



UNSW
THE UNIVERSITY OF NEW SOUTH WALES

PhD opportunity at the School of Minerals, Energy and Resources Engineering, UNSW, Sydney

Topic: *Characterisation of fractures and fluid flow behaviour around longwall mining panels*

Scope of Project: Longwall mining is associated with massive fracturing in both overlying and underlying strata. Mining-induced fractures can interact with pre-existing discrete fracture network and form flow channels that connect with a neighbouring gassy coal seam or high pressure aquifer, which poses a serious threat of gas outburst or water inrush to coal production faces. This PhD project aims to characterise fracture network distribution resulting from progressive longwall face advance. This research is expected to develop a generic methodology to investigate fracture distribution around advancing longwall panels through analytical, numerical and experimental analysis. Furthermore, an increased understanding in fracture failure mechanism, fracture microseismicity and fluid flow behaviour in fractured media as a result of coal extraction in longwall mining will be achieved.

Requirements: The ideal candidates are highly self-motivated and will hold, or be expected to achieve, a Master degree in addition to a Bachelor's degree (or equivalent) with Distinction (85/100 or above) in a relevant subject (e.g. Mining Engineering, Petroleum Engineering, Civil Engineering, Computer Science and other related Engineering subjects). Other competencies, skills and abilities may include:

- Ability to develop and apply new research concepts;
- Background knowledge in rock mechanics / fluid mechanics would be an advantage;
- Creative approach to problem-solving, lab testing, computer programming and application in particular;
- Excellent communication skills to engage with a wide range of people;
- Excellent academic performance with strong background knowledge in mathematics, physics and numerical modelling;
- High calibre, enthusiastic and self-motivated.

Funding Information: This PhD scholarship will cover research stipend at the UNSW, which is \$27,082 (AUD) per annum for a three-year period. Non-Australian candidate will also need to apply for [Tuition Fee Scholarship](#) and the UNSW will match up tuition fees. The student will work under the supervision of Dr Guangyao Si, Prof. Ismet Canbulat and Dr Qinghua Lei (ETH-Zurich), with frequent interaction with other staff from the School.

About the School: The School of Minerals, Energy and Resources Engineering is a new and combined force building upon the strength of the previous Schools of Mining and Petroleum Engineering at the UNSW. The Minerals and Mining Engineering at the UNSW ranks the 9th in 2018 QS world university ranking by subjects, which reflects its strong research performance and being a leading mining education provider. The home city Sydney is the world's most loved cities and it has a lively and vibrant culture that makes it the ultimate destination throughout the year.

Application Procedure: Candidates interested in this opportunity are required to use the [self-assessment tool](#) to evaluate if you have met the PhD recruitment criteria at the UNSW. A formal application email together with your CV, academic transcripts and self-assessment result should be sent to Dr Guangyao Si, g.si@unsw.edu.au. The closing date for applications is 8 July 2018. Shortlisted candidates will be notified for the next round interview. The successful candidate is expected to start in early 2019.

