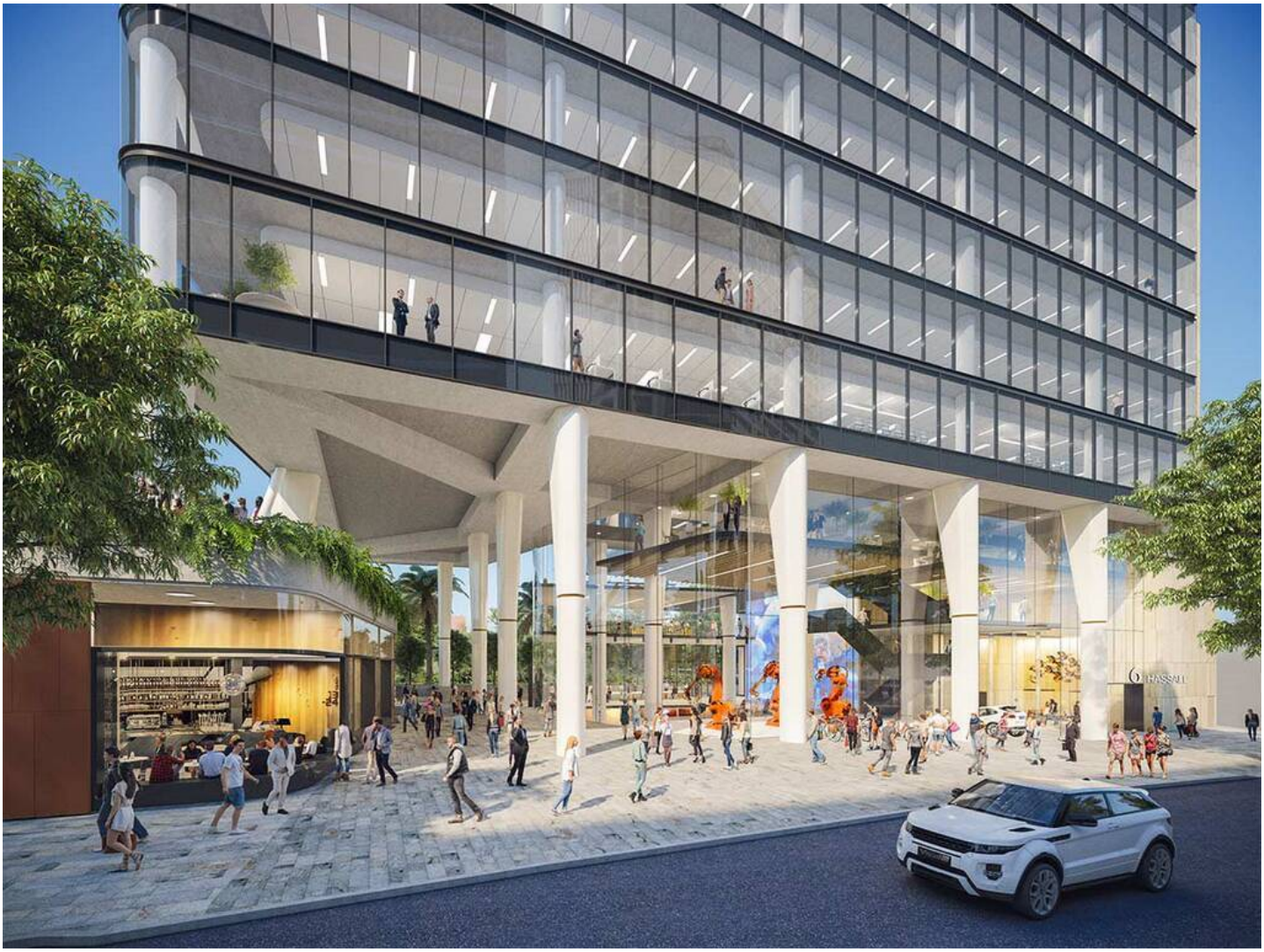
EXCiTE

CONNECTING ENGINEERING DESIGN AND BUILT ENVIRONMENT

WESTERN SYDNEY UNIVERSITY

News from the School of Engineering, Design and Built Environment.

eNewsletter | September 2021 | Issue 6



Message From The Deputy Dean

I am very pleased to share that School of Engineering, Design and Built Environment will be offering a number of new undergraduate and postgraduate programs in 2022 including BEng Honours (Sustainability Engineering), BEng Honours (Advanced Manufacturing) BEng Honours (Materials Engineering), Bachelor of Construction Management Honours (Advanced) and Master of Construction Law. The School is participating in The National Priorities and Industry Linkage Fund (NPILF) pilot plan which is a part of the Job-ready graduates (JRG) package of higher education reforms. During the year 2022-24 the 67% of the School's programs will go through NPILF co design. The aim of this codesign is to develop and strengthen partnerships with industry and increase the number of internships, and other innovative approaches to work-integrated learning.

A/Professor Swapan Saha
Deputy Dean, School of Engineering, Design and Built Environment

The Buzz

The WSU Multidisciplinary Project-Based Learning/Research working group conducted an inaugural Roadmap for Multidisciplinary Project-Based Learning & Teaching workshop on Thursday the 10th of June 2021. Five out of Thirteen organising members are from our School. They are Ali Hellany, Kejun Dong, Upul Gunawardana, Leo Zhang, and Mariam Darestani. The keynote speakers, A/Prof. Jo-Anne Chuck (WSU), Dr Giedre Kligyte (UTS), and Dr Mahyar Shirvanimoghaddam (USyd) demonstrated multidisciplinary approaches in learning and teaching. There were 35 participants in the event.

Engagement News

The School of Engineering, Design and Built Environment participated in Pathways to Dreaming in July. We ran a Strawbees Bridge Building workshop. There were more than 100 Indigenous students participated from different schools from Western Sydney Region.

The Aspire Program was promoted to the students, and it was well received. The team involved in this event are Olivia Mirza, Nazanin Salehi, Dayani Kahagala Hewage, Sameera Pathirana and Mabel Joe. We received positive feedback from both students and teachers: "They are very motivated and dynamic team and the team are engaging".

Learning & Teaching

Spring semester is in full swing, although the hard lockdown has impacted on our plan to resume face-to-face activities. With the increase in vaccination rate, we are hopeful to bring back face-to-face learning & teaching activities on campus for the summer sessions. The School's Learning & Teaching Plan (2021-2026) was endorsed by the School Executive and has been submitted to the University for approval. Thanks to the Learning and Teaching Advisory Group (LaTAG) members for their active engagement and input. The Plan has incorporated feedback received from all staff on the Planning Day. We have set some ambitious targets; and are confident of achieving these with cooperation from all staff and students alike.

Student Success | Kyle Plant

Kyle Plant is a proud Kamilaroi, Wailwaan and Yuin man from Walgett North-West of New South Wales. He is currently in his third year of Bachelor of Construction Management at Western Sydney University. He found out about the Aspire Program through the Tiah Vocale a Badanami student support officer.

When asked about his experience with Aspire Program, he replied "*I feel very supported from the program side of things. I believe they have built good relationships with the organisations they have partnered with because I have felt very respected and valued at work since the get go. I highly recommend the Aspire Program* ".

His advice for the future Indigenous student is to take every opportunity they can get whilst still at university as the experience is invaluable. These opportunities will allow one to stand out from the rest. Furthermore, one may secure a graduate position with the well-established organisation from experience you gained.

International News

The Associate Deans continue the support of international students (both onshore and offshore) to resolve their pressing issues in this challenging period. The ADIs would like to thank DAPs and UCs for their unwavering support to our international students. There will another series of Virtual Fair being scheduled by Western Sydney University International Office from 20 – 24 September. That includes the session for our Project Management, Architecture, and Construction Management programs to global audience on 22 September; and similar activity is scheduled for Engineering programs on 20 and 23 September.

On 23 July, Professor Gu Fang was invited to join an expert panel in R.I.S.E. 2021 (Delhi-NCR Edition) conference to discuss the topic on “Measuring Learning Outcomes in Online Education.” He was joined by experts from US, Europe, India, and New Zealand to explore ways in developing effective assessments in the online education environment.

Engineering Virtual Work Experience

The virtual work experience modules have been developed to help student engineers put university theory into working practice. The modules are designed to provide insight into what it is like to practice as an engineer.

We know gaining physical work experience can be challenging, particularly at the moment, so the aim is to provide access to real life experiences without having to leave home.

For further information head to the YEA website here https://yea.engineersaustralia.org.au/engineering-virtual-work-experiences and check them out today.

Alumni Achievement | Kara McCormick

Kara McCormick is currently working as a Site Engineer on the Nepean Hospital Redevelopment overseeing the services installation and fit-out of two levels of the hospital. She graduated from a Bachelor on Construction Management with Class 1 Honours and was the University Medal recipient for the class of 2019. She enrolled in the Bachelor of Construction Management as she wanted to actively contribute to the community by delivering iconic projects that will give back to the community for many decades to come. She was fortunate to secure her role with CPB Contractors in the position of Undergraduate Engineer during her second year of studies on the

Northern Beaches Hospital Project. In her roles she has the opportunity to be exposed to many facets of the project including liaising with clients and stakeholders, coordination on site with subcontractors, quality control, and contracts administration. She enjoys the comradery that comes with being onsite, and experiencing the work that is being done. Every day is different, and that variety keeps her role very interesting.

Research News

Professor Chin Leo, Associate Professor Samanthika Liyanapathirana, Dr Qinghua Zeng and Dr Pan Hu from the school were successful in receiving funding from the Australian Research Council Linkage project scheme. They received $283,353 from ARC and $140,000 from EIC Activities to develop a novel method to stabilise expansive soils by alkali-activation. Project aims to address durability and sustainability issues with traditional lime-based methods by advancing an alkali-activation based approach.

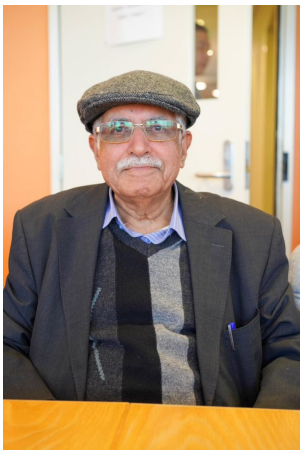
Professor Zhong Tao and Professor Sarah Zhang from the school were successful in receiving $247,000 from the Environmental Protection Agency to investigate the Structural behaviour and durability of Nu-Rock concrete pipes. The proposed research will study the structural behaviour of the new pipes under compression, shear and bending. Durability of the pipes under various exposure conditions will be quantified based on standard test procedures.

Degradation of Solar Photovoltaic Modules (Dr Ali Hellany)

Collaborating with researchers from Weidmuller Australia, academics and PG students from the WSU-SEDBE are investigating the yearly degradation of solar photovoltaic systems.

The calculation of the degradation rate of PV modules is via the development of an artificial neural network (ANN) in MATLAB with the help of a neural fitting tool. The aim is to find the yearly degradation rate for mono-Si and poly-Si Photovoltaic systems by using different learning algorithms for ANN.

New Developments in Electrical Drives for EVs (A/Prof Mahmood Nagrial)



The recent development and interests in EV, has increased interests in the development of high efficiency and high-performance Electrical Drives. WSU have been extensively involved in the development of PM, Variable Reluctance and Hybrid (PM assisted reluctance) drive systems. Various configurations have been developed, fabricated and tested for high-performance applications such as EV.

PM machines use high quality rare-earth magnets (NdFeB-SmCo). A PM motor is generally driven as a brushless DC motor with electronic controller. At high speed, the magnetic field must be shunted (Flux-weakening) to meet the speed/torque requirements. Another alternative is synchronous reluctance or switched reluctance drive systems. These drives do not use any permanent magnets and hence the performance and efficiency is rather low.

A new breed of drive systems has emerged termed as PM assisted Reluctance Machines (PMARM). It is a mixture of PM and variable reluctance (VR) motors.

At WSU, a series of PMARM designs have been fabricated, tested as part of a Ph.D. Thesis submitted last

year. Even Tesla has decided to move away from PM drives to PMARM drives (as shown in the video: https://youtu.be/esUb7Zy5Oio?t=242).

Research on Power Engineering and Renewable Energy Systems (Dr Jamal Rizk)

Research has been carried out in the areas design and control of different types of Electrical machines. The latest machine: a new permanent magnet assisted synchronous reluctance machine was built and tested. The machine shows remarkably higher efficiency and power factor. Dr Jamal Rizk is an expert in the use of finite element method in design of electrical machines. Recently Dr Jamal Rizk focused his research on Engineering Education as the director of academic program in Electrical Engineering at Western Sydney University.

Facilities

The Electrical Engineering laboratory is equipped with LabVolt

- It combines a modular design approach **with computer-based data acquisition and control** to provide latest training in Power engineering systems.
- It is oriented toward today's competence requirements, including electricity fundamentals, **single-phase and three-phase ac power circuits, power transformers, three-phase transformer banks, permanent magnet dc motors, three-phase rotating machines** and power factor correction.
- The system features: **Four-Quadrant Dynamometer/Power Supply,** which can be mechanically coupled to all rotating machines to operate as a prime mover or brake; **Data Acquisition and Control Interface**, which gives access to a large variety of computer-based measuring instruments via the LVDAC-EMS software, etc. The courseware provides students with a sound knowledge of basic electric power technology.

Student Success | Timothy Hodge

Congratulations to our very own Bachelor of Engineering (Honours) student, Timonthy Hodge, on his success at the Tokyo 2020 Paralympic Games in the swimming and cycling events. Timothy won a bronze in the Men's 100m Backstroke - S9, and silver in the Men's 200m Individual Medley - SM9 and Men's 4x100m Medley Relay - 34 Points. Timothy joined his first Australian team at just 14 and was selected for the 2020 Tokyo Paralympics.

Find out more >>

People Who Inspire | Dr Mary Hardie

What significant events and people have influenced your career?

The events that influenced me strongly in my early career included many of the social reforms that came with the Whitlam government in the 1970s. It was suddenly possible to change the expectations that many young women had of their lives.

I have had the good fortune to have many mentors who influenced the

direction of my career. The first was a high school social studies teacher who told me to take control of my own learning process and do not wait for others keep up. They are on a different path. Then at university I had a lecturer who reinforced this by saying that it is important to follow your own process. I try to make good use of the opportunities that have been given to me.

Which places that you have travelled on your career had more impact? Why?

I have travelled more within Australia than I have outside it. The biggest impact for me has been from the National Parks and wilderness areas both coastal and inland. These places reinforce the sense that we are only here for a short time and we should do our best to hand on a better place to the next generation.

What is your vision for the School of Engineering, Design and Built Environment?

I would like to see a School that is more accepting of the diversity of human experience. I would also like to see more robust debate about policy and direction. It is easy to slip into the mode of complacency and compliance. Academics should stir up trouble from time to time.

What advice would you give to a 20-year-old Mary Hardie?

Be confident in your own judgement. Opportunities will come to you and you don't have settle for others making your choices for you.

Thank you & Subscribe

View Newsletter in browser and subscribe.

Find out more >>

EXCITE
CONNECTING ENGINEERING