PHD OPPORTUNITY

- Research project centred around fluid-driven soil erosion.
- Based in Sydney Centre in Geomechanics and Mining Materials (SciGEM).
- PhD stipend of $35,000 per year available for 3 years.

Project information

When water flows over beds of soil or other granular materials it can wash away the base layer, eventually depositing the particles at unwanted downstream locations. This is very problematic for urban construction projects, as on-site material is lost via erosion and becomes a pollutant to the region's water source, as well as agricultural environments, where overland flow removes fertile topsoil from farmland. A thorough understanding of soil erosion and sedimentation is therefore crucial to predict, and ultimately protect against, these difficulties.

This project seeks to shed light on the fundamental behaviour of fluid-driven soil erosion. To this end, the candidate will conduct laboratory experiments using our in-house x-ray facility DynamiX to measure erosion and deposition rates, and/or develop mathematical models based around discrete element method simulations and depth-averaged continuum mechanics. They will work with Dr James Baker and Prof Itai Einav, as well as other members of the Sydney Centre in Geomechanics and Mining Materials (SciGEM).

Candidate profile

We are seeking a highly motivated individual with:

- A first-class undergraduate or master's degree (or near completion) in physics, mathematics, engineering or geophysics, which must include a research component.
- Strong analytical, problem solving and critical thinking skills.
- The ability to communicate ideas clearly, both written and verbally.

Furthermore, it would be desirable to have:

- Experience designing and building lab experiments, as well as analysing the resulting data.
- Programming experience (e.g. Matlab, C++, python).
- A working knowledge of continuum mechanics or discrete element methods.

Research environment

SciGEM, based in the School of Civil Engineering at the University of Sydney, is a vibrant, collegial scientific group home to 11 permanent academic staff, 5 postdoctoral research associates and numerous PhD students. Members have a diverse range of expertise from maths, physics, engineering, geology and materials science, all sharing a strong interest in understanding granular processes. Besides the innovative DynamiX laboratory, the PhD candidate will have access to a wealth of experimental facilities including 3D printing and microscopy, as well as dedicated high-performance computing resources.

How to apply

Please send an email with your CV and a short cover letter outlining your background and reason for applying to Dr James Baker: james.baker@sydney.edu.au