an AI system train on. It can also help preserve the loss of knowledge associated with industry turnover and retirement.

The future of AI in geology is the holistic combination of interoperable semantic and numerical geologic data. This data will act as an input to data-driven techniques like machine learning. Combined with knowledge-driven processes capable of explaining the inputs and outputs, data can now be more easily understood by decision-makers, saving multi-disciplinary teams time and money while increasing communication.

**Samuel Cantor** is a geologist with nine years of varied experience in mineral exploration, laboratories, and environmental remediation, and now focuses on the use of semantic AI in mineral deposit research and mineral exploration as the Section Head of Economic Geology at Minerva. Sam completed his Bachelor's in geology at the University of Colorado in Boulder in 2009, after which he worked on mineral exploration projects in Idaho and Nicaragua before moving to Chicago to work in environmental remediation. He moved to Vancouver to pursue his MSc with the Mineral Deposit Research Unit at the University of British Columbia to investigate the exploration potential of stable isotopes and luminescence in carbonate-hosted deposits.