Presenting spatio-temporal porphyry copper prospectivity research at IAMG 2026 in Montreal

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Report on a 2025 34th IGC Travel Grant, an initiative of the Australian Geoscience Council and the Australian Academy of Science

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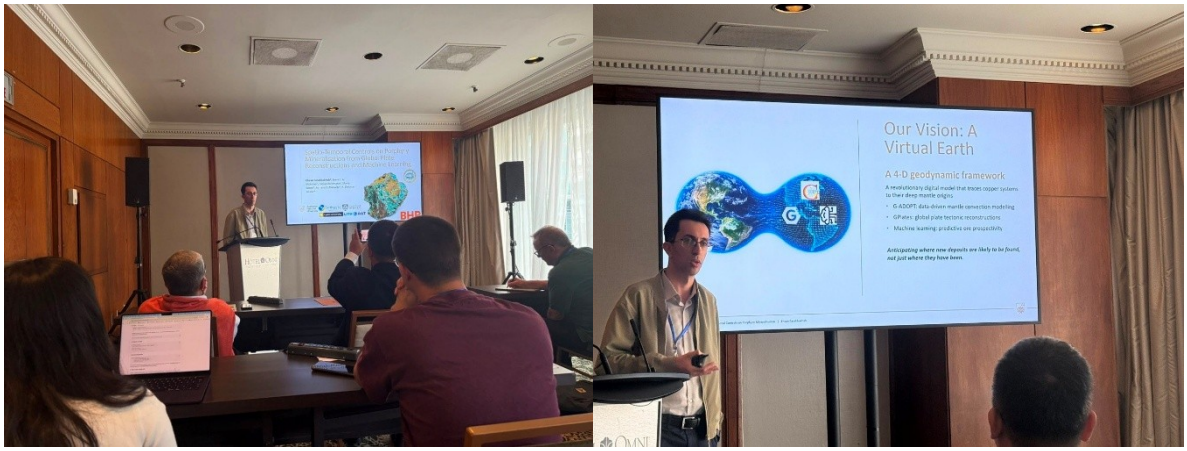
In August 2026, I travelled to Montreal, Canada, to present at the 24th Annual Conference of the International Association for Mathematical Geosciences (IAMG 2026), held from 23 to 28 August. The trip was supported by a 34th IGC Travel Grant, awarded in 2025 by the Australian Geoscience Council (AGC) and the Australian Academy of Science (AAS), which covered part of my costs. I am a research fellow at the Research School of Earth Sciences at The Australian National University, where I work on mineral prospectivity modelling, plate tectonic reconstructions, and machine learning applied to mineral exploration.

IAMG 2026 was held in collaboration with the Commission on Mathematical Geophysics of the International Union of Geodesy and Geophysics, with a thematic core of data-driven discovery, artificial intelligence, and cross-disciplinary approaches to pressing geoscientific problems. Sessions ranged from mineral prospectivity mapping and machine learning for geoscience applications to computational geodynamics, spatio-temporal data analytics, mining geostatistics, and geothermal energy. For someone working at the boundary between geodynamics, economic geology, and data science, it is one of the very few meetings where all of those communities are in the same building for a week.

I gave an oral presentation titled “Spatiotemporal controls on porphyry mineralisation from global plate reconstructions and machine learning” in the session on Integration of AI and Mathematical Modelling for Earth System Interaction Analysis. Porphyry systems supply most of the world’s copper and are major sources of gold and molybdenum, yet targeting them at regional to global scales remains difficult, because both their formation and their survival in the geological record depend on tectonic and surface processes operating over hundreds of millions of years. Most prospectivity models start from present-day tectonic configurations. The approach I presented, developed with collaborators across Australia, instead trains a global machine learning model on known porphyry occurrences using time-dependent features extracted from plate tectonic reconstructions spanning the Phanerozoic, combined with outputs from a landscape evolution model so that the likelihood of a deposit being preserved is treated explicitly alongside the likelihood of it forming. The results point to a small number of dominant controls on where porphyry deposits occur and suggest that the character of the subducting plate matters more than is commonly assumed. A full account of the work is currently under review, so my talk concentrated on the framework itself and on what it means for exploration targeting.



Presenting my work at IAMG 2026, Montreal, Canada, August 2026.

The conversations that followed, in the session itself and over the days afterwards, were the most valuable part of the week. I met several world-leading researchers in mineral prospectivity modelling whose work I have followed for years, and was able to compare notes on how different groups handle uncertainty, data scarcity, and model interpretability in exploration targeting. I also met researchers from the Geological Survey of Canada and the Geological Survey of New Brunswick, and we agreed to collaborate on mineral prospectivity modelling projects in Canada. Alongside those projects, we are planning mutual workshops so methods developed in Australia and Canada can be tested against each other's datasets and geological settings. Several further collaborations were discussed during the week and are now taking shape.

Attending IAMG 2026 has broadened my research network well beyond Australia at a formative stage of my career and has given me a much clearer sense of where global-scale, time-dependent prospectivity modelling sits within international efforts to improve exploration for critical and energy transition minerals. The Canadian collaborations in particular open a new avenue for testing and generalising the modelling approaches I am developing at ANU. I intend to bring what I learned back to the Australian community through the Australian Society of Exploration Geophysicists and the Geological Society of Australia, of which I am a member, and through the workshops now being planned.

I am very grateful to the Australian Geoscience Council and the Australian Academy of Science for awarding me a 34th IGC Travel Grant. Without this support, presenting this work internationally and building these connections would not have been possible. I would encourage other early-career geoscientists in Australia and New Zealand to consider applying to the scheme.