POSITION DESCRIPTION

Position Title: Postdoctoral Research Fellow (Level A) or Research Fellow (Level B)

Organisation Unit: School of Mechanical & Mining Engineering

Position Number: TBA

Type of Employment: 1 year with extension to 3 years, subject to funding and performance.

Classification: Research Academic, Level A or B

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, in 2016, secured a share ($24.5 million) of Australian Research Council grants greater 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 university 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**

The School of *Mechanical and Mining Engineering* is one of the largest Schools of this type in Australia with at least 75 full-time academic staff members who are widely published internationally and have extensive research backgrounds. The research team is actively involved in the prestigious Centre for Advanced Materials Processing and Manufacturing (AMPAM) and Cooperative Research Centre for Rail Manufacturing.

The Advanced Forming group, led by Professor Paul Meehan, is designing, developing and testing predictive simulation models and control algorithms for a novel advanced manufacturing process known as Incremental Sheet Forming (ISF). In particular, this large collaborative project will develop and validate various advanced simulation techniques to predict process forces and product shape. This will result in a rapid simulation software kernel for process prediction and optimisation. In addition, advanced model predictive feedback control will utilise validated models to represent and optimise process states to increase robustness and accuracy, thus enabling ISF as a commercially viable process. Research will be performed in collaboration with a global aerospace and defence industry partner.

Information about the Faculty and the School 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 Positions

Project overview: Develop and experimentally validate a multi-stage forming technique, whereby intermediate shapes are formed prior to the final desired shape. A systematic and efficient methodology for designing multi-stage deformation passes will be developed and enhanced based on model-based deformation analyses or alternatives.

The primary duties of the position are to –
- perform research and project management including modelling, development and testing of new algorithms and/or processes
- report results to industry and academia in the area of advanced forming.

Duties

Duties and responsibilities include, but are not limited to:

Research
- Conduct research and publish scholarly papers in high-quality refereed international journals, books and conference proceedings.
- Actively seek and gain research funding from internal and external sources including the Commonwealth research granting agencies, the state government and industry.
- Develop a program of fundamental, applied and contract research in ISF including –
  - Manage and develop mathematical and simulation models for advanced forming.
  - Develop algorithms and computational code for ISF prediction and/or optimisation and/or control.
  - Coordinate and assist with the design and implementation of laboratory experiments for validation on the ISF machine.
  - Coordinate and assist with the design and commissioning of any required modifications to the ISF machine.
  - Perform closed loop control ISF laboratory experiments.
  - Report on designs, modelling and laboratory results.
- Present regular research seminars within the group and within the School/Faculty and to external stakeholders.
- Build collaborative research projects within the School, internationally and, if relevant to the area of research, centres and institutes.

Teaching and Learning
- Contribute to the effective supervision of undergraduate and postgraduate coursework student thesis and design courses, and supervise research higher degree students.
- Assist the teaching team in the delivery of practical classes, tutorials, and lectures and mark assessment.
- Effectively train staff and students in the safe and effective operations of equipment and research laboratories in accordance with University requirements.

Service and Engagement
- Perform a range of administrative functions in the School including -
o Manage and report weekly work for the Advanced Forming Group.
o Prepare reports for key stakeholders such as Industry partners.
o Effectively source and recommend the purchase of materials and equipment in accordance with UQ policy.

- Contribute to the processes that will enable the academic team to manage the work of the Advanced Forming Group as directed by the supervisor.
- Foster the School's relations with industry, government departments, professional bodies and the wider community.
- Demonstrate the ability to develop and contribute to an inclusive culture.

Safety
- Conduct inductions, prepare risk assessments, and ensure users of laboratories and equipment have been thoroughly trained.
- Maintain laboratories and equipment in a safe and clean condition.
- Act as laboratory manager if required.

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 positions will report to Professor Paul Meehan through the project manager.
SELECTION CRITERIA

Essential

- PhD (or thesis submission) in mechanical engineering or electrical engineering or related field such as applied physics or mathematics.
- Demonstrated record of research in the field of the PhD, and for Level B, evidence of engagement in independent and/or team research projects.
- Publications in high quality journals, and for Level B, an established track record of publication in high quality journals.
- Ability to achieve national recognition in the area of expertise and for Level B, national recognition in the area of expertise.
- Ability to participate in applications for external funding, and for Level B, the ability to take a chief investigator role in applications for external funding.
- Ability and willingness to be involved in the supervision of honours and RHD student supervision, and for Level B, ability and willingness to contribute toward the effective supervision of honours and RHD students and participate in teaching of coursework students.
- Demonstrated high level of drive and enthusiasm.
- Demonstrated ability to work collaboratively with colleagues, administrative, and technical staff.
- Demonstrated high level interpersonal, written and verbal communication skills.
- Demonstrated ability to prioritise own workload, work independently and meet deadlines.
- Ability to -
  - develop mathematical models for mechanics problems.
  - simulate mechanics phenomena using software tools.
  - design and implement computer code for mechanical problems.
  - develop control systems for mechanical problems.
  - perform closed loop control experiments.
  - prepare effective reports on designs, modelling, lab and field results.
  - Demonstrated problem solving ability in the areas of control theory and/or applied modelling and optimisation and/or the ability to rapidly acquire this knowledge.

Desirable

- Experience with the Incremental Sheet Forming process and/or similar advanced manufacturing process.
- Experience with model based control, nonlinear control or similar methods and/or the ability to rapidly acquire this knowledge.

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.

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