

## PhD Opportunity – University of Auckland

### Phase Change and Reactive Models of Ore Deposition

This PhD investigates how fluid flow, phase change, chemical reactions and transient structural processes drive ore deposition in geothermal and orogenic systems. Using numerical reservoir simulation, you will model two-phase flow, heat and mass transfer, supersaturation, and permeability changes caused by coseismic dilation or pressure cycling. The research spans epithermal environments, deep orogenic gold systems, and a New Zealand case study to quantify ore accumulation rates, favourable parameter regimes, and structural controls on mineralisation.

The project suits a candidate with strong numerical and computational modelling skills, familiarity with fluid flow or geothermal processes, and confidence working with geological, geochemical, and structural datasets. Analytical thinking and interdisciplinary collaboration are essential.

#### Supervisory Team

You'll be supported by a multidisciplinary team with expertise in structural geology, numerical modelling, and mineral systems: **Dr. Michael Gravatt, Prof. JR Rowland, Dr. Ayrton Hamilton and Prof. David Dempsey (University of Canterbury)**

#### Who Should Apply

This project is ideal for students with backgrounds in: **Numerical modelling or Applied mathematics with an interest in Earth science, Fluid mechanics, Structural geology or Geophysics with a strong analytical background.**

#### Funding

This project is funded by the MBIE Endeavour Research Program “Next Generation Ore (N-GO)” and will involve working with a wider team across Aotearoa – particularly with University of Canterbury. The stipend will be \$35,729 (Year 1), \$36,467 (Year 2), \$37,146 (Year 3). The scholarship will also cover fees and health insurance (for international students only).

#### How to apply

To apply, please email Michael Gravatt ([michael.gravatt@auckland.ac.nz](mailto:michael.gravatt@auckland.ac.nz)) with the subject line “Boil Models of Ore Deposition” **by the 27<sup>th</sup> February** and please include the following information:

- A full curriculum vitae, including your university transcripts (both undergraduate and postgraduate)
- A statement indicating why you are interested in this project
- Evidence of your English language ability, e.g. TOFEL or IELTS
- Your expected starting date

## PhD Opportunity – University of Auckland

### Squeeze-Box Modelling of Structural Permeability and Ore Focusing

Mineral systems rely on a “metal transfer superhighway” that moves fluids from deep in the crust to shallow levels where ore deposits can form. Structural permeability—damage, fractures, and fault networks—controls these pathways. Yet we still lack a clear understanding of how permeability develops, how it varies across scales, and how it focuses mineralisation.

This PhD will use advanced **finite element modelling** to simulate fault slip, stress accumulation, and damage formation in 3D “squeeze-box” experiments. You’ll explore how tectonic forces interact with real geological structures to create zones of enhanced permeability that may host mineral deposits.

#### Supervisory Team

You’ll be supported by a multidisciplinary team with expertise in structural geology, numerical modelling, and mineral systems: **Dr. Michael Gravatt, Prof. JR Rowland, Dr. Ayrton Hamilton and Prof. David Dempsey (University of Canterbury)**

#### Who Should Apply

This project is ideal for students with backgrounds in: **Structural geology, Geophysics, Geomechanics, Numerical modelling, Earth science with strong quantitative skills.**

Experience with finite element modelling or coding is beneficial but not essential—enthusiasm and curiosity matter most.

#### Funding

This project is funded by the MBIE Endeavour Research Program “Next Generation Ore (N-GO)” and will involve working with a wider team across Aotearoa – particularly with University of Canterbury. The stipend will be \$35,729 (Year 1), \$36,467 (Year 2), \$37,146 (Year 3). The scholarship will also cover fees and health insurance (for international students only).

#### How to apply

To apply, please email Michael Gravatt ([michael.gravatt@auckland.ac.nz](mailto:michael.gravatt@auckland.ac.nz)) with the subject line “Squeeze Box Modelling of Structural Permeability and Ore Focusing” **by the 27<sup>th</sup> of February** and please include the following information:

- A full curriculum vitae, including your university transcripts (both undergraduate and postgraduate)
- A statement indicating why you are interested in this project
- Evidence of your English language ability, e.g. TOFEL or IELTS

Your expected starting date