POSITION DESCRIPTION

Position Title: Postdoctoral Research Fellow/Research Officer
Organisation Unit: School of Mechanical and Mining Engineering
Position Number: NEW
Type of Employment: Full Time, fixed term
Classification: Academic Level A

THE UNIVERSITY OF QUEENSLAND

The University of Queensland (UQ) contributes positively to society by engaging in the creation, preservation, transfer and application of knowledge. UQ helps shape the future by bringing together and developing leaders in their fields to inspire the next generation and to advance ideas that benefit the world. UQ strives for the personal and professional success of its students, staff and alumni. For more than a century, we have educated and worked with outstanding people to deliver knowledge leadership for a better world.

UQ ranks in the world’s top universities, as measured by several key independent ranking, including the Performance Ranking of Scientific Papers for World Universities (43), the US News Best Global Universities Rankings (52), QS World University Rankings (47), Academic Ranking of World Universities (55), and the Times Higher Education World University Rankings (60). UQ again topped the nation in the prestigious Nature Index and our Life Sciences subject field ranking in the Academic Ranking of World Universities was the highest in Australia at 20.

UQ has an outstanding reputation for the quality of its teachers, its educational programs and employment outcomes for its students. Our students remain at the heart of what we do. The UQ experience – the UQ Advantage – is distinguished by a research enriched curriculum, international collaborations, industry engagement and opportunities that nurture and develop future leaders. UQ has a strong focus on teaching excellence, winning more national teaching excellence awards than any other in the country and attracting the majority of Queensland's highest academic achievers, as well as top interstate and overseas students.

UQ is one of Australia’s Group of Eight, a charter member of edX and a founding member of Universitas 21, an international consortium of leading research-intensive universities.

Our 50,000-plus strong student community includes more than 13,000 postgraduate scholars and more than 12,000 international students from 144 countries, adding to its proud 240,000-plus alumni. The University has about 7,000 academic and professional staff and a $1.8 billion annual operating budget. Its major campuses are at St Lucia, Gatton and Herston, in addition to teaching and research sites around Queensland and Brisbane city. The University has six Faculties and four University-level Institutes. The Institutes, funded by government and industry grants, philanthropy and commercialisation activities, have built scale and focus in research areas in neuroscience, biomolecular and biomedical sciences, sustainable minerals, bioengineering and nanotechnology, as well as social science research.
Organisational Environment

With an excellent reputation for quality graduate training and research performance, the School of Mechanical and Mining Engineering delivers a comprehensive range of programs in aerospace, materials, mechanical, mechatronic and mining engineering. The School's research strengths include hypersonics, renewable energy, materials and manufacturing, automation, oil and gas production, and mining technology. With an annual research income of more than $17 million, the School is internationally known for its high levels of industry collaboration, research quality and output, and commercialisation of discoveries. Our research activities are conducted through four school-based research centres and a confederation of diverse research groups.

Boasting strong student enrolments in professionally accredited programs, combined with world-class researchers and facilities, we are focused on strengthening our position in the engineering community. We will develop global solutions to contemporary issues and mentor the leaders of tomorrow by attracting the brightest minds and fostering a truly innovative and collaborative work environment.

Our people are our greatest asset. We offer collaborative, inclusive work and study places, which are enriched by the significant diversity of our staff, students and community. We genuinely believe that creativity and innovation flourishes in an environment where people feel supported, valued and empowered. Mutual respect, inclusivity and accountability are at the cornerstone of UQ’s culture.

The School is committed to supporting the career growth of women researchers and have a number of initiatives to support women in developing and achieving a fulfilling research career at the School.

The School is undertaking pioneering research in the area of poroelastic rock mechanics to support the resources industries of the future. Areas of focus include the development of advanced rock preconditioning and fragmentation techniques to support the extraction of future mineral resources, and the sustainable enhancement of unconventional gas from coal seams. A strong industry funded research program has been secured, including all of the resources required to create a paradigm shift in these strategically important industries, both within Australia and overseas. The research team is led by recognised experts in their respective fields, who are committed to developing the careers of early-career researchers and engineers.

For more information about the School, please visit: http://www.mechmining.uq.edu.au/

Information for Prospective Staff

The School recognises and values equity and diversity, and encourages applications from any individual who meets the requirements of this position irrespective of gender, sexuality, race, ethnicity, religion, disability, age or other protected attributes. The School strives to provide an inclusive working environment, and along with the University is committed to supporting staff with family and caring responsibilities by providing policies, programs and initiatives to help balance work and family responsibilities.

Further information about life at UQ including staff benefits, relocation and UQ campuses is available at: http://www.uq.edu.au/current-staff/working-at-uq

The University of Queensland Enterprise Agreement outlines the position classification standards for Levels A to E.
DUTY STATEMENT

Primary Purpose of Position

The primary purpose of the position is to manage and undertake research in support of the broader program being run by A/Prof Onederra and Dr Leonardi. At a high level, this will involve the development and testing of computational models for coupled fluid-rock systems, and then applying them in the area of porous media flows. It is expected that complementary laboratory work will be required to validate and direct the modelling. This work will be undertaken in parallel with the activities of other research staff, including small-scale and site-based experiments.

Duties

Duties and responsibilities include, but are not limited to:

Research
- Undertake fundamental and applied research in the areas of computational fluid-rock mechanics and the laboratory characterisation of rocks, including, but not limited to:
  - Pore-scale imaging of igneous rocks using techniques such as micro-computed tomography (μCT), scanning electron microscopy (SEM), and image segmentation to assess porosity and mineral composition;
  - Pore-scale modelling of fluid flow in igneous rocks to quantify permeability and assess the potential for mineral dissolution
  - The upscaling of transport phenomena from small-scale to field-scale models of porous media flow featuring dual porosity (i.e. fractured) systems;
  - Data-driven interrogation of model outputs to facilitate the coupling of different computational codes and the physical interpretation of results;
  - Provide input and assistance to other areas of modelling and experimentation.
- Document research findings and publish scholarly papers in high-quality refereed international journals, books and conference proceedings;
- Attend technical meetings with research sponsors, and present regular research seminars within the group, the School, the Faculty, and to other external stakeholders;
- Work with colleagues and postgraduates to develop new research avenues and build collaborative projects within the School, the University, and if relevant to the area of research, other national and international centres and institutes;
- Actively seek and gain research funding from internal and external sources including the Commonwealth research granting agencies, the state government and industry;

Teaching and Learning
- Contribute to the effective supervision of higher degree by research (HDR) students, as well as undergraduate and postgraduate thesis students;
- Assist in the delivery of lectures, tutorials and practical classes, where appropriate, as well as the marking of assessment.

Service and Engagement
- Perform a range of administrative functions in the School, including the regular preparation of reports for the School, industry, and other key stakeholders;
• Contribute to the processes that enable the academic team to manage the work of the School, as directed by the supervisor;
• Foster the School’s relations with industry, government departments, professional bodies and the wider community;
• Contribute to the development of a positive safety culture in the School;
• Any other duties as reasonably directed by your supervisor.

**Other**

Ensure you are aware of and comply with legislation and University policy relevant to the duties undertaken, including but not exclusive to:

- The [University’s Code of Conduct](#);
- Requirements of the Queensland occupational health and safety (OH&S) legislation and related [OH&S responsibilities and procedures](#) developed by the University or Institute/School;
- The adoption of sustainable practices in all work activities and compliance with associated legislation and related University [sustainability responsibilities and procedures](#);
- Requirements of the Education Services for Overseas Students Act 2000, the National Code 2007 and associated legislation, and related [responsibilities and procedures](#) developed by the University.

**Organisational Relationships**

The position reports to A/Prof Italo Onederra and Dr Christopher Leonardi.

**SELECTION CRITERIA**

- PhD, (or significant progress towards a PhD) in mechanical engineering, civil/geotechnical engineering, mining/petroleum engineering, or a related field such as earth sciences, and or equivalent qualifications and experience.
- Demonstrated expert knowledge in resource geology and porous media flows, including their potential interaction via reaction kinetics.
- Demonstrated ability to develop scientific and data analysis codes such as Python, and apply computational models in fluid and rock mechanics.
- An understanding of working with the lattice Boltzmann method for fluid mechanics, the finite element method for solid mechanics, or the ability to rapidly gain this knowledge.
- An understanding of explosive technology and blast-induced fracturing, or the ability to rapidly gain this knowledge.
- Demonstrated:
  - Ability to publish in high quality outlets and prepare effective reports that document research findings for both internal and external audiences;
  - Ability to work collaboratively with colleagues from a range of technical and non-technical backgrounds;
- High-level interpersonal, written and verbal communication skills, with strong experience in writing and reviewing risk assessments for the relevant experimental work, and effective scheduling of the experimental procedures;
- Ability to prioritise own workload, work independently and meet deadlines.

- An ability and willingness to:
  - Develop a coherent research program and to work effectively with the research group;
  - Participate in applications for external research funding support;
  - Supervise honours and Higher Degree by Research (HDR) students;
  - Contribute to positive safety practices and culture.

**Qualification Verification**

An appointment to this position is subject to the verification of the highest academic qualification from the conferring institution.

The University of Queensland values diversity and inclusion and actively encourages applications from those who bring diversity to the University. Please refer to the University's Diversity and Inclusion webpage (http://www.uq.edu.au/equity) for further information and points of contact if you require additional support.

This role is a full-time position; however flexible working arrangements may be negotiated.

Accessibility requirements and/or adjustments can be directed to the contact person listed in the job advertisement.