



# Opening up research internship opportunities

## INDUSTRY ENGAGEMENT CASE STUDY

At Macquarie University, our higher degree research (HDR) candidates are bright thinkers, highly skilled and adaptable. Internships offer them the opportunity to apply their research solutions to real-world challenges. This case study, featuring PhD candidates from our School of Engineering, highlights the benefits and outcomes of an internship collaboration with Macquarie, APR.Intern (Australian Postgraduate Research Intern) and Electrotechnik.

### HIGHER DEGREE RESEARCH AT MACQUARIE

We aim to be in the top research-intensive universities in the world. To drive our ambitious research agenda, we make choices to deliver exceptional HDR programs that are globally competitive and prepare candidates for the challenges ahead. Our HDR candidates are key to enhancing our reputation and building our capacity to carry out world-changing research.

Mentored by world-leading experts, our HDR candidates also have access to excellent research facilities and are part of a supportive community that encourages innovation and discovery.

### APR.INTERN

The University partners with Australian Postgraduate Research Intern (APR.Intern) – Australia's only PhD internship program spanning all sectors, disciplines and universities – to connect our PhD candidates with industry.

The program does this through short-term research projects, empowering students to thrive in a practical research environment. For businesses, APR.Intern is a platform to access some of Australia's brightest research minds and new worlds of innovation.

[aprintern.org.au/](http://aprintern.org.au/)

### ELECTROTECHNIK

Electrotechnik provides commercial solutions to the electrical industry using innovative software for a world-wide market. The Electrotechnik team invests in engineering, development, customer support and design. Its software is developed and supported by an experienced team of electrical and software engineers.

[elek.com.au/](http://elek.com.au/)

### TAPPING INTO OUR EXPERTISE AND TALENT

Our electrical engineering PhD candidates are able to look into the future through research. They develop advanced engineering skills and contribute to industry-focused research projects, identifying solutions to electrical and electronic engineering problems.

Electrotechnik identified a need to make improvements in software products for performing high-voltage cable rating calculations.

They partnered with Macquarie in 2018 through the APR. Intern internship program to engage PhD candidates in projects focused on making these improvements. Since then, highly skilled PhD candidates from our world-class School of Engineering have completed placements with Electrotechnik.



(LEFT TO RIGHT) KHUSHBOO SINGH – PHD CANDIDATE, MACQUARIE UNIVERSITY  
 JAYSON PATRICK – TECHNICAL DIRECTOR, ELECTROTECHNIK  
 EDSTAN FERNANDES – PHD CANDIDATE, MACQUARIE UNIVERSITY

### MEET EDSTAN FERNANDES: ELECTRICAL ENGINEERING PHD

Edstan Fernandes was the first intern to undertake a five-month placement, four days a week at the Sydney office, with Electrotechnik. The objectives of Edstan's internship was to produce high-voltage cable rating calculations and modelling for commercial software by researching the latest international standards and literature on how to solve and perform the calculations. He then used this to research, design, document and implement a series of software models for performing the calculations.



*"The internship is very important in your career and should be taken up at whatever level of study you are in. It teaches you to be responsible, realise the power of decision making and maintain a flexible approach."*

**EDSTAN FERNANDES** PHD CANDIDATE  
MACQUARIE UNIVERSITY

### BENEFITS AND OUTCOMES

This collaboration has enabled excellent commercial outcomes for Electrotechnik and built stronger industry relationships.

Both Edstan and Khushboo have also continued to work at Electrotechnik since finishing their internships, a testament to this great opportunity for all stakeholders.

During their internships, Edstan and Khushboo were supported and guided by their principal supervisors Associate Professor Jahangir Hossain and Professor Karu Esselle respectively.

*"Electrotechnik continues to produce world-class electrical software with the help of these [intern] programs. PhD-calibre staff fit very well into our company and with the demands in developing our algorithms. It's been a pleasure working with Edstan and Khushboo and other PhD interns, several of whom have been welcomed as permanent staff."*

**JAYSON PATRICK**  
TECHNICAL DIRECTOR, ELECTROTECHNIK

*"[The program is] a wonderful opportunity to sneak a peek into the industrial world. A perfect chance to sharpen my skills and to implement my academic knowledge into a project that intrigued me. It was a doorway to a real world where my contributions could make a difference.*

*[The internship] has been a life-changing experience for me, and I am sure it will help any other student who wants to validate his/her skills and capabilities."*

**KHUSHBOO SINGH** PHD CANDIDATE  
MACQUARIE UNIVERSITY



### MEET KHUSHBOO SINGH: ELECTRICAL ENGINEERING PHD

Khushboo Singh interned at Electrotechnik from June to November 2019. Her focus was on the development of a numerical algorithm for studying the electrical performance of buried earthing systems during low-frequency faults based on the method of images for multilayer soils. Khushboo researched the numerical methods based on the method of images outlined in technical publications on how to solve and perform the electromagnetic calculations and built a software model for performing the calculations.

*"I would highly recommend and encourage other HDR students and academics to make use of the APR. Intern internship. It definitely helps to bridge the gap between industry and academia."*

**PROFESSOR KARU ESSELLE**  
SCHOOL OF ENGINEERING, MACQUARIE UNIVERSITY

### COLLABORATE WITH MACQUARIE

Our HDR candidates are passionate and ambitious leaders with expertise across a diverse range of fields and industries. Their world-class research environment has given them the freedom to break through traditional boundaries to solve the big issues of our time.

Tap into our best and brightest minds by hosting an internship. They'll bring a fresh perspective, new skills and innovative approaches to your workplace, while giving you the chance to promote your organisation and profile future graduates.

For more information on how to engage with HDR candidates at Macquarie, visit: [mq.edu.au/connect/engage-hdr](https://mq.edu.au/connect/engage-hdr)

### FIND OUT MORE

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