



# FOUNDATION FOR POWER ENGINEERING EXCELLENCE MEMBERSHIP PROSPECTUS



FOUNDATION FOR  
POWER ENGINEERING  
EXCELLENCE

UNIVERSITY OF  
WOLLONGONG  
AUSTRALIA



## MISSION STATEMENT

**The Foundation for Power Engineering Excellence at the University of Wollongong will deliver excellence in power engineering research, education and industry professional development, along with value added services to industry supported through long term sustainable partnerships.**



A MESSAGE FROM THE  
DIRECTOR OF THE  
FOUNDATION FOR POWER  
ENGINEERING EXCELLENCE  
(FPEE)

Associate Professor Philip Ciuffo

It is with great pleasure that I am writing to you, extending an invitation for you to become part of the strong, vibrant and well established electrical power engineering group at the University of Wollongong (UOW). For close to two decades we have worked very closely with the electrical power industry in Australia delivering outcomes with tangible benefits to the wider community. These include research and development projects, consulting activities and continuing professional development alongside undergraduate and postgraduate education. Through these activities, we have established a strong track record and an outstanding national and international reputation.

The modern electricity grid is now integrated with many novel types of devices, loads and generating sources. There are challenges ahead to ensure that the electricity grid continues to operate in a reliable and efficient manner while ensuring the lowest cost to the entire community. The work being undertaken at UOW in relation to the integration of renewable sources, quality of supply, network protection, and the techno-economic aspects of future electricity networks is helping to make this so. We are excited about these activities and intend to continue contributing to the industry and the community as a whole.

Our aim is to sustain our current strengths and activities while, at the same time, expanding our collaboration with a broader cross-section of industry partners. With this in mind, we are now embarking on the establishment of the Foundation for Power Engineering Excellence (FPEE), which aims to enhance the power engineering research and teaching activities at UOW by attracting industry partners from across the country. I hope that you will take the time to read our prospectus and will consider partnering with us in this new Foundation.

## OBJECTIVES

### RESEARCH

- To engage in world leading, highly industry relevant collaborative research and innovation
- To be recognised nationally and internationally as the premier Australian institution for electrical power engineering research

### EDUCATION

- To enhance the quality of power engineering education at the University of Wollongong (UOW) and to play a key role in the fostering of power engineering education on a state and national level
- To provide opportunities in postgraduate education allowing students to acquire the specialised skills required by industry and to develop the next generation of electrical power engineering educators

### TRAINING

- To provide ongoing training to industry and the community in fields ranging from general awareness to specialised technical topics
- To produce technical documentation useful to the industry and the broader community

### INDUSTRY COLLABORATION

- To work closely with industry to ensure that the research and development work undertaken remains relevant and addresses the real world problems faced by the industry and to produce innovations that make Australian industries world leaders in electrical power engineering practice
- To provide informed and credible input to the development of national and international standards and guidelines, via Standards Australia, the International Electrotechnical Commission (IEC) and Council for Large Electric Systems (CIGRÉ)

# ELECTRICAL POWER ENGINEERING AT UOW

UOW was initially founded on strengths in engineering disciplines which continue to this day. These strengths are reflected in the results of the Excellence in Research for Australia 2012 Initiative (ERA) which awarded UOW a 4 star rating (above world standard) for electrical and electronic engineering.

The following are UOW research centres that are active in research related to electrical power engineering:

- **The Australian Power Quality and Reliability Centre (APQRC).** Founded in 1996, the APQRC is one of the premier electrical power engineering centres in the country. It has a distinguished record of collaboration with industry, producing high quality engineering graduates, delivering applied research and contributing to industry best practices.
- **The Sustainable Buildings Research Centre (SBRC)** which is a multi-disciplinary facility that brings together a wide range of researchers. SBRC staff members are active in renewable energy, distributed generation, energy efficiency and micro-grid research.
- **The Simulation, Modelling and Analysis for Research and Teaching (SMART) Infrastructure Facility.** SMART draws on UOW's proven research track record and academic strength in the areas of engineering, commerce, informatics, law, and science to holistically assess infrastructure solutions.
- **The Institute for Superconducting and Electronic Materials (ISEM)** is a world class research group with a record of research breakthroughs in new applications for innovative materials in the fields of energy generation and transmission, energy storage and energy conversion. ISEM also has internationally recognised specialist expertise in battery storage and management.

## RESEARCH

Power engineering research at UOW is internationally recognised. Significant power engineering research activities at UOW include:

- Five Australian Research Council (ARC) industry linkage and discovery research projects with funding in excess of \$1.6 million
- Successful completion of 6 Australian Strategic Technology Program (ASTP) projects
- Extensive record of research publications
- Host of the 2008 International Conference on Harmonics and Quality of Power (ICHQP 2008)
- Power Quality Compliance Audit – An ongoing project which analyses, reports and benchmarks power quality data supplied by electricity distribution utilities across Australia

- Standards Australia Handbook HB 264-2003, a practical guide to the Australian standards for allocation of harmonics and flicker written for Standards Australia
- Significant contributions to CIGRÉ working group reports in the area of power quality

## EDUCATION

### Undergraduate Education

The Bachelor of Engineering (Electrical) course (with specialist final year subjects available in power engineering) at UOW is a comprehensive engineering program that provides graduates with the core skills required for successful careers in professional practice. Electrical Engineering graduates from UOW are highly sought after by industry and hold many leadership roles.

### Postgraduate Education

A large number of postgraduate research students are engaged in electrical power engineering research at UOW. Their work is essential to the operation of the evolving electrical power system and hence brings benefits to the wider community.

The key research being conducted by UOW students includes:

- Power quality
- Power system reliability
- Renewable energy
- Distributed generation
- Electric vehicles
- Fault current limiters
- Energy storage
- Energy Efficiency

In 2011 UOW launched a modular Masters and a Graduate Certificate course work program in electrical power engineering directly targeted towards addressing the industry needs for specialised knowledge. To date, this course has been extremely well supported by industry and attended by industry professionals.



## TRAINING

In addition to formal degree offerings, UOW has a long history in providing practical training to industry personnel ranging from engineers to managers to technicians across a range of subject areas. In addition to provision of training courses, the APQRC periodically publishes a number of documents which explain a range of electrical engineering topics in simple terms. These 'technical notes' are freely available to all.

## LABORATORY FACILITIES

UOW operates a number of world class teaching and research laboratories. Undergraduate laboratories are equipped with modern Lab Volt teaching equipment along with custom designed equipment for motor and drive experiments.

The power engineering research laboratory contains a range of sophisticated equipment useful for a broad range of research and testing. Hardware is complemented by advanced software packages allowing simulation and analysis.

## COLLABORATION WITH INDUSTRY & PEAK BODIES

UOW staff and industry have a long history of collaboration. UOW staff are active members of many industry peak bodies and committees. These include:

- Standards Australia
- CIGRÉ (Council for Large Electric Systems)
- ENA (Energy Networks Association)
- IEC (International Electrotechnical Commission)
- EESA (Electric Energy Society of Australia)
- Australian PV Institute

UOW has provided consultancy services to some of Australia's largest power transmission and distribution companies and manufacturers to solve practical problems. Over the past five years 42 consulting projects have been undertaken for 22 individual industry clients.



## ABOUT THE FACULTY OF ENGINEERING & INFORMATION SCIENCES

The Faculty of Engineering and Information Sciences at the University of Wollongong has many leading engineering, mathematics, physics and ICT research centres, based on our long standing collaboration with local and multinational industries and research institutions in Australia and overseas. We have over 600 students enrolled in PhDs and over 300 academic staff supported by more than 60 technical staff enabling us to be one of the most research intensive Faculties of its type in Australia. Our faculty members are driving relevant and cutting-edge research in a wide range of areas focused on providing innovative solutions to global issues.

## UOW PROFILE

### UOW is consistently ranked in the Top 2% of universities in the world:

- 276th in the world – QS World University Rankings 2013/2014
- 298th in the world – Times Higher Education World University Rankings 2013/2014
- 352nd in the world – Academic Ranking of World Universities (ARWU) 2013
- 314th in the world for research quality – 2014 Leiden Ranking

### Globally ranked as one of Australia's best modern universities:

- 22nd in the world – QS Top 50 Under 50 Rankings 2014
- 33rd in the world – Times Higher Education Top 100 Under 50 Rankings 2014

### Globally rated a five-star university:

- 5 Star rating – QS World University Rankings 2012/2013

### For the fourteenth year in a row, the Good Universities Guide (2014) awarded UOW five stars in:

- Getting a job
- Graduate starting salaries
- Positive graduate outcomes

### Top 100 in the world for global graduates:

- 6th year in a row that employers have ranked our graduates in the top 100 universities in the world – QS World University Rankings Graduate Employers Survey 2013

### Top tier rankings in every discipline:

- Top tier rankings in every discipline category – Australian Government's Learning and Teaching Performance Fund 2008

## A SUCCESSFUL UOW UNDERGRADUATE PROFILE



**Ms Felicity Galluzzo**

Section Manager – Power, Beca,  
Winner of the Engineers Australia  
Graduate Electrical Power Engineer  
of the Year Award – 2008

I completed my Bachelor of Electrical Engineering degree on a part-time basis as a Cadet Electrical Engineer at BlueScope Steel. Keen to pursue a future in Power Engineering I moved to Melbourne after graduating in 2003 to take up a position with Powercor and Citipower as a Protection & Control Engineer. In October 2008 I joined Beca and I am now the Section Manager – Power. Our team spans Adelaide, Brisbane, Melbourne and Sydney and we provide Power Engineering professional services to clients across numerous markets including power transmission, distribution and generation, airports, water, rail, and energy and resources. I have often run into my former lecturers at industry events and conferences, and have always been impressed with how closely engaged the UOW Power Engineering staff is with industry. My undergraduate experience provided a robust foundation upon which I have developed my career, and I am proud to be associated with a university so committed to preparing its graduates for the vast world which awaits them.

## A SUCCESSFUL UOW POSTGRADUATE PROFILE



**Dr Tim Browne**

Principal Power Systems Engineer,  
PSC Australia

The University of Wollongong offered a formidable reputation for power engineering expertise, and did not disappoint. Being able to learn from and work with noted experts in the field, who are particularly focussed on real-world problems experienced in industry, was an attractive selling point for UOW. Material from my postgraduate thesis has been, and continues to be, directly relevant to a number of consulting engagements. Power industry clients, both within Australia and internationally, have experienced and recognised the value in the broad and deep knowledge of power quality built up and passed on by UOW's experts.

## FOUNDATION FUNDING UTILISATION

The funding associated with the FPEE will be used to promote power engineering activities and excellence at UOW. Examples of the mainstream areas in which the funding will be utilised will include:

- Staff Recruitment and Retention - Funding will contribute to the recruitment and retention of leading researchers and educators in the field of electrical power engineering. These researchers and educators will be dedicated to undertaking applied industry based research as well as training the next generation of the electrical power industry workforce.
- Postgraduate Scholarships - Funding will be used to establish a scholarship program to attract high quality electrical power engineering postgraduate students who will work on industry based projects and who will be committed to obtaining solutions to practical industry problems.
- Undergraduate Scholarships - Scholarships will be offered on a yearly basis to attract high quality students who will form the future industry workforce and leaders.
- Research Infrastructure Support - Funding will be utilised to procure and maintain laboratory equipment and facilities required to conduct applied research and undertake consulting work of relevance to the industry.
- Support for Attendance at Peak Industry Committees - The researchers and educators associated with the FPEE are involved in peak national and international working groups

and committees in order to ensure access to state of the art knowledge and solutions for industry problems as well as ensuring the contribution of Australia on the world stage. Some funds from the FPEE will be used to offset the costs of staff participation in these activities.

## BENEFITS AVAILABLE TO FOUNDATION PARTNERS

In addition to supporting the long term future of excellence in power engineering education and research in Australia, Foundation partners can expect to receive the following benefits:

- The ability to nominate undergraduate thesis and/or postgraduate research projects to enhance collaborative research
- Acknowledgement on all Foundation websites and documentation
- Priority expert consulting and/or laboratory testing time
- The ability to provide company-named scholarships to facilitate the recognition of company name, vision and values
- Exposure to students through guest lectures and seminars and other Foundation activities
- Complimentary attendance at all Foundation managed continuing education courses (typically 2 per year)
- Foundation partner-only technical expertise and developed literature
- Direct promotion of employment opportunities to potential undergraduate and postgraduate students.



## FOUNDATION PARTNERSHIP LEVELS

Foundation partnerships are offered at Platinum, Gold, Silver and Bronze levels. The higher the level of membership, the greater the benefits including greater access to additional UOW resources and technical expertise.



## KEY STAFF PROFILES



### Emeritus Professor Vic Gosbell

Vic obtained his Ph.D. in 1971 from the University of Sydney for work on the asynchronous operation of turbogenerators. In 1972 he commenced lecturing at the University of Sydney where his research interests included model power systems, power system stability, HVDC transmission, power electronics and variable speed motor drives. In 1990 he moved to the University of Wollongong where he became foundation Professor of Power Engineering. His current research interest is power quality with an emphasis on harmonics, PQ survey measurements, and standards.

He is a member of the Standards Australia "Power Quality" Committee, a Fellow of the Institution of Engineers, Australia and past Chairperson of the Australasian Committee for Power Engineering. He was the recipient of the M.A. Sargent Medal in 2008.



### Professor Sarath Perera

Sarath graduated from the University of Moratuwa, Sri Lanka with a BSc (Eng) specialising in Electrical Power. He obtained his MEngSc from the University of New South Wales and PhD from the University of Wollongong. He has been on the academic staff at the University of Wollongong since 1988. He has been active in electromagnetic modelling, machine design and analysis, in particular permanent magnet machines.

His current research interests are in the general area of power quality and in particular voltage fluctuations, flicker and voltage unbalance. He is a member of the Standards Australia Committee on Power Quality and is/has been closely involved with CIGRÉ C4 (System Technical Performance) working groups at international level. He is currently the Technical Director of the Australian Power Quality and Reliability Centre.



### Professor Chris Cook

Chris graduated from The University of Adelaide with a BSc in 1971 and a BE in 1972. He received his PhD from The University of New South Wales in 1976. He then went to the U.K. to work for Marconi Avionics. After three years he returned to Australia to work for GEC as Technical Manager of their automation and control division.

In 1983 he joined UOW. In 1989 he became Professor of Electrical Engineering with research interests in industrial automation and power engineering. In 1990 he was involved in establishing, with Pacific Power, the Energy Efficient Research Centre Ltd., a nonprofit company which designs and installs variable speed drive and other power engineering systems. In 1996 he continued to develop joint Industry-University initiatives by assisting with the setting up and running of the 'Power Quality Centre' at UOW.

In 2002 he was appointed Dean of Engineering, and in 2013 he was appointed as Executive Dean, Faculty of Engineering & Information Sciences.



#### Professor Danny Sutanto

Danny received his B.Eng. and Ph.D. from the University of Western Australia in 1978 and 1981 respectively. Following his graduation he joined GEC Projects, Australia as a Power System Analyst. In 1982 he joined the School of Electrical Engineering at UNSW. In 1996 he joined the Hong Kong Polytechnic University as a Professor in Electrical Engineering.

In 2006, he joined UOW as Professor of Power Engineering. His main areas of research are power system analysis, power system economics, voltage stability, harmonics, power electronics and computer aided education. He was awarded the N. Svennson's Award for Teaching Excellence in the Faculty of Engineering in 1994. In 2000, he was awarded the HK Polytechnic University President's Award for Outstanding Performance in Teaching. He is also a member of the International Editorial Advisory panel of the International Journal "Electric Power Systems Research".



#### Professor Paul Cooper

Paul is the Director of the UOW Sustainable Buildings Research Centre (SBRC). Paul has been involved in research on a wide variety of topics in sustainable buildings, energy systems, energy efficiency and fluid mechanics over the past thirty years. He holds a bachelor in Electrical Engineering, a masters in Science and Technology Studies and a PhD in Heat Transfer, all from Imperial College London. He joined UOW as a lecturer in the Department of Mechanical Engineering at UOW in 1988 and has collaborated with colleagues in the Electrical Power group since that time.

Paul was the Head of the School of Mechanical, Materials and Mechatronic Engineering at the University of Wollongong prior to taking up his present appointment. Paul was also the Faculty Advisor and the lead academic on the Team UOW Solar Decathlon China 2013 campaign. This project culminated in Team UOW winning the competition with the highest number of points scored by any team in the history of all competitions around the world.



#### Professor Pascal Perez

Pascal received his PhD in Environmental Studies from Montpellier University, France in 1994. Pascal is a specialist of integrative infrastructure modelling, using various computer simulation technologies to explore complex interactions between social and technological components of infrastructure systems.

He has a 30-year experience in complex system modelling, first in France, then at the Australian National University and CSIRO. Pascal joined UOW in 2011. He currently is the Research Director of the SMART Infrastructure Facility. He is a member of the Technical Committee of the Australian Urban Research Infrastructure Network (AURIN). He is also a member of the Modelling and Decision Support Division of Simulation Australia and of the Modelling and Simulation Society of Australia and New Zealand (MSSANZ). Professor Perez has published 100 refereed papers and book chapters. In 2006, he co-edited with his colleague David Batten the book 'Complex Science for a Complex World' (ANU E Press).



## HONORARY PROFESSORIAL FELLOWS



**Mr Alex Baitch**

Alex holds BE, MEngSc and MBA degrees from Sydney University, University of NSW and Deakin University respectively. He is an honorary Fellow of Engineers Australia and a fellow of Australian Institute of

Energy, a Senior Member of IEEE and an Associate Member of the Australian Institute of Arbitrators and Mediators. In 2014 Alex took up the role of National President of Engineers Australia. Alex has over 40 years industry experience in the electricity industry including electricity utilities, manufacturing, importing and consulting. Alex is principal of BES (Aust) Pty Ltd specialising in electrical distribution and utilisation. Alex is one of Australia's leading authorities on electric safety.



**Dr Robert Barr AM**

Robert commenced his career in the electricity supply industry in 1973 as a cadet engineer with Prospect Electricity. He was appointed as a professional engineer with Prospect Electricity in 1976 and gained experience in

electricity distribution including load forecasting and system planning. Robert joined Illawarra Electricity as System Control Engineer in 1982 and was later appointed Area Manager Nowra. Robert has managed and worked for his company "Electric Power Consulting Pty Ltd" since 1990 and has dealt with a wide range of power quality and general electricity industry problems. He was recognised by the Electrical College of Engineers Australia as the 2012 Professional Electrical Engineer of the Year and was announced as being appointed as a Member of the Order of Australia (AM) in the Queen's Birthday 2013 Honours List for significant service to engineering, particularly electrical energy supply and distribution.



**Dr Peeter Muttik**

Peeter holds Ph.D, B.E. (Hons) and B.Sc degrees from the University of Adelaide. Peter has many years of experience in a wide variety of electric power projects, power systems analysis and design

including substations and high power electronics.



**Dr David Sweeting**

David holds Ph.D, B.Sc and B.E. (Hons) degrees from Sydney University. He is an Honorary Fellow of Engineers Australia, a Senior Member of IEEE, and a member of the Electric Energy Society of Australia, Consult

Australia and CIGRÉ. After finishing his PhD David worked for Brown Boveri in Switzerland for 4 years on circuit breaker development, testing and switching transients. On returning to Australia he joined the Sydney County Council, now Ausgrid, where he held positions in substations, overhead transmissions, the Testing Branch and ran the Lane Cove High Power Testing Station. In 1980 he joined the consulting firm Bassett and Partners where he became an Associate Director. In 1989 he began Sweeting Consulting Pty Ltd specialising in High Voltage Electrical Engineering. David has over 40 years experience in HV electrical distribution, power quality reviews and being an expert witness. He has been and still is involved on many National and International Standards Committees covering short circuit currents, standard voltages, power quality and arcing hazards.



**Mr Ty Christopher**

Ty Christopher started in the Electricity Supply Industry in New South Wales in 1986 as a cadet engineer. Over the last 29 years, his career within the industry has included responsibility for substation

and mains design, project management, system operations, network planning, asset strategy and most recently program delivery. In his current role Ty is accountable to the Chief Operating Officer for overall program management and delivery of network capital and maintenance programs. This includes the management of a Portfolio Management Office to provide end to end management of projects, including those undertaken by contract resources and delivery of efficient and effective network asset management services. The portfolio delivered is in the order of \$500 million per annum. Ty has led his current team through a period of transformational change required to successfully deliver the largest network investment program ever undertaken by Endeavour Energy or its predecessor organisations, with substantial results delivered by contract service providers.

# LEARN MORE

For more information about the Foundation for Power Engineering Excellence (FPEE):

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