POSITION DESCRIPTION

Position Title: Postdoctoral Research Fellow or Research Fellow in Groundwater Modelling
Organisation Unit: Energy Initiative
Position Number: 3038046
Type of Employment: Research Academic
Classification: Level A/B negotiable

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 (45), the US News Best Global Universities Rankings (52), QS World University Rankings (51), 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 secured a greater share of Australian Research Council grants in 2016 ($24.5 million) than any other university nationally.

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 230,000-plus alumni. The University has about 7,000 academic and professional staff and a $1.7 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.

UQ has an outstanding track-record in commercialisation of our innovation with major technologies employed across the globe and integral to gross product sales of $11billion+ (see http://uniquest.com.au/our-track-record).

UQ has a rapidly growing record of attracting philanthropic support for its activities and will have further success in this area as an important strategic aim going forward.

Organisational Environment

Come and join an exciting multi-disciplinary research group that is working on solving some of the world’s trickiest energy and environmental problems. The University of Queensland Energy Initiative has initiated a project on a new Carbon Storage evaluation trial, which will advance Australia’s understanding of its capacity to permanently store carbon dioxide in geological formations. The acquisition of critical, flow-test data in suspended (non-hydrocarbon bearing) oil and gas exploration wells, provides the Project with a highly cost effective means to increase the understanding of aquifer properties and how CO2 plumes behave. Importantly, it will do this in a real, Australia basin-specific location which has been identified by previous CCS studies as having “high potential”. This first, Australian, dynamically calibrated, regional storage assessment will be integrated with industrial CO2 supply scenarios and known surface and sub-surface constraints, to deliver the first full, techno-economic assessment of dynamic storage capacity which rate-matches the source and sink conditions. It is expected that such an exercise in ‘basin management’ will lead to improved resource assessment methodology and knowledge of how costs can be minimised by careful choice of development sequence. A parallel social science program will work on establishing CCS in the context of future energy choices, including the development of regulator and educator capacity and the development of social baseline methodologies.

Further information on the UQ Energy initiative may be accessed via https://energy.uq.edu.au/.

The position will be located in the University’s Engineering, Architecture, and Information Technology Faculty (EAIT). Information about the Faculty may be accessed on the Faculty’s web site at

https://www.eait.uq.edu.au

Information for Prospective Staff

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

To work in a multidisciplinary research team of geologists, engineers, geophysicists, hydrogeologists and modellers to trial new lower cost rapid evaluation techniques that assess commercial carbon storage viability. You will be working with senior academics, other postdoctoral fellows and post graduate students to deliver high impact science outcomes. This position will provide the key technical scientific horsepower to drive the building, attribution and simulation of fit for purpose groundwater models of the Precipice Sandstone and Evergreen Formation (reservoir-seal pair) and overlying strata of the Great Artesian Basin. You will be investigating if any cumulative impacts to groundwater resources might be expected from various carbon storage scenarios.

The research work will include significant consultation with experts in the School of Earth Sciences and School of Chemical Engineering, and will be conducted in partnership with technical experts in the Coal Industry and Government. Duties will also include providing support and coordination of PhD students working on theses related to the project.

Duties

Duties and responsibilities include, but are not limited to:

Research
- Develop and design appropriate research methodologies for modelling cumulative impacts on aquifers from carbon storage scenarios in the Precipice Sandstone of the Surat Basin. Modelling and calibration with water pumping field trials and Managed Aquifer Recharge activities will be conducted to evaluate best practice.
- Develop and design appropriate research methodologies for modelling code comparison and sensitivity analysis.
- Apply cutting edge hydrogeological principles and techniques to simulate the effects of, density, reactive geochemistry, faults, and intraformational baffles on groundwater dynamics.
- Contribute to an integrated analysis of the storage capacity and containment security of potential Surat Basin commercial scale carbon storage.
- Advise and direct PhD students working on components of the overall project
- Contribute to comprehensive and regular project and milestone reporting so that the achievements are effectively communicated.
- Prepare board papers, research reports and journal articles
- Deliver research presentations to various audiences

Service and Engagement
- Establish and maintain close working relationships with stakeholders within the community, coal industry companies and all levels of government, where relevant, Engage with fellow researchers in the University of Queensland faculties and collaborating research institutions
- As a motivated and enthusiastic individual you will work as an integral part of a diverse project team and contribute to the overall performance of the team,
- You will participate in the mentoring and supervision of PhD students that are working on the team
- You will liaise closely with the project Chief Investigator and with academics in Earth Sciences, Engineering and other UQ Schools/Institutes.

**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 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 the Project Chief Investigator.
SELECTION CRITERIA

Essential

- The applicant should be an early career researcher and have obtained a PhD in hydrogeology or related discipline.
- Detailed understanding of technical aspects of groundwater modelling including boundary conditions, sensitivity analysis, history matching, calibration and validation.
- Detailed knowledge of hydrodynamic and inorganic geochemistry processes including aquifer drawdown or injection processes, recharge, discharge, evapotranspiration, CO2 dissolution, density driven processes and reactive transport processes.
- Detailed knowledge of reservoir Groundwater Modelling software such as MODFLOW, MODFLOW USG, FEFLOW and TOUGH React (or equivalent) to be run as in both steady state and transient modes.
- Experience in groundwater modelling at regional scale (sub-basin scale) including the incorporation of a static geological model, up scaling properties, history matching, calibration and validation. Experience is also required in groundwater processes such as density effects, diffusion, depression, dissolution, and reactive transport.
- Strong inter-personal communication and well-developed written communication skills.
- The ability to work both collaboratively in a team and independently to a high level of professionalism; as well as the ability to relate to and engage with a diverse stakeholders with competing interests and views.
- Experience in collating, analysing and interpreting quantitative and qualitative research data or other similar information,
- Experience in hydrogeology and hydrochemistry.
- Demonstrated ability to manage a program of work to meet milestones, and commitment to following safe work practices,
- High levels of personal integrity and transparency, particularly in contentious settings.

Desirable

- Ability to grow and develop personal research expertise, demonstrated by an emerging profile in research with an increasing degree of autonomy,
- Knowledge of the Surat Basin geology in Queensland
- Knowledge of Carbon Storage Projects globally
- Excellent time management skills

Seminar

Applicants invited for interview may be expected to present a seminar in conjunction with the selection interview process.

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.

Applications are particularly encouraged from Aboriginal and Torres Strait Islander peoples. For further information please contact our Australian Indigenous Employment Coordinator at: atsi_recruitment@uq.edu.au

Applications are also encouraged from women.

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