

PhD Scholarship: Buildings Contributing to a Zero Carbon Grid

A highly competitive scholarship is available to support a suitably interested and eligible Australian resident / citizen to undertake a 3-year PhD research project at *UNSW Sydney*, supported by the *Cooperative Research Centre (CRC) for Reliable Affordable Clean Energy for 2030 (RACE 2030)* in collaboration with industry partner *Buildings Alive*.

This PhD project will explore opportunities for dynamic optimisation of energy use in large buildings, responding to weather, building operational data, electricity prices and emissions intensity data to help minimise carbon emissions, reduce energy costs and support the electricity distribution network. The project team will have access to a unique dataset of energy, weather and IoT data from hundreds of commercial and institutional buildings across Australia and internationally through the industry partner, *Buildings Alive*.

Project description

Like major economies and institutions around the world, owners and operators of large commercial, residential and institutional buildings in Australia are increasingly committed to Net Zero Carbon targets. Such targets raise optimisation questions (for individual buildings, organisations and institutions) that arise when the increasingly dynamic nature of energy generation, distribution and usage is considered.

This research will draw upon a large (and constantly updating) database of energy and other metering, weather and IoT data from hundreds of commercial and institutional buildings across Australia and internationally managed by *Buildings Alive*. The research will focus on analysis of this unique dataset in the context of its real-world energy and carbon implications and will be rooted in questions of energy engineering. However, the research process could draw on methods from any of applied statistics, machine learning, computer science, building physics, social science and economics.

This PhD will also be supported by an Industry Reference Group (IRG) throughout the project.

The specific area of research will be determined in consultation with the industry partner, research supervision team and IRG during the first 6 months of the PhD and may relate to one or more of the following:

- Operational/engineering methods for harnessing the ‘active efficiency’ potential of buildings;
- The scale of opportunity considered from various perspectives, e.g., commercial, economic (societal), environmental;
- Significant statistical challenges associated with forecasting and feedback;
- Application and benefit of various technologies, in particular controls, sensors, IoT devices.
- Implications for network management, energy market design and policy

Project partners

The PhD project will be completed at *UNSW Sydney*, in the *School of Photovoltaic & Renewable Energy (SPREE)*, through the *Collaboration on Energy and Environmental Markets (CEEM)*.

[SPREE](#) is internationally recognized for its record-breaking research in solar power (photovoltaics) and renewable energy. The PERC solar cell was first invented at UNSW in our labs in 1983, and today powers more than 85% of all new solar panel modules, all over the world. SPREE's work and people have changed the face of sustainable energy on the global stage, and we continue to be at the forefront of leading-edge research and development in the field of renewable technologies, including their deployment and integration into the energy system, as our economies transition away from fossil fuels.

[CEEM](#) undertakes interdisciplinary research in the design, analysis and performance of energy and environmental markets and their associated policy frameworks. CEEM brings together UNSW researchers from the UNSW Business School, the Faculty of Engineering, the Faculty of Arts and Social Sciences, the Institute of Environmental Studies, and the Faculty of Law, working alongside a growing number of international partners.

[Buildings Alive](#) is the Industry Partner on the project.

This PhD will be completed through a PhD by publication/compilation or thesis with a minimum of three peer reviewed publications and will commence with an industry focused [Rapid Review](#). The rapid review will be completed in parallel with immersion in Buildings Alive's dataset.

The successful candidate is expected to split their time between the UNSW campus and the Buildings Alive office, with an expectation of a minimum of 1 day/week at each, as agreed by the project team and based on the project and candidate's needs at the time.

You can find out more about RACE for 2030 [here](#).

Funding

RACE for 2030 will provide **three years** of funding at \$38,000 per annum (tax exempt) via a student scholarship managed by UNSW. RACE2030 will also supply up to \$3,000 per annum for expenses for the candidate, for items such as a computer, publishing fees, travel and/or conference costs. Scholarships are provided as a living stipend and do not cover international tuition fees.

Eligibility

1. Scholarships are available for Australian residents and citizens. We encourage female identifying or Indigenous applications. Offshore applications will not be accepted.
2. Applicants should have a first-class Honours or Masters degree or equivalent in a related discipline, OR a combination of an upper second-class honour's degree or equivalent in a related discipline together with a minimum of five years equivalent full-time professional work experience in a relevant field.
3. Applicants must be eligible for enrolment in a PhD program at UNSW, including [minimum entry requirements](#) and [English language requirements](#).
4. Applicants must study full time.

Skills and experience

In addition to the eligibility criteria, candidates should also have the following skills and/or experience:

- Background in, and broad understanding of, energy engineering is preferred

- Specific knowledge, skills and experience from any of the following disciplines could be beneficial: applied statistics, machine learning, computer science, building physics, social science and economics
- Excellent communication skills
- English language requirements for UNSW also apply

During the selection process, candidates will also be assessed upon their ability to:

- Independently pursue their work
- Collaborate with others
- Have a professional approach
- Analyse and work with complex issues and
- Formulate scientific texts

How to apply

Interested applicants who fulfill all the eligibility requirements should e-mail an application to Mike Roberts m.roberts@unsw.edu.au

Your application must include:

- A cover letter / personal statement describing:
 - Your reasons for undertaking a PhD and applying for this scholarship
 - Your professional and research experience and skills, and how you will apply these to the PhD project
 - Your outputs and achievements, and their quality and impact
- A CV including contact details and citizenship / residency status and outlining your education, professional experience, details of publications and other achievements to date. This should include details of grades achieved, prizes and awards received, research projects undertaken and their outcomes.
- Official academic transcripts from your previous and current degree(s)

Contact details

For further information please contact:

Dr Mike Roberts m.roberts@unsw.edu.au

Prof Iain MacGill i.macgill@unsw.edu.au

Application closing date

17th January 2022