



School of Engineering Dean's Address, Professor Mike Kagioglou

First of all, I would like to acknowledge the amazing work that all of our staff within Western Sydney University have performed this year. Under unique and extremely difficult circumstances we have managed to transition to online delivery, working from home and remotely, and achieving great levels of satisfaction from our students.

We will always follow the scientific health advice available to us and do our utmost to continue delivering a very high educational experience. I would also like to thank our partners and collaborators for their continued support and engagement with us and the great work we have achieved in research, enterprise and engagement. The school is progressing very well with significant successes and great plans for the future. Our student-led Solar car team has been established and registered for next year's race in Australia, exhibiting high levels of professionalism and desire to win!

We are also progressing very well with the developments around our joint Engineering program with UNSW in our brand-new Parramatta Engineering Innovation Hub (PEIH), due for completion in June of 2021.

I wanted to congratulate all of our colleagues, thank all of our partners and collaborators and wish each and every one of you a wonderful Christmas and Festive Season as well as a happy and prosperous 2021!

SoENG End of Year Celebration

Due to the COVID19 pandemic, staff from School of Engineering has worked hard to make sure students feel secure and supported.

School of Engineering organized the 2020 End of the Year Celebration. This is our first Hybrid event, a combination of face to face and online. The School of Engineering Dean, Prof. Mike Kagioglou joined us via zoom to thank all Engineering staff for their hard work and acknowledge their successes in 2020.



Student Achievement

Mr. Michael Jones has won the 2020 Engineers Australia Bradfield Award under Student Engineer Award.

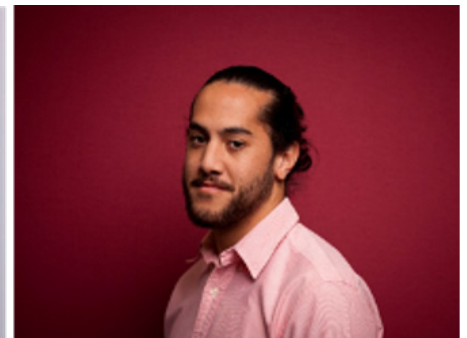
The Award recognises an accomplishment of exceptional engineering merit, which makes a major contribution to the community.

Michael thesis title entitles “The effect of temperatures on the Wagner Composite Fibre Technology on Sydney Harbour Bridge” supervised by A/Prof. Olivia Mirza.

He graduated in 2020 with Honours Class 1, Bachelor of Engineering (Advanced) (Construction). He was working as intern with Xavier Knight then as graduate engineer with Kneebone and Beretta Consulting.

Engagement News

The School of Engineering, Western Sydney University launched its Indigenous Engineering Aspire Program on the 8 December 2020. Associate Dean (Engagement) from the School, Associate Professor Olivia Mirza initiated this program with the support from Badanami Group. This is a new internship program that aims to support the career development of aspiring Indigenous engineers. The program, which forms part of the School of Engineering’s ongoing commitment to improving the representation of Indigenous people in STEM. Aspire gives opportunities to students to enhance their professional skills and network and industry partners to connect with talented pool of indigenous students at Western. Vice Chancellor, Barney Glover and Pro Vice-Chancellor, Aboriginal and Torres Strait Islander Education, Strategy and Consultation, Professor Michelle Trudgett, are very supportive of the innovative program. Dean of the School of Engineering, Professor Mike Kagioglou, stated that the program would build upon the school’s strong engagement with industries which can put School of Engineering at a unique position. The launch was also attended by founding partners, including leader of Waco Kwikform’s Design and Estimation Team, Peta Heffernan, and WSP Senior Talent Acquisition Consultant, Marie Victor.



Learning and Teaching

Now that the Spring semester exams are finally over, everyone (staff and students alike) are looking forward to the well-earned Christmas-New Year break. The impact of COVID-19 continues to affect us - this has been yet another challenging semester with all lectures and tutorials conducted online. A small number of practicals were held face-to-face observing the COVID-19 restrictions. The lessons learnt in the Autumn semester were efficiently utilised to improve student experience. The last quarter was also the period when the Engineering External Advisory Committee (EAC) held its first meeting of the year. It was attended by 38 members who actively engaged and contributed in the discussions to improve Engineering @ WSU. A total of 12 Learning & Teaching (L&T) grants were awarded in this quarter. The funds will be used to develop L&T material for 19 units to improve student learning. In addition, three categories of L&T awards have been established to recognise contributions made in learning and teaching. Applications have been invited and the winners will be announced before the university closes for the Christmas-New Year break.

Best wishes for the festive season.

Please enjoy time with family and friends and stay safe.

International Master Classes to Our Partner Universities

COVID-19 may have closed the Australian physical borders to international students. However, our School is active in international collaboration using online communications. During the past few months, School of Engineering staff have run some Master classes via Zoom to students from Chitkara University in Rajpura, Punjab, India and to students from Tamkang University, Taiwan.

In August, Associate Professor Gaetano Gargiulo gave an inspiring class on using human muscle signals to control prosthetic devices. Following the success of Gaetano, Associate Professor Haiping Zhu has run another informative class on structural analysis to Civil engineering students in Chitkara.

Both classes had attracted a large number of students from Chitkara University to attend. These classes have reinforced the long established collaborations between Western Sydney University and Chitkara University. With more of such classes planned for the coming months, we look forward to welcoming students from Chitkara to come to Western Sydney in person.

In November, Professor Gu Fang from Mechatronic Engineering of the School has given two classes to students from Tamkang University (TKU) in Taiwan. The first class was run to undergraduate students in TKU about WSU and how School of Engineering is engaging students in their final year thesis projects. The second class targeted towards TKU's postgraduate students. Gu introduced Robotics research in SoEng at WSU to the students in TKU. These sessions were well attended by students in TKU.



Facilities

Environmental Engineering Lab and PC2 Lab are equipped with various advanced instruments.

- The Gallery (Thermo Scientific) high-precision wet chemistry automated analyser for measuring ammonia, nitrite, phosphate and NO_x (nitrite + nitrate) concentrations.
- The Shimadzu Total Organic Carbon Analyser (TOC-L CSH/CSN, Shimadzu, Japan) for measuring dissolved organic and inorganic carbon, total nitrogen.
- The Dionex Integrion high pressure ion chromatography (IC) for measuring most of the anions such as nitrate, acetate and sulphate.
- Inductively coupled plasma - optical emission spectrometry (ICP-OES) for determining the composition of the trace elements in water-dissolved samples using argon plasma and a spectrometer.
- SHIMADZU Gas chromatography (GC) with headspace (HS20) for identifying different volatile substances in industrial waste water and unknown samples.
- CFX96 real time PCR for DNA identification and Nano drop for quality and quantity measurements of DNA samples.

- CytoFlex (Beckman Coulter, USA) which is equipped with a blue laser ($\lambda_{ex} = 488 \text{ nm}$) to count the bacterial cells.
- Glomax 20/20 luminometer (Promega Glomax 20/20 luminometer) for Adenosine Triphosphate measurement.

All these instruments have a superior analytical performance for the applications including water sample analysis, food and beverage analysis, environmental testing, and industrial quality control.



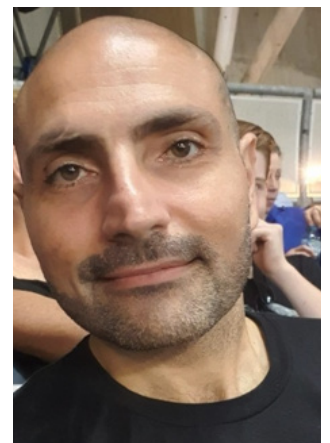
Alumni Achievement

Dr Khaled Haddad | Stormwater Engineer, Cumberland City Council

Dr Khaled Haddad (FIEAust) is a stormwater engineer in Cumberland City Council, Sydney. He completed his BEng Civil (Honours) and MEng(Honours) and PhD degrees in statistical hydrology from Western Sydney University. His research is focused on regional flood frequency analysis with a particular emphasis on uncertainty and the regional modelling of large to rare floods.

Khaled also has 17 years' experience in floodplain management, working on many different flood mitigation, water resources and water quality projects. Khaled was heavily involved with Australian Rainfall and Runoff (ARR) Project 5 Regional flood methods, where interactive software was developed to estimate design floods at any catchment in Australia. Khaled also made a notable contribution to ARR Project 1 development of intensity-frequency-duration information across Australia.

He has published over 100 research papers, reports and book chapters on various aspects of hydrology, design rainfall and water quality. With regards to his experience at WSU, he states, "WSU has a dedicated team of lecturers who know the theory and practical components of hydrology, hydraulics and water engineering extremely well which helped me to excel and put in the extra effort to do well, given this was the area of engineering I wanted to be in. Furthermore, the staff at WSU really went out of their way and had a genuine care for our education; this also helped and encouraged me to do my best. In particular I would like to point out Prof Ataur Rahman and Assoc.



Prof Surendra Shrestha for their dedication to both undergraduate and post graduate students. Overall, this support helped me achieve my full potential as an engineering student and as researcher in completing my PhD, being able to work on a range of exciting projects in the hydrology area that has made a significant difference nationally and internationally to the way we estimate design floods.

Field Testing and Evaluation of Stormfilter and Bioretention system (Professor Ataur Rahman)

Urban stormwater is a major source of pollution which undermines the health of urban waterways. Stormwater improvement devices can be used to clean the stormwater before it reaches urban waterways. However, the effectiveness of these stormwater improvement devices is not explicitly known. In this research project, stormfilter and bioretention systems are tested in a parking lot within Western Sydney University campus to monitor and enhance their effectiveness in removing pollutants from stormwater runoff. The project is funded by Ocean Protect Pty Ltd.



Research on surface and ground water resources (A/Prof Surendra Shrestha)

Research has been carried out in the areas ranging from surface water planning and management to stochastic ground water flow modelling, based on the expertise in hydrology engineering for both ground and surface water modelling. Over the past two and half decades, mathematical models of the built environment have been developed in collaboration with academics, researchers and engineering professionals. More recently, A/Prof Shrestha has focussed his research on engineering education as the Associate Dean (Learning & Teaching) in the School of Engineering at Western Sydney University.



Research on water, nutrients and materials recycling (Dr. Dharma Hagare)

Research has been carried out in the areas of recycled water for irrigation, reuse of water and nutrients and urban water management. The projects include Production of animal feed and liquid fertilizer from food waste supported by Food Recycle Ltd.; recycling of plastic waste from the construction and demolition industry supported by Sell and Parker P/L; recharge processes of springs and its management to mitigate anthropogenic and climate change impact for water security supported by SPARC, MHRD, India; and increasing dairy farm productivity through stormwater harvesting, resource recovery and recycling supported by Dairy Australia, Water NSW and WSU.



Student Success

Mr. Cezanne Sarraj, School of Engineering 2nd year Bachelor of Engineering (Electrical) student has been awarded \$3000 Scholarship for 3 years from Infrabuild. He will also be offered an internship during the summer during his study. Mr. Kevin Halbe, the Technical Support Superintendent for Infrabuild stated that "I am pleased that Infrabuild is able to continue to support this scheme, despite COVID-19. It is good to be able to support good students through their studies, and to be able to give them experience of working in the steel industry – valuable skills that will help them into their future careers."



PEOPLE WHO INSPIRE

I am an Environmental Engineer specialising in Sustainability and Water quality engineering, although my undergraduate degree was in Civil Engineering. I am fortunate to gather valuable experience from working in various industries and academic institutions in many parts of the world for over 30 years. As an educator and a son of a teacher myself, I am very particular about the quality of the students we produce and the importance of proper assessment of the students. I am enthusiastic about finding solutions to real life problems that are difficult to solve which I feel will ultimately lead to transformation of the society. I strongly believe there are sustainable way of doing many things but there is a huge knowledge gap amongst public as to what is sustainable and hence education I feel will play a crucial role in breaking myths and achieve sustainability.

Why did you choose Western Sydney University? What has been your experience at Western Sydney University?

Many challenges of WSU and that there is potential to make a difference have attracted me to WSU. The team approach to solving problems in WSU engineering attracts me a lot and I am proud to be a part of many successful outcomes. One of my contribution being a Discipline Team Leader in designing the curriculum for Civil and Environmental Engineering Program. Lately, I was fortunate to be given the responsibility to head the development of a Sustainable Engineering Program. Coming from Curtin University and looking at the staff profiles in Civil Engineering program, I felt there is potential for better rank than what we had in 2012 and campaigned for it. I am a very proud and happy member of WSU and engineering to see our enviable rank amongst the best as it should be.

What is your research area? What are the achievements and impacts?

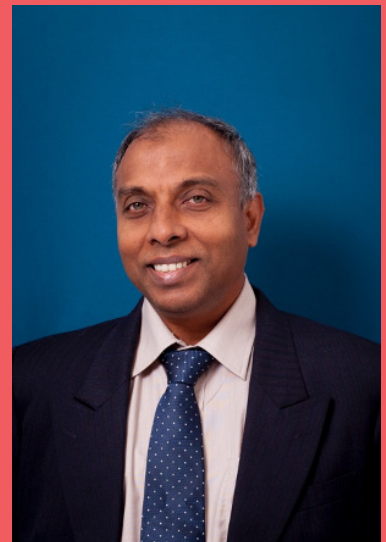
My research is to improve the quality of drinking water supplied to customers and sustainability and rightly contributed to sustainable development goal (SDG) "Clean water and Sanitation" to be ranked second amongst world universities. Our work also was selected as a high impact research by Australian Research Council and at least 40 water industries across Australia regularly support our work or seek our advice. More specifically our research looks into difficult to solve problem of disinfectant management especially that of chlorine and chloramine. Most previous approaches have been pure science based without integrating engineering. Quantification and prediction lacked for more than a century and ad-hoc approaches were adopted by water utilities. Being an engineer passionate about natural sciences and solving problems, I was able to bring in not only quantification and prediction but also reveal many fundamental microbial and chemical mechanisms. We produced a decision making system based on our predictive capability and the approaches developed by us are adopted across the world. For example, our chlorine decay models are adopted by the major international software company Innovyze. We also work on recovering much of resources from wastewater and in water sensitive urban design initiatives.

How have you linked your research and teaching?

I believe in research and teaching nexus. The teaching provides us an opportunity to make a difference in undergraduates on the new ways of thinking and the importance of working with people from various expertise to find innovative solutions. I spend a lot of time explaining the ideas behind equations and formulae in the classroom and via short videos and encourage them to develop equations themselves to empower them as future engineers and innovators.

What is the strength of our Western Sydney University students based on your experience?

Major strength of our students comes from collective efforts of our colleagues to expose the students to both practical and theoretical work and in empowering them to solve real life problems in many projects such as solar car during their time in WSU which develop skills in team work, problem solving, perseverance etc.



**Professor
Sathaa Sathasivan**