POSITION DESCRIPTION

Position Title: Postdoctoral Research Fellow
Organisation Unit: School of Mechanical and Mining Engineering
Position Number: NEW
Type of Employment: Full Time, Fixed Term for 2 years
Classification: Research 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.

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 this will be a strategic focus going forward.

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.

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.

The School recognises and values equity and diversity, and encourages applications from any individual who meets the requirements of this position, regardless 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.

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

A Postdoctoral Research Fellow is required for a two year appointment, to work on continuing the development of an adaptive, multi-fluid plasma simulation capability, and using this capability to investigate shock driven instabilities related to fusion. The successful candidate is expected to show creativity, independence, self-motivation, as well as leadership and management skills to ensure the success of the project he/she is associated with.

The successful applicant will add dissipative effect models, an ionization model, and a field divergence constraint control algorithm suitable for strong fields and adaptive meshes to an existing multi-fluid plasma simulation code. They will then use this enhanced simulation capability to investigate the role of these effects in shock driven plasma instabilities, including in the presence of seed magnetic fields and converging geometry. The successful applicant will also be involved in supervising postgraduate and honours students.

Duties

Duties and responsibilities include, but are not limited to:

Research

- Add models for dissipative effects model and ionization to UQ's existing multi-fluid plasma simulation code.
- Adapt a field divergence constraint control algorithm suitable for adaptive grids and implement this in a multi-fluid plasma simulation code.
- Computationally investigate the influence of seed magnetic fields and dissipative effects on shock-driven plasma instabilities in both planar and converging geometries over a wide range of plasma parameters.
- Build links and collaborate with other researchers/academics who can support the tool development.
- Write and edit scientific works and publish high-quality reports and scholarly papers.
- Work with team members to supervise honours, masters and RHD students.
- Support development of research proposals for funding in aligned topics.

Teaching and Learning

- Teach into related undergraduate courses.
- Supervise students undertaking undergraduate and postgraduate coursework engineering projects and participate in the supervision of Higher Degree by Research (MPhil and PhD students).

Service and Engagement

- Perform a range of administrative functions in the laboratory and/or research group as needed, including an ability and willingness to serve as a Laboratory Manager if required.
• Foster relations with industry (including international partners), government departments, professional bodies and the wider community.

• Provide support to other staff if required during absences.

• 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 Associate Professor Vincent Wheatley in the School of Mechanical and Mining Engineering.
SELECTION CRITERIA

Essential
- A PhD (completed or near-completion) in Mechanical Engineering, Aerospace Engineering, Physics, Applied Mathematics or a related field.
- Experience with the development and use of numerical methods for compressible, multi-fluid plasma flows coupled to Maxwell’s equations.
- Experience with the simulation and analysis of shock-driven instabilities in plasmas.
- Experience with code development, verification and management for massively parallel high-performance computing platforms.
- Experience with code development and use within adaptive mesh refinement frameworks.
- Knowledge of shock and wave dynamics in multi-fluid plasma systems.
- Knowledge of hydrodynamic plasma instabilities.
- Demonstrated high level of interpersonal, written and verbal communication skills.
- Track record of high quality publications.
- Ability and willingness to promote and adhere to a positive safety culture.
- Demonstrated tutoring skills at undergraduate levels.

Desirable
- Experience with adapting and implementing divergence constraint control algorithms for Maxwell’s equations.
- Experience collaborating remotely with an international research team.
- Experience with postgraduate student supervision.
- It is strongly desirable that the applicant has experience with compressible multi-fluid plasma simulations coupled to Maxwell’s equations;

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.