

INDUSTRY-SPONSORED PHD OPPORTUNITY

- Research project to tackle energy efficiency issues in industrial crushing and grinding machinery.
- Based in Perth, Australia.
- Collaborative project between [MolyCOP](#) and the [University of Sydney](#).
- PhD stipend of \$35,000 per year available for 3 years for living expenses.

Project information

The mineral processing industry consumes a significant proportion of global energy, with half of this coming from comminution – the process of crushing and grinding solid materials into smaller particles. In existing comminution machinery much of this energy is used to produce unwanted heat and noise, rather than their intended purpose of reducing grain size. There is therefore the prospect of huge energy savings by improving energy efficiency in industrial grinders.

This project seeks to work towards this aim by harnessing the digital transformation. Whereas mineral processing engineers historically only had access to limited data about their systems, thanks to new sensor technologies engineers of today are able to obtain a wealth of real-time information about forces, velocities and power output inside their comminution machinery. The challenge becomes how to interpret this data and identify when the system is performing inefficiently. This project aims to combine such industrial data with models of energy transfer in order to develop an energy efficiency measure that can ultimately help reduce overall consumption.

Research environment

This is a unique collaborative opportunity. Being enrolled as a PhD student at the Sydney Centre in Geomechanics and Mining Materials (SciGEM) of the University of Sydney, the candidate will primarily be based on-site at MolyCOP company offices in Perth. In this way the project will leverage both industrial and academic expertise to tackle the energy efficiency problem.

MolyCOP:

MolyCOP is a leading mineral processing company, who are actively engaging with universities to work towards a target of reducing the energy of the grinding task by 50%. As part of this aim, MolyCOP has pioneered a smart sensor technology that allows engineers to measure forces and accelerations inside large-scale milling machinery, giving unprecedented insight. The PhD candidate will work with this sensor data, under the guidance of [Dr Paul Shelley](#) (VP Innovation).

SciGEM:

Based in the School of Civil Engineering, SciGEM is a vibrant, collegial scientific group home to a diverse range of staff, all sharing a strong interest in understanding granular processes. SciGEM is known internationally for advances in the mathematical modelling of comminution, thermodynamics and heat transfer in particulate systems, and granular segregation and mixing, as well as innovative laboratory experiments to support such models. This PhD project is part of SciGEM's vision to use this knowledge to address the most pressing industrial challenges, and will be supervised by [Prof Itai Einav](#) (Director).

Candidate profile

We are seeking a highly motivated individual with:

- A Bachelor's degree with First Class Honours (or equivalent) and/or a Master's degree in Engineering, Data Science, Physics or Mathematics.
- Outstanding analytical, numerical and critical thinking skills.
- Excellent written and verbal communication, including ability to engage with all project partners.
- Flexibility and willingness to travel between Perth and Sydney when necessary.

How to apply

Please send an email with your CV and a cover letter outlining your background and reason for applying to Prof Itai Einav (itai.einav@sydney.edu.au) and Dr Paul Shelley (paul.shelley@molycop.com).