

POSITION DESCRIPTION

Position Title:	Postdoctoral Research Fellow / Research Fellow (Power Systems)
Organisation Unit:	School of Information Technology & Electrical Engineering
Position Number:	NEW
Type of Employment:	Full-time, Fixed-Term
Classification:	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 CWTS Leiden Ranking (32), the Performance Ranking of Scientific Papers for World Universities (40), the US News Best Global Universities Rankings (42), QS World University Rankings (47), Academic Ranking of World Universities (54), and the Times Higher Education World University Rankings (66). Excluding the award component, UQ is now ranked 45th in the world in the ARWU, and is one of the only two Australian universities to be included in the global top 50.

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, bio- molecular 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+.

UQ has a rapidly growing record of attracting philanthropic support for its activities and this will be a strategic focus going forward.

School of Information Technology & Electrical Engineering

It is an exciting time to get involved with the School of Information Technology and Electrical Engineering, located on UQ's St. Lucia campus. The School is ramping up its investment in teaching, research and engagement to create an inspiring, diverse and flexible workplace. The direction is backed by a bold, new strategic vision to ensure the School is at the forefront of meaningful research outcomes and pedagogy across its core impact areas of health, data, automation and energy. Boasting strong student enrolments in professionally accredited programs, combined with world-class researchers and facilities, the School is focused on strengthening its position in the global computer science and engineering communities. By attracting the brightest minds and fostering a truly innovative and collaborative work environment, the School will develop global solutions to contemporary issues and mentor the leaders of tomorrow.

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.

Enabling the Power Systems of the Future

Department of Innovation and Tourism Industry Development of the state Government of Queensland has recently funded a Project 'Enabling the Power Systems of the Future' at the University of Queensland where the project will develop a new power system simulation/analysis platform to investigate the security of Queensland's power system to support its transition to integrate new energy platforms and achieve 50% renewables by 2030. Project partners in this work includes Powerlink Queensland (Transmission Network Service Provider of Queensland), GridQube, Mining3, Manitoba Hydro International and a consultant QGE Pty Ltd, with support from the Australian Energy Market Operator and Energy Queensland. The research and development is focused on Queensland Power system network. This project will deliver a new EMT platform incorporating new algorithms and state-of-the-art models for new interconnected technologies and other energy platforms. The analytics developed in this project will be useful to accurately assess security risks and optimise the design of new energy platforms, such as renewable generators, battery storage, synchronous condensers, VSC based HVDC interconnectors and new technology based pumped storage.

Globally there is an urgent need for a step change in the platform for monitoring and controlling electricity distribution networks to ensure safety, reliability, and support customer participation, via home energy management (HEM) platforms, in electricity supply and usage, including through distributed technologies such as household photovoltaics (PV), battery storage, smart appliances and electric-vehicle (EV) chargers. This project also develops and trials a scalable estimation and control platform to enable intensive, wide-scale integration of HEM platforms and associated distributed technologies across Medium Voltage (MV) and Low Voltage (LV)

networks. This part of the project collaborates closely with an SME GridQube, who will provide a major part of the deliverables for the State Estimation part of the project in association with Energy Queensland.

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. Details of the School may be accessed on its website at <http://www.itee.uq.edu.au/>.

DUTY STATEMENT

Primary Purpose of Position

To perform the research activities within the Power Systems research area and to ensure effective collaboration with the investigators and academics, PhD students and industry partners involved in this project.

The successful applicant will collaborate with the other researchers in the project including the higher degree research (HDR) students to meet the research project objectives. The Postdoctoral Research Fellow / Research Fellow will be responsible to deliver the projects milestone commitments and project deliverables.

For Appointment at Level A

Duties and responsibilities include, but are not limited to:

Research

- Perform power systems stability analysis (voltage, transient and frequency stability) for Queensland's interconnected power systems network using PSS/E and PSCAD tools.
- Develop model of new technologies to enable transition to future Queensland power system. This includes, but not limited to, developing models for Synchronous Condenser, Energy Storage, and Grid-forming Inverters along with VSC HVDC and new Pumped Hydro schemes suitable for the QLD network.
- Explore impacts of Queensland Renewable Energy Target (QRET) on the current Queensland networks regarding voltage stability, transient stability, frequency stability and operational reliability using PSCAD and PSS/E tools.
- Perform distribution system analysis with Solar PV/Battery/EV with application to State Estimation algorithms and use commercial tools
- Perform research activities for the project that ensure delivery against project milestones on a half yearly basis throughout the project tenure of three years.
- Publish high-quality technical papers in domain-specific top outlets for PhD level candidates.
- Produce milestone reports and relevant project submission documents.
- Implement and be accountable for the policies and guidelines of University of Queensland.

Teaching and Learning

- As a 'Research focussed' position there is no formal requirement for undergraduate teaching. However it is encouraged that you actively seek teaching opportunities.
- Support HDR students in research training and supervision.
- Participate in events to attract postgraduate students to the research project.

Service and Engagement

- Contribute to the processes that enable the research team to manage the work of the project.
- Represent the research team in industry or funding body forums and develop and maintain a relevant industry network.

- Foster the projects relations with industry, government departments, professional bodies and the wider community.
- Any other duties as reasonably directed by your supervisor.

For Appointment at Level B

Duties as listed for Level A, in addition to the following:

- Engage in independent and/or team research programs including external funding, and achieve national recognition and impact in the research area.
- Conduct research and publish scholarly papers in both academic peer- reviewed and professional journals that contribute to the School's strategic research strengths.
- Work with colleagues and postgraduates in the development and conduct of joint research projects, especially projects that are interdisciplinary and contribute to the strategic direction of the School.

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 Professor Tapan Saha, and will work under the guidance of Professor Tapan Saha and Dr Ruifeng Yan within the School of Information Technology and Electrical Engineering.

SELECTION CRITERIA

For Appointment at Level A

- Undergraduate or Master's degree in electrical engineering with expertise in power systems analysis tools or a higher degree in Electrical Engineering or related field. For PhD, proven submitted thesis for examination is acceptable.
- Demonstrated research experience in field of power system high voltage network analyses tools in PSS/E and PSCAD with control techniques including renewable generation integration.
- Comprehensive knowledge in distribution system analysis and state estimation principles.
- A track record of publications in reputed peer-reviewed journals in power engineering or related area for PhD level candidates.
- Effective communication and interpersonal skills.
- Experience in team work.

Desirable:

- Background in power systems analysis and control systems applications.
- Practical PV//wind/storage/Synchronous condenser/HVDC integration experience (involving software).
- Python programming skill to interface PSS/E and PSCAD for quasi static time series analysis.
- Knowledge of control systems theory and applications.
- Experience in power systems planning and operation.
- Experience in multidisciplinary team work.

For Appointment at Level B

As listed above, in addition to the following:

- PhD in Electrical Engineering or related field.
- Strong track record of publications in highly refereed journals in power systems.
- Experience in supervision of Honours and Research Higher Degree students.
- Ability to successfully deliver outputs to industry and excellent writing, communication and interpersonal skills, including successful milestone delivery.
- Evidence of a contribution to research, including successful external grant applications.
- An ability to establish effective relationships and to represent and promote the school at a university and wider community level, including industry, government and professional bodies.

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](#) 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 recruitment@uq.edu.au.