

# HDR PROJECT SUMMARY

## ROBUST SOLUTIONS FOR COMPLEX ENERGY INFRASTRUCTURE

### HDR PROJECT DESCRIPTION

Renewable energy poses significant challenges in terms of infrastructure capable of supporting demands and dealing with uncertainties inherent in resources such as wind and solar.

This project will explore different approaches to the optimisation of energy infrastructure, quantifying and evaluating uncertainties based on historical data. They will develop solutions that meet supply and demand settings in a robust, cost-effective way.

### PROJECT OBJECTIVES

This project aims to provide robust solutions for energy infrastructure by developing algorithms that can optimise complex infrastructure based on predicted energy supply and demand, while dealing with associated uncertainties. It will build on existing modelling tools for energy storage and prediction, such that they can deal with non-linear objectives and constraints.

### PROJECT SCOPE

The successful candidate will develop a full research proposal during the initial months of their candidature.

Uncertainties will be quantified and evaluated based on historical data, and solutions will be provided that are cost efficient and robust such that they meet supply-and-demand settings in a cost-effective way.

Techniques may include the application of mixed-integer programming formulations and the use of artificial-intelligence-based optimisation from the field of evolutionary computation.

### QUALIFICATIONS AND EXPERIENCE

The prospective student should have a strong background in energy networks and/or the design and application of optimisation algorithms such as mixed integer programming or heuristics search algorithms. To deal with stochastic aspects of the problems and algorithms, strong mathematical knowledge is also required.

To determine your eligibility for studying at The University of Adelaide visit: [adelaide.edu.au/graduate-research](https://adelaide.edu.au/graduate-research)

For further enquiries and more details, please contact Professor Frank Neumann, School of Computer and Mathematical Sciences:

**Email:** [frank.neumann@adelaide.edu.au](mailto:frank.neumann@adelaide.edu.au)

**Telephone:** +61 8 8313 4477

### PRIMARY UNIVERSITY SUPERVISOR

- Professor Frank Neumann,  
The University of Adelaide

### PROJECT PARTNER

- The University of Adelaide

### PROJECT TYPE

- PhD

### DATE ADVERTISED

- Friday 30 August 2024

# HILT CRC POSTGRADUATE PROGRAM

**Are you interested in receiving training from world-leading researchers, whilst working with industry partners on real-world problems?**

**Join the HILT CRC postgraduate program for a research career in de-risking decarbonisation for heavy industry.**

Through engagement with industry and universities we are committed to training the heavy industry workforce of the future through practical, demand driven research projects with world-leading teams and facilities.

We offer Higher Degrees by Research (HDR) through a PhD or Masters qualification for up to 3.5 years duration, providing you with the opportunity to acquire world-leading training in a field of growing demand to take your engineering career further.

By joining our postgraduate research program, you will work on real industry problems and challenges with the potential for immediate high-impact practical results to decarbonise heavy industry.

**When undertaking a research degree with us, you will also gain:**

**Expert knowledge** – designed specifically for the heavy industry sector and draws on your foundation of engineering knowledge by developing further skills tailored to transitioning the steel, iron, alumina and cement industries to reduce heavy industry's carbon emissions.

**Invaluable networking opportunities and professional development** – benefit from opportunities to collaborate and network with multiple industries and research experts and teams via participating in the HILT CRC specialised webinars, yearly conferences, and master classes.

**Career outcomes** – linked with industry and government, you will gain hands on industry experience to help you develop the skills required to operate in a new low-carbon economy, become an expert in your field, and enhance your employability.

**A platform for communicating your findings** – your research findings may be presented at industry conferences, published, commercialised and in turn, create a positive impact on society.

## Financial Support and Scholarships

We can provide full, co-funded or top-up scholarships to eligible postgraduate students (Higher Degree by Research students at both Master and PhD levels) across our three research programs at our partner universities. The distribution of funding is at the discretion of the principal (main) supervisor of the project and may be used for student stipend, costs associated with the research project or other expenditure related to the project.

Any student interested in undertaking a postgraduate scholarship is encouraged to review the [Scholarship Guidelines](#) and complete the [HDR Scholarships Application Form](#). Details for how to apply for postgraduate scholarships are included in the guidelines.

## How to Apply

All HILT CRC prospective postgraduate students are required to enrol in their degree through their host institution as per the normal university application process. Therefore, students need to meet the requirements stipulated by the host university to enrol (e.g. appropriate Honours or Masters degree).

## Further Information

For more details about the postgraduate research opportunities and projects, and financial support with HILT CRC, contact us at [hdr@hiltcrc.com.au](mailto:hdr@hiltcrc.com.au)