School of Civil & Environmental Engineering

Annual Report 2019

UNSW SYDNEY

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UNSW SYDNEY 2052

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The Big Picture

Welcome from the Head Of School

I am delighted to introduce the School of Civil & Environmental Engineering's 2019 Annual Report. During 2019 the School was led by myself, as Acting Head, in the first six months of the year and Professor Stephen Foster, on his return from other senior Faculty duties, in the second half.

As this 2019 Report has been compiled in 2020, in the midst of the Covid-19 pandemic and all its upheavals, Professor Foster is now Acting Dean of UNSW Engineering and I am once more in this custodial role of our wonderful School.

The School has long been internationally ranked as the number one School of its kind in Australia and is now globally ranked in the world's top twelve for civil engineering (AWRU & QS Rankings 2019).

The School maintains strong breadth and depth of knowledge in all core areas of civil and environmental engineering as well as surveying and geospatial engineering. The quality and diversity of our academic staff, and our intensive engagement with industry, allows us to bring an unmatched level of expertise to our research and teaching.

We offer numerous undergraduate single and dual degree programs, and a wide variety of very popular postgraduate coursework specialisations. Not surprisingly our School is large by both national and international norms, with 3,600 students enrolled in our programs in 2019.

The School has always been at the forefront of innovative 'blue sky' and applied research across the many facets of our very broad engineering field. Our researchers continue to receive extensive industry and government funding. In 2019 this included $2.8M from seven highly sought-after Australian Research Council (ARC) grants.

We are excited by the social impact we have as teachers and guides of the next generation of innovative professionals, as well as our critical mass contribution to the global research sphere. But we aim also to have a positive use for the whole community, beyond any campuses, as we transfer our knowledge to industry and government through many external partnerships.

In 2019 our centres and hubs worked with over one hundred and thirty industry and government organisations on a wide variety of research projects to face current challenges and provide sustainable solutions. Details of those projects as well as many other inspiring stories are to be found in this Annual Report. **NK**

Professor Nasser Khalili, Acting Head of School

Professor Stephen Foster, Head of School

About Us

...ranked as the premier School of its kind in Australia...

UNSW Civil & Environmental Engineering is internationally ranked as the premier School of its kind in Australia and in the world's top 12 (QS ranks us as #12 and AWRU as #9). Our excellence in research is ranked five out of five by the Australian Research Council. From our foundation in 1949, the School has pursued excellence and innovation in education and research. We now offer 14 undergraduate degree programs, with one third of our undergraduate students enrolled in dual degrees. Our academic staff are recognised world leaders in their fields of expertise, while our alumni are to be found as innovators and decision makers in industry, government and the community.

We are embedded in the real world. Each year we work with over 130 industry and government organisations on specific industry and community related research projects.

2019

Snapshot Stats

School academic staff: **56**

School and centres research staff: **75**

School professional and technical staff: **32**

Enrolment

HDR: **172** Students - EFTSL **96**

Postgraduate coursework:
1365 Students - EFTSL **956**

Undergraduates;
2060 students - EFTSL **1525**

Research

ARC funding awarded in 2019: **$2.8M**

Total research funding: **$14.72M**

Refereed research publications: **416**

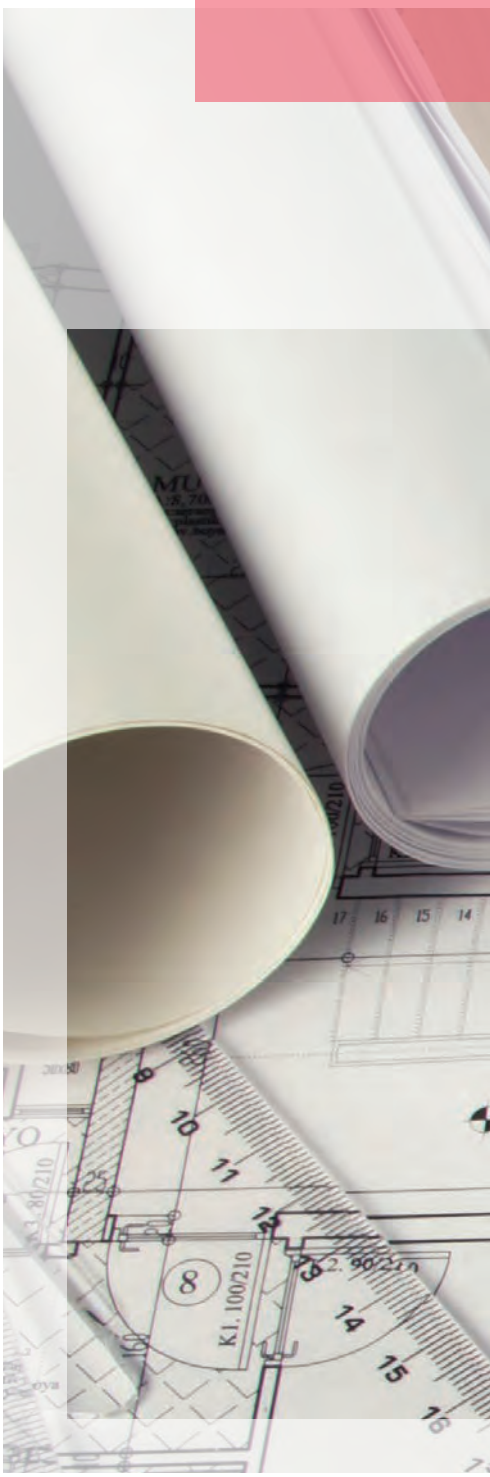
Finances

2019 generated teaching & research income: **$101.4M**

2019 operating budget: **$24.4M**

Executive and Management Committees

Member	Role
School Executive Group (SEG)	
Nasser **Khalili**	Chair (From Jan-June)
Stephen **Foster**	Chair (From June)
Mario **Attard**	Associate Head (Academic)
David **Carmichael**	Discipline Leader - Construction
Anthony **Dever**	School Manager
Lucy **Marshall**	Associate Dean – Equity & Diversity
Chongmin **Song**	Director CIES
Richard **Stuetz**	Deputy Chair TLC
Ian **Turner**	Director WRL
School Management Committee (SMC)	
Nasser **Khalili**	HoS & Chair (Jan-June), Geotech Rep
Stephen **Foster**	HoS & Chair (From June)
Denis **O'Carroll**	Chair RMC Director WRC
Mario **Attard**	Associate Head (Academic)
Steven **Davis**	Chair TLC
Kurt **Douglas**	Chair ERC
Linlin **Ge**	Chair CIT&ETC
Vinayak **Dixit**	Director rCITI Chair, TSC
Paul **Gwynne**	Chair HSC
Ian **Turner**	Director WRL
Chongmin **Song**	Director CIES
Martin **Andersen**	Director CWI
David **Carmichael**	Discipline Leader - Construction
Craig **Roberts**	SAGE Representative
Anthony **Dever**	School Manager
Ellie **Williams**	Student Services Rep
Lucia **Wong**	EA to HoS/Administrator



Staff Awards and Achievements

Prestigious ACRS Fellowship awarded to Professor Michael Regan

Professor Mike Regan

Congratulations to CVEN Professor Michael (Mike) Regan who was awarded an Australian College of Road Safety (ACRS) Fellowship in 2019. The award recognises Professor Regan's global impact and leadership in transport human factors and road safety.

Professor Regan is Professor of Human Factors at the School's Research Centre for Integrated Transport Innovation (rCITI). Mike has Bachelor of Science (Hons) and PhD degrees in Psychology and Human Factors from the Australian National University and more than 20 years' experience in transportation Human Factors and safety – as a researcher, research manager, and policy maker.

He has designed and led more than 200 research projects in transport safety - spanning motorcycles, cars, trucks, buses, trains and aircraft – on various topics: driver distraction and inattention; driver interaction with intelligent transport systems; driver and pilot selection and training; human error in road and aviation crash causation; vehicle and roadway human-machine interface design; and driver licensing.

Mike is the author/co-author of around 250 published documents, including around 190 peer-reviewed publications and three books, and sits on the Editorial Boards of four peer-reviewed journals, including Human Factors and the Journal of the Australasian College of Road Safety.

In presenting the award, ACRS President Mr Martin Small said "Our success in eliminating fatal and serious injury in road traffic by 2050 will depend upon our acceptance and our shaping of road traffic technology and systems. Ahead of this crucial time, Professor Regan's body of work has re-oriented our focus on human capability towards those essential human machine interface issues which we must grapple with, reminding the world that we must always place humans at the very centre of our safety thought and action."

Our global leadership continues

Emeritus Professor Chris Rizos

Emeritus Professor Chris Rizos has been voted in as President-Elect of the International Union for Geodesy and Geophysics (IUGG) during the General Assembly in Montreal in July 2019.

The IUGG is a non-profit global organisation dedicated to promoting international cooperation in earth sciences. Founded one hundred years ago, with Australia as one of the union's nine founding members, IUGG is committed to the principle of free exchange of data and knowledge among nations, and encourages unreserved scientific participation by all peoples.

Through his new role, Professor Rizos hopes to raise visibility of IUGG and communicate its continued relevance for global science, as well as

increase engagement with early-career scientists in developing countries.

Professor Elaine Sadler AO FAA, the Australian Academy of Science's Foreign Secretary, commended Professor Rizos on his election and its impact on science in Australia.

"Professor Rizos's appointment is an excellent example of Australia's reputation as an active and valuable member of the international science community," she said, "His service will enhance Australia's authority on the international stage and cultivate relationships that can facilitate meaningful research."

Professor Rizos is the second Australian President in the union's 100-year history. He is an emeritus professor of geodesy and navigation at UNSW Sydney, a previous Head of School of UNSW Surveying and Geomatic Engineering, a member of the bureau of the IUGG, and an observer on the Australian Academy of Science's National Committee for Earth Sciences. He has previously served as Chair on the union's Visioning Committee and the Strategic Planning Committee.

UNSW awards Ian Gilbert – the busy Emeritus Professor

Em Professor Ian Gilbert

Ian Gilbert received the inaugural UNSW Emeritus Award 2019 for his significant contributions to the university as an Emeritus Professor.

The Award was established by UNSW in order to acknowledge and celebrate the achievements of those Emeriti who have continued to contribute in significant ways to the university. Andrew Hall, from UNSW's Division of Philanthropy said they were "incredibly impressed by the breadth of work done by Ian Gilbert".

Since 2010 Ian has been the author or co-author of 6 books, four of which are text books used both in Australia and overseas in under-graduate and post-graduate courses in structural engineering : Design of Prestressed Concrete to Eurocode 2, (2017); Design of Prestressed Concrete to AS3600-2009, (2016); Structural Analysis: Principles, Methods and Modelling, (2015); Solution Manual for Structural Analysis: Principles, Methods and Modelling, (2015) - all published by CRC Press (Taylor & Francis Group), Florida, USA.

Ian has also published 56 refereed journal papers and 71 refereed conference papers since his 'retirement' in 2010, and supervised or co-supervised 9 PhD students to completion.

Professor Gilbert's research on the time-dependent deformation of concrete structures has been incorporated into the 1988, 2001, 2009 and 2018 editions of the Australian Standard for Concrete Structures AS3600, in particular the clauses relating to design for deflection control, crack control and creep and shrinkage modelling.

As such, Professor Gilbert's research has influenced and will continue to influence the in-service performance of concrete structures designed and constructed in Australia in the last 30 years and in the foreseeable future.

Lighting up UNSW and CVEN

Anthony Dever receives his award, with Professor Ian Jacob, Professor Anne Simmons and Andrew Walters

In 2019 CVEN School Manager Anthony Dever was awarded a UNSW President's Award in the category of Excellence, for his high performance and service excellence.

These awards formally recognise and celebrate remarkable UNSW staff, who light up UNSW not only by what they do but how they go about it.

The five other award categories included innovation, diversity, respect, collaboration, and the people's choice. In our opinion Anthony could have won all of them!

Several School staff nominated Anthony for the award. As Kate Brown said in her nomination, "Anthony has exceptionally managed the School since 2013. We have been through rapid growth, expansion and workplace change. He has led us through this period smoothly and with minimal disruption to our work output and morale. "

The phrases "people-centric", "problem-solver" "approachable" were repeated several times by nominators. One staff member wrote, "He is encouraging, inspiring and knowledgeable. He encourages his staff to learn new skills and to attend workshops or any training sessions. He gives sound advice on career progression and he trusts his staff."

The high praise continues from others. "Anthony is always supportive to team members and staff in the school without compromising operational standards and excellence. Challenging issues such as workspace shortage, workplace changes and budget shrinking have to be dealt with by him and his team for optimal solutions. Fortunately, Anthony is not only an excellent listener but also a person with solutions!"

Yet another staff member wrote, "He demonstrates excellent communication skills and respects everyone's cultural diversity."

"I always feel that I am being supported but not micro-managed," wrote an appreciative administrator. "In the office, we feel like we have the best administration and teaching support team in Engineering."

Another affirmed, "He is a role model of how a team leader should be."

Congratulations, well done and thank you Anthony!

CVEN Professor Ana Deletic named Honorary Fellow of Engineers Australia

Professor Ana Deletic honoured for her work in sustainable urban water management.

In 2019 UNSW Pro Vice-Chancellor (Research) and CVEN Professor Ana Deletic was named an Honorary Fellow of Engineers Australia for her exceptional contributions to the engineering profession and the Australian community.

Honorary Fellow is the highest membership of Engineers Australia and can only be awarded to and retained by 200 living members of the organisation. It's an honour presented to distinguished people for conspicuous service to the Australian people or in recognition of outstanding achievement.

Professor Deletic is renowned for her research in sustainable urban water management. She is responsible for several "green" water solutions that have been adopted by cities in Australia and overseas, including the creation of an industry standard for stormwater biofilters. Also known as "raingardens", these innovative garden beds filter and clean stormwater before it drains into waterways. The technology is used in Sydney, Melbourne, Singapore, Israel and China. More than 10,000 raingardens have been installed in Melbourne alone, to protect the lower Yarra from stormwater pollution.

Professor Deletic's team is also responsible for developing blue-green walls, which are vertical gardens covering many modern high-rise buildings. The plants are irrigated with stormwater and household greywater instead of potable water from the tap, helping to conserve this valuable resource.

Professor Deletic is also known for her research in integrated urban water modelling, which helps to plan the use of green technologies in Water Sensitive Urban Designs (WSUDs). She has also produced modelling that's used for flood planning and protection.

Until mid-2017 Ana was Associate Dean of Research - Engineering Faculty and the Founding Director of Monash Infrastructure Research Institute at Monash University. Ana now leads a large research group at the School's Water Research Centre that is working on multi-disciplinary urban water issues focusing on stormwater management and socio-technical modelling.

Real-world impact

Professor Deletic believes engineering research can make an impact only if it is relevant to industry and positively impacts how we live. "I believe that academics in engineering should be closely working with industry to advance their research agenda, as well as the profession."

Proud to have been named an Honorary Fellow of Engineers Australia, Professor Deletic said: "Given that Engineers Australia has 100,000 professional members, and only 200 can hold this lifetime Fellowship, it means a lot to me."

Professor Deletic is grateful to everyone who has supported her throughout her career, thanking her teams past and present. "I would like to thank my 40 PhD students, many post docs and close colleagues for their hard work and support over the past 20 years."

Original story by Louise Templeton, UNSW Newsroom, published 10 Dec 2019

Below: Professor Ana Deletic with Engineers Australia Sydney Division President, Bruce Howard. Photo: Engineers Australia

WRL

James Carley and Chris Drummond
WRL researchers

Congratulations to the two WRL teams presented with the 2019 NSW Coastal Management Award for Innovation at the 28th Annual NSW Coastal Conference.

In the end the judges could not decide between two great WRL projects and so gave the award for both of them!

Dr Valentine (Tino) Heimhuber, with colleagues James Carley, Chris Drummond and Associate Professor Will Glamore received the award for their work on estuarine risk assessment and climate change strategic response.

James Carley and Chris Drummond were awarded for their Ocean-Umina Beach erosion management study.

Assessing the impacts and effect of climate change in estuaries

Many estuaries are already facing increasing development and population stresses as coastal populations grow, resources are depleted, nutrients increase, and flow regimes change. When combined with climate change impacts, these pressures can result in ecological tipping points, drainage declines and forced changes to adjoining land-use.

Assessing the impacts and effect of climate change in estuaries is complex. To help estuarine managers and coastal communities navigate this complexity, WRL researchers and colleagues developed a multi-report guideline that details climate change, its role in estuaries, existing trends/pressures and the potential impacts.

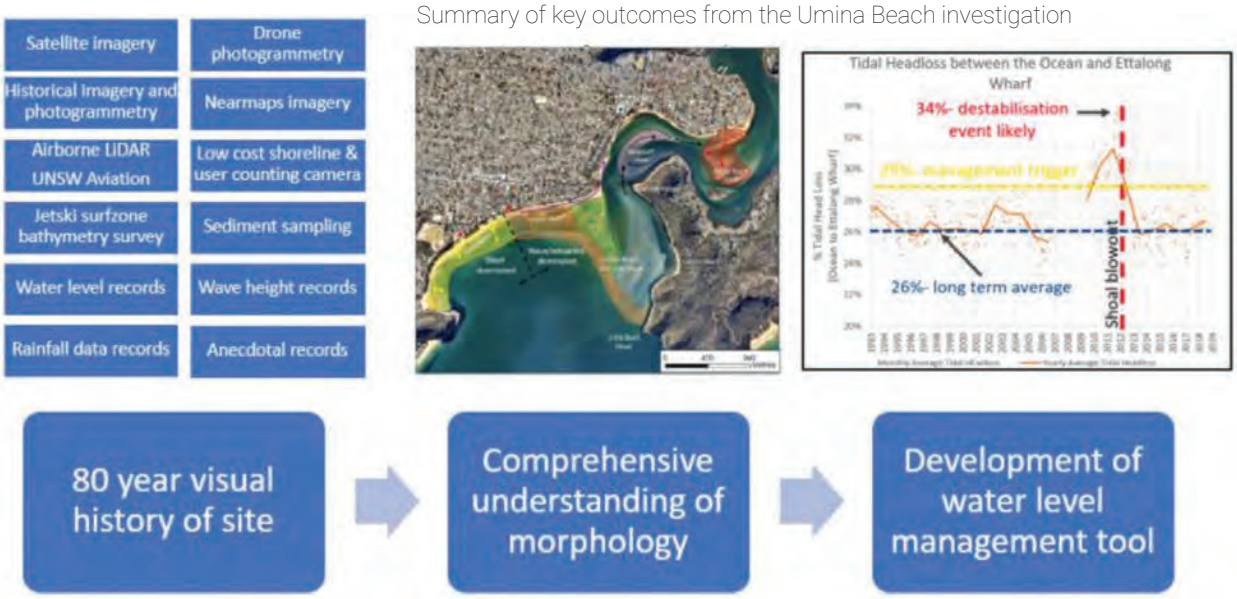
Titled "Climate change in estuaries: State of the science & guidelines for assessment" this report and database is freely available online. The guide provides a summary of the relevant climate, ocean and ecosystem science along with best-practice frameworks for prioritising risks.

Promoting the sustainable management of the NSW coastal zone.

Through this project, WRL has worked with Central Coast Council and Royal Haskoning Australia to develop a holistic long-term erosion management strategy for Ocean-Umina Beach, an area which has challenged coastal managers and planners for over a century. The site is located at the entrance to a large coastal estuary and has undergone unpredictable cycles of erosion including undermining of a major road in recent years.

A comprehensive data measurement campaign was completed throughout the study, collecting and combining detailed datasets from drones for the beaches and foreshore, jetskis for the underwater bathymetry, and coastal monitoring cameras equipped with machine learning tools to assess the time varying nature of the system. The project also included application of the latest satellite-based mapping tools to produce an 80-year visual history of the site.

Summary of key outcomes from the Umina Beach investigation



The road to sustainable construction

School researchers are at the helm of an emission-reducing, green roads project. Concrete made using industrial waste from coal-fired power stations and steel manufacturing is being used in a world-first green roads trial in Sydney.

The CRC for Low Carbon Living-funded project with The City of Sydney is putting the environmentally friendly building product to the test on a busy inner-city street, replacing a 30 metre section of roadway on Wyndham Street in Alexandria. As a major road leading to Sydney Airport, the high traffic volume provides the perfect conditions for the trial.

Professor Stephen Foster, Head of School of Civil and Environmental Engineering, is the CRCLCL project lead and describes the trial as "a huge step forward".

"This trial will help drive step change in the industry. Many concrete companies are already doing a lot to change, but this trial really gives it another push," Professor Foster said. "Research into Geopolymer has been undertaken since the 90s, but it's only now that it's starting to be commercialised."

To test the green concretes durability, the City of Sydney has laid a 15 metres traditional concrete and 15 metres of Geopolymer concrete, a sustainable blend of concrete and recycled materials. Nine sensors have been positioned under the concrete to monitor and compare how the Geopolymer concrete performs.

"While we'll monitor the road performance for up to five years, a lot of the data collected in the first three to 12 months of this world-first trial will be used to confirm our models and strengthen our predictions," Professor Foster said.

Made from fly ash and blast furnace slag, Geopolymer generates just 300 kilograms of CO_2 per tonne of cement, compared to the 900 kilograms from traditional cement production.

According to leading sustainability researcher Associate Professor Tommy Wiedmann, if all concrete produced in Australia was Geopolymer instead of traditional concrete, this would save 12,000 kilotons CO_2 per year. This is equivalent to taking 4.5 million cars off the road per year, or the total food consumption of 2 million households for one year!

Industry partner Craig Heidrich, executive director, Australian (Iron and Steel) Association and Ash Development Association, says the benefits of the trial will be far-reaching.

"Geopolymer concrete has great engineering properties. It is a durable, high performance product that has a low carbon footprint when used in construction," Mr Heidrich said.

"It's a fundamental tenet in business that you need to be constantly innovating and investing into new technologies. This trial will provide real examples of Geopolymer concrete use that we can all use.

Results from the trial will be used to create the first set of industry guidelines for Geopolymer concrete.

WRL (cont)

Researchers Valentin Heimhuber, and Will Glamore

The project involved significant inter agency collaboration including engagement between local and state departments, and included the placement of channel dredge material on the eroded beach from the navigation channel, which has provided a win-win outcome for all stakeholders.

About the Awards:

The Annual NSW Coastal Management Awards are presented to publicly recognise and acknowledge the contributions of individuals, groups, organisations and agencies committed to the principles of Ecologically Sustainable Development, and specifically toward the ecologically sustainable management of the NSW coastal zone.

The Innovation Award's selection criteria include initiation and development of innovative approaches, techniques and programs in coastal management involving policy, research, planning, analysis, public awareness and education.

Seventy Years young! Happy Birthday to the School!

From its humble yet visionary beginnings in 1949, UNSW Civil and Environmental Engineering has grown into the premier Australian centre of civil and environmental engineering education and research, internationally ranked (**AWRU 2019** and **QS 2019**) as one of the world's top dozen schools.

From its humble yet visionary beginnings in 1949, UNSW Civil and Environmental Engineering has grown into the premier Australian centre of civil and environmental engineering education and research, internationally ranked (AWRU 2019 and QS 2019) as one of the world's top dozen schools.

One of the eight foundation schools of UNSW, the School has come a long way from its hardscrabble origins at Sydney Technical College (STC) when a tough-minded post-War State Labor Government decided it would have a brand-new technical university. The Sydney establishment were horrified by such working-class cheek, dismissing the new university as 'only a technical college.' But their protests were to no avail. The times were a-changing!

And while the arguments raged in the political and media arenas, a small band of civil engineers met in cramped, under resourced offices at Ultimo, and began to plan for the expanding and expansive future. Humble beginnings, in even more humble surroundings. Crawford Munro, the legendary first Head of School, reported that in early 1948 'it would be fair to say that the School of Civil Engineering consisted of a table and chair in an office in the School of Mechanical Engineering, this little corner being occupied by Mr Stan Hall'. Even this 'little corner' had been hard won.

Hall himself recalled how, following his appointment as STC Head Teacher of Civil Engineering – the first full-time member of staff, he had arrived at work on 6 February 1946 to find neither desk nor chair, and it was some days before 'drastic action' , ie plain theft, obtained them.

There was no money for any equipment, officially, but Hall used senior army contacts to locate various instruments his teaching staff needed and have them declared 'surplus to requirements' by a sympathetic Colonel in charge of army stores at Liverpool.

Surveying was an area which was particularly under-resourced, even by the hand to mouth standards of the day. A surveyor from the Department of Main Roads, brought along each Saturday a level, staff and tape borrowed from the Department and on some occasions a theodolite. After a short lecture on the use of these instruments, the students lined up and each in turn took a measurement.

Regardless of their limited physical surroundings, when the new University was finally declared into existence by the determined State Government in 1949, the bold buccaneers of civil engineering were more than ready. In fact they were a year ahead. A non-existent university had not stopped nine eager

students enrolling in the new BE (Civil) in 1948. Five of them would graduate in 1952.

The 1960s brought a baby boomer explosion in enrolments as the School took its place, finally, on the hill of the new UNSW Kensington campus in 1966. (pic) It was the largest UNSW School, having over 1,000 undergraduate and 200 postgraduate coursework students, with 56 full time academic staff by 1969.

The '70s saw a period of intense social change, the first women graduates and the abandonment of student suits and ties, and slide rules. Ambitious academic staff continued to produce seminal texts in structural engineering, civil engineering materials, public health engineering, engineering construction management, and water engineering.

A growing cultural disillusion, however, with science and technology saw a contraction in enrolments in the 1980s. The science and craft of Civil Engineering was now seen as a 'traditional' conservative, even boring, pursuit. In 1989 the School student population had dwindled to less than five hundred undergraduates while still providing important industry focussed education with two hundred coursework students. Academic staff numbered 43.

The '90s saw the ever creative School introduce Australia's first environmental engineering degree in 1991 - an immediate and much imitated success, provide distance education options for its growing numbers of MEngSc students, and establish strong links with China and Indonesia. Student numbers began to revive upwards to 650 undergraduates, Masters students robust at 286, 90 PhDs, although academic staff numbers had continued to fall, to 31.

By the late 2000s the School had transformed itself into a veritable powerhouse of research, attracting funds and support from both Government and industry. It had established two world class research centres, the **Centre for Infrastructure Engineering and Safety**, and the **UNSW Water Research Centre**. In 2007 the School also introduced another Australian first – an innovative Civil with Architecture degree. By 2009, the School had an expanding undergraduate population of nearly 1200 undergrads and 375 Masters students.

If the first decade of the 21st century had been expansive, the second decade saw an explosion - in student numbers, in ARC research grants ($40M) an ERA ranking of 5 out of 5, and new research centres & hubs such as the **Connected Water Initiative**, **Surveying and Geospatial Engineering Group**, the **Research Centre for Integrated Transport Innovation**, and **Sustainable Engineering Research Group**.

While women are still not sufficiently represented in the School or in the profession, their increasing participation (currently at 26% of student enrolments) gives hope for a more balanced future.

It had never been an ivory tower School and it isn't one now. It remains intensely involved with its community, working annually with over 130 industry and government partners on a wide range of research projects, vitally aware that in many cases the work is more urgent than ever.

End of decade seven school snapshots

	1949	1959	1969	1979	1989	1999	2009	2019
Head of School	Crawford Munro	Crawford Munro	Rupert Vallentine	Ian Lee	Robin Fell	Ian Gilbert	David Waite	Stephen Foster
Under-graduates enrolled	29	604	1007	505	474	647	1173	2060
coursework	0	40	210	214	195	286	375	1365
Higher degree	0	24	58	67	41	90	65	172
% women students	0	0	0	2	9.5	23	18	26
% International students	0	n/a	14	9.5	n/a	n/a	31	52
Cost of BE fulltime (local fees) pa	£27	£90	$330	$0	$1800	$4855	$7412	$9527
Nos of full time academic staff	3	37	56	60	43	31	31	56
Nos of full time non academic staff	n/a	33	57	53	48	29	22	32
Prime Minister	Ben Chifley	Robert Menzies	John Gorton	Malcolm Fraser	Bob Hawke	John Howard	Kevin Rudd	Scott Morrison

2019 Elite Student Industry Partner Breakfast

The splendour of Sydney's Royal Botanic Gardens proved once again to be the perfect backdrop for the School's 2019 Elite Student Industry Partner Breakfast turning out the most beautiful of spring mornings for our students and Industry guests.

An annual event, the breakfast provides members of the School's Industry Partnership Program with an advantage to recruit our top Engineering and Surveying students into their industrial training, cadetship and graduate programs.

In 2019, 55 of the School's most talented students had the opportunity to network with 15 of Australia's premier engineering and infrastructure companies and consultancies flexing some professional muscle with a select group of Australia's most seasoned engineering leaders. Breakfast tables came alive with conversation as students canvassed prospective employers responsible for shaping and delivering some of Sydney's most prominent infrastructure works.

An initiative of the School's External Relations Committee, the Elite Student Breakfast is one of a number of exclusive events in which our Industry Partners are invited to engage with our undergraduate students, offering their businesses a competitive advantage when vying to recruit Australia's finest engineering talent.

For further information on the School of Civil and Environmental Engineering's Industry Partnership Program see our website or contact Dr Kurt Douglas, Chair, External Relations Committee - k.douglas@unsw.edu.au

Our People

Academic Staff

Alvarez Gaitan, Juan Pablo

Research Interests: Improving the environmental performance of products and processes using Life Cycle Assessment (LCA)

Andersen, Martin
Associate Professor and Director CWI
MSc in Engineering, PhD DTU, Denmark

Research Interests: Investigations of physical & geochemical processes at the surface water groundwater interface; groundwater dynamics in the coastal zone; reactive flow & transport modelling; developing methodologies for using heat as a tracer of groundwater flow; karst hydrology.

WELCOME

Atroshchenko, Elena
Senior Lecturer
MSc in Mechanics and Applied Mathematics, Saint-Petersburg State University
PhD in Civil Engineering, University of Waterloo, Ontario

Elena's research interests lie in the area of Computational Mechanics and Numerical Methods, with application to fracture mechanics, acoustics, bending and vibration of composite plates.

Attard, Mario
Associate Professor
Associate Head – Academic
BE PhD MHEd UNSW, MIEAust, CPEng

Research Interests: Finite Strain Isotropic & Anisotropic Hyperelastic Modelling; Anisotropic Hyperelastic Modelling of Biological Material; Plasticity Formulation for Confined Concrete Columns; Cover Spalling in High Strength Reinforced Concrete Columns; Lateral Buckling of Thin-Walled Beams.

WELCOME

Bidarmaghz, Asal
Lecturer
PhD Civil Engineering (Geothermal Technologies) University of Melbourne

Research Interests: Energy geo-structures and geothermal systems, Investigating the impacts of urbanization on subsurface temperature increase at the city-scale, Uncertainty analysis of large scale subsurface hydro-thermal models.

Bradford, Mark
UNSW Scientia Professor
BSc BE PhD USyd, DSc UNSW, CPEng, CEng, MASCE, FIEAust, MIStructE

Research Interests: High-strength steel structures, steel-concrete composite structures, steel-timber hybrid structures, concrete structures, arches, geometric non-linearity, pavement thermo-upheaval buckling, railway thermo-lateral buckling, design for deconstructability, low-emissions structural paradigms, forensic engineering..

Carmichael, D G
Professor
BE MEngSc USyd, PhD Cant, CPEng, FIEAust, MASC

Research Interests: Management, systems applications of optimisation, synthesis: Identification & analysis: Contracts & disputes: Project delivery: Construction operations: Project management & management functional areas including risk, economics, finances, people resources & scope: Construction management: Problem solving & decision making.

Castel, Arnaud
Associate Professor
BE, MEngSc, PhD Toulouse

Research Interests: Durability of construction materials, low carbon concrete technology, alternative SCMs, Geopolymer concrete, Performance based & service life design, Steel reinforcement corrosion in concrete, serviceability, time-dependent effects, restrained shrinkage induced early age cracking.

Dackermann, Ulrike
Lecturer
Dipl.-Ing. Univ., Technical University of Munich (TUM), PhD UTS

Research interests: Structural Health Monitoring, Non-Destructive Testing, Damage Detection, Structural Dynamics, Artificial Intelligence, Timber Engineering

WELCOME

Dansie, Andrew Phillip
Senior Lecturer
BSc, MSC, Flinders
PhD, University of Oxford

Dansie is a Senior Lecturer in Humanitarian Engineering. He has 13 years of experience in the water and development sector spanning the private sector, multilateral organisations, universities and an NGO. His time as a Research Fellow with the United Nations University Institute for Water, Environment and Health saw him work with projects and partners across six continents.

Davis, Steven
Senior Lecturer
Chair, Teaching & Learning Committee
BE PhD UNSW

Research Interests: Online Assessment, Virtual Reality, Project Scheduling, Safety, Construction Defects and Rework.

Deletic, Ana
Pro-Vice-Chancellor (Research)
Master of Engineering, Civil Engineering, University of Belgrade
Ph.D, Civil Engineering, University of Aberdeen

Professor Ana Deletic is Pro Vice-Chancellor (Research) at UNSW. Ana leads a large research group that is working on multi-disciplinary urban water issues focusing on stormwater management and socio-technical modelling. Earlier she led the development of a number of green nature based water treatment systems which are now widely adopted in Australia and abroad.

Dixit, Vinayak
Professor
Director, rCITI
MT Institute of Technology, Delhi,
PhD University of Central Florida

Research Interests: Behaviour under Risk & Uncertainty in Transportation Systems: Transportation Modelling & Simulation: Traffic Flow Theory: Traffic Safety: Workzone Management Strategies: Experimental Economics.

Douglas, Kurt
Pells Sullivan Meynink Senior Lecturer of Rock Mechanics,
Chair External Relations
BE (Hons1)USyd, PhD UNSW

My interests lie in the field of rock mechanics and dam engineering. Predicting field properties of rock masses continues to be a major challenge for us to address. My dams research focusses on spillway erosion and backward erosion of dams.

WELCOME

Eisentrager, Sascha
Lecturer
Doctor of Engineering (Computational Mechanics), Otto von Guericke University Magdeburg, Germany

Sascha's research is within the context of structural health monitoring (SHM) applications, particularly with the development of efficient numerical methods for the analysis of wave propagation phenomena in thin-walled structures. Therefore, the propagation of elastic guided waves (Lamb waves, Love waves, Rayleigh waves, etc.) is an important area for his innovative high order finite element and fictitious domain approaches.

Felder, Stefan
Senior Lecturer
Dipl.-Ing. RWTH Aachen, PhD UQ

Stefan is an expert in hydraulic engineering and applied fluid mechanics. He uses his expertise in physical modelling to improve hydraulic designs, flow performances and ecological outcomes of water infrastructure including flow conveyance, urban stormwater, wastewater and irrigation systems.

Foster, Stephen
Professor and Acting Head, School of Minerals & Energy Resources Engineering (MERE)
BE NSWIT, MEngSc PhD UNSW, MIEAust, FIEAust

I research the behaviour of structural systems (buildings and bridges) constructed of reinforced and prestressed concrete. I'm particularly interested in bringing new and advanced materials technologies to the engineering of structures. My interests are in the use of high and ultra-high performance concretes, fibre-reinforced concretes and geopolymer concretes and in use of carbon fibre technologies for strengthening and repair of structures and structural systems. I develop physical-mechanical models for use in advanced computational and numerical tools such as FEM and for their use in the study of behaviour of concrete structures that are subjected to extreme events.

Gao, Wei
Professor
BE HDU, ME PhD Xidian, MIIAV, MAAS

Research Interests: Uncertain modelling & uncertain methods: Vehicle-bridge interaction dynamics: Wind and/or seismic induced random vibration: Train-rail-sleeper-foundation-tunnel/bridge system: Stochastic nonlinear system: Vehicle dynamics & vehicle rollover: Structural optimization & control: Smart structures: Stability & reliability analysis.

Ge, Linlin
Professor,
BE, MSc Wuhan, PhD UNSW

Research Interests: I combine remote sensing with GPS & GIS to produce cost-effective & highly reliable maps. Integrating radar & optical remote sensing with GPS & GIS, we measure the subtle change on the surface of the Earth with minimum latency using data collected from satellite, airborne & UAV platforms.

Ghasrikhouzani, Milad
Associate Lecturer
PhD, UNSW

Research Interests: Data Analysis, Big Data, Econometrics Analysis, Integrated Land-Use and Transport Modelling, Behavioural Travel Modelling, Social-Media Sentiment Analysis, Transport and Life Satisfaction

Glamore, William
Associate Professor
Principal Research Fellow, WRL
BE UI Boulder Colorado USA, PhD UoW

Associate Professor William Glamore leads a large award-winning research team examining various aspects of landscape restoration, emerging contaminants, estuary dynamics and climate change. William highlights his real-world experiences during his teaching on water principles, groundwater resources and estuaries/rivers.

Glenn, Nancy Fraser
Professor of Geospatial Engineering
B.S., Geological Engineering, University of Nevada, Reno,
M.S., Geotechnical/Civil Engineering, University of California, Berkeley
Ph.D., Geo-Engineering University of Nevada, Reno

Professor Glenn is an expert in remote sensing of the environment, dryland ecology and geological engineering, and an innovative researcher and leader in multidisciplinary projects.Most of her research is focused in dryland ecosystems and understanding how these ecosystems respond to changes in climate and disturbance. Her current research focuses on soil and vegetation characterization with lidar and imaging spectroscopy (hyperspectral) for ecological structure and function, and modelling.

Hajimohammadi, Ailar
Senior Lecturer
Ph.D. (sustainable cementitious materials) University of Melbourne

Ailar's research examines the chemistry of materials to develop innovative construction elements with attractive properties. She is also investigating waste management and resource recovering strategies towards the circular economy in civil and construction projects

Hamed, Ehab
Associate Professor
BSc MSc PhD Technion

Research Interests: Viscoelastic behaviour of materials and structures, strengthening of structures with FRP composite materials, sandwich panels.

Harvey, Bruce
Senior Lecturer
BSurv (Hons 1), GradDip Higher Ed, PhD UNSW

Research Interests: Least Squares analysis of surveying measurements is my main interest. I also investigate alternative analysis methods and the latest measurement technologies. Are there better ways to analyse surveying measurements? Can we improve Least Squares, L1 and grid search methods?

Holdom, Robert
Senior Lecturer

Research Interests: construction management.

Johnson, Fiona
Associate Professor
BE, PhD UNSW

Research Interests: statistical hydrology and climate change impact assessment for water resources systems; bias correction and post-processing methods to improve forecasts and climate projections; methods for sustainable and resilient water and flood management in the developing countries and marginalised communities.

WELCOME

Kashani, Alireza
Lecturer
BSc, MSc Amirkabir University of Technology, Tehran
PhD University of Melbourne

Lecturer and Churchill Fellow in Sustainable Construction Automation and 3D Printing with extensive experience in research, development, and commercialisation of advanced and sustainable construction materials. Research areas include development of novel high-performance materials and techniques for construction 3D printing, and sustainable construction materials for the 'Circular Economy' including wastes valorisation, low-carbon construction materials and sustainable concrete.

Khalili, Nasser
Professor and Acting Head of School CVEN
BSc Teh, MSc Birm, PhD UNSW

Research Interests: Mechanics of unsaturated soils: Flow & deformation in double porosity media: Numerical methods applied to geotechnical engineering: Pavement engineering.

Khan, Stuart
Professor
BSc (Hons 1) USyd, PhD UNSW, MIEAust.

Research Interests: Advanced Water & Wastewater Treatment & Analysis: Trace Chemical Contaminants in Water: Chemical Risk Assessment: Probabilistic Chemical Exposure Assessment: Water Recycling & Seawater Desalination: Sustainability Assessment & Risk Assessment: Environmental Fate Modelling: Water Quality Impacts of Extreme Weather Conditions.

Khoshghalb, Arman
Senior Lecturer
BEng, MEng, Sharif University of Technology, Tehran, PhD UNSW

Research Interests: Mechanics of unsaturated soils, coupled analysis of porous media, advanced numerical methods in geomechanics, modelling discontinuities in porous media, large deformation analysis in geomechanics, stabilisation techniques in computational geomechanics, constitutive modelling of geomaterials, dynamic properties of geomaterials.

Kim, Taehwan
Lecturer
BSc, MSc KAIST, Seoul, PhD Purdue USA

Research Interests: Advanced and sustainable infrastructure materials: Thermodynamics in cementitious materials and the modelling of their chemical process: Advanced materials characterization techniques: fundamental understanding of chemo-physical reactions in cementitious materials: Microstructure evolution of cementitious materials: Utilizing natural and waste materials to develop low carbon foot-print materials.

Lim, Samsung
Associate Professor
BA, MA (Mathematics) Seoul, PhD U Texas at Austin

Research Interests: I apply geospatial and remote sensing technologies to spatio-temporal information extraction, image classification, digital elevation modelling, feature extraction, building edge detection and change detection from lidar (known as light detection & ranging) data and aerial/satellite images.

L | | S

Liu, Wei
Lecturer (CVEN/Comp Sci & Eng)
BE/BA (Law) Tsinghua, PhD HKUST

Wei's research interests are in the field of smart transport and smart cities. Current research includes transport system modelling and optimisation, large-scale traffic modelling, simulation and computing, transport economics, and urban big data analytics. He teaches in numerical methods and transport systems.

Manefield, Michael
Professor (CVEN/Chem Eng)
PhD UNSW

Research Interests: I have developed research portfolios in biological remediation of contaminated environments, biogas production from organic feedstocks and biofilm formation and control. My teaching encompasses the full breadth of microbiology from food fermentation to wastewater treatment with hands on laboratory and field work.

Regan, Michael
Professor
BSc, PhD ANU

Michael (Mike) Regan is Professor-Human Factors with rCITI. He is a psychologist and transportation safety researcher with specialist expertise in driver distraction and inattention, interaction with vehicle automation, driver and pilot selection and training, human error, user-centred design of vehicles and roadways and driver licensing.

Rey, David
Senior Lecturer
BSc, MSc EE & IT Montpellier; MSc Maths PUC-Rio, Brazil; PhD IFSTTAR Lyon. Grenoble, France

Research Interests: Research Interests: Optimisation and Control, Operations Research, Transportation and Logistics, Network Design, Collision Avoidance, Shared Mobility, Contagion Modeling, Vehicle Routing.

Roberts, Craig
Senior Lecturer
BSurv, University of South Australia, PhD UNSW

Research Interests: As an education focussed academic I am interested in the implications of datum modernisation on the geospatial community, leveraging multi-GNSS CORS infrastructure for practical application to surveying and geospatial engineering and applications of UAVs for high precision mapping

Russell, Adrian
Associate Professor
BE, PhD UNSW, PGCert Bristol

Research Interests: Applied unsaturated soil mechanics; Liquefaction of variably saturated soils and tailings; Fundamental modelling of soils linking microstructure to large scale behaviour; Fundamental rock mechanics: Fibre reinforced soils.

Saberi, Meead
Senior Lecturer
BS Mashhad, MS Portland, PhD Northwestern University, Illinois

Dr. Saberi is leading the CityX lab as part of the Research Centre for Integrated Transport Innovation (rCITI) which focuses on scientific understanding of smart cities through modelling, simulation, data analytics, and visualisation. His research interests and experience cover a range of transportation areas including traffic flow theory & characteristics, large-scale transport network modelling, complex networks, pedestrian crowd dynamics and simulation, and urban data analytics & visualisation.

Sharma, Ashish
Professor
ARC Future Fellow
BE Roorkee, MTech IIT Delhi, PhD Utah State

Research Interests: Stochastic hydrology: Synthetic generation of seasonal streamflow; Medium to long-term probabilistic forecasting: Stochastic downscaling of hydrologic variables under climate change scenarios: Radar rainfall estimation: Rainfall runoff model & parameter uncertainty assessment in a Bayesian framework: Water Resources Management: new developments in statistics to solve water problems.

Shen, Johnson Xuesong
Senior Lecturer
BEng, MSc Nanjing, PhD Hong Kong Polytechnic University

Research interests: Digital Twins, Artificial Intelligence, Smart Sensing, Autonomous Systems, Internet of Things, Mixed Reality, and their applications in the construction, operation, and maintenance of civil infrastructure and built environment.

Song, Chongmin
Professor and Director CIES
Chair, Computing, IT & Ed Tech Ctte
BE ME Tsinghua, DEng Tokyo

Research Interests: Scaled Boundary Finite-Element Method, Mesh Generation, Dynamic Soil-Structure Interaction, Structural Dynamics & Earthquake Engineering, Fracture Mechanics, Elasto-Plastic-Damage Constitutive Modelling.

Splinter, Kristen
Senior Lecturer
BSc (Eng), Queen's University, Kingston, Canada; MSc, Florida, PhD Oregon State, USA

Research Interests: I study how our coastline (namely the beaches) erode and recover from changes in the size of waves, sediment supply, and water levels. I develop simple numerical models based on broad-scale observations that can predict how beaches change due to changes in wave height and wave period.

Stuetz, Richard
Professor
Co- Chair Teaching & Learning
BSc, PhD UNSW

Research Interests: Research Interests: Water & wastewater quality monitoring: Fate of chemical contaminants in natural and engineering systems: Assessment and treatment of volatile emissions and odours.

Tamburic, Bojan
Melbourne Water Lecturer on the Nuisance and Harmful Algae Science-Practice Partnership
BSc, MSc, PhD Imperial College, London

Project Manager on the Nuisance and Harmful Algae Science-Practice Partnership. My research focuses on algae – microscopic photosynthetic plants that live in our waterbodies. Algal blooms need to be managed because they can produce harmful toxins and other nuisance compounds. Algal biomass is a resource for the production of sustainable fuels and green chemicals. I am passionate about teaching engineers the biological processes that impact water quality and water treatment.

Tang, Chuyang
Professor (CVEN/Chem Eng)
PhD Stanford

Professor Chuyang Tang's main teaching and research interests include environmental engineering, membrane technology, desalination, water chemistry, and physical/chemical treatment methods. He has published approximately 200 refereed journal papers, with a total citation of > 11,000 and an H-index of 60 (Scopus).

Turner, Ian
Professor,
Director, Water Research Laboratory
BSc (Hons) USyd, MEnvEngSc UNSW, PhD USyd

Research Interests: Coastal Engineering & Coastal Management; Innovative coastal measurement & monitoring techniques; Sediment transport at the beachface; Modelling of coastline variability & change spanning storm, seasonal, annual & decadal time-scales; Assessment of coastline adjustment to a changing climate.

Vali Pour Goudarzi, Hamid Reza
Associate Professor
BE, MEngSc, PhD UNSW

Research Interests: Structural mechanics; Development of innovative hybrid steel-timber-concrete structures with emphasis on sustainability and improved structural performance; Behaviour of structures subjected to extreme loads such as earthquake, impact, blast and explosion: Computational mechanics and non-linear finite element modelling of structures: Constitutive modelling of materials.

W | | Z

Waite, T David
Scientia Professor,
BSc Tas, GradDip RMIT, MAppSc Monash, PhD MIT, FRACI

Research Interests: Redox and photochemical processes in natural and engineered systems; Electrochemical technologies for water & wastewater treatment and resource recovery; Separation processes involving colloids & particles in water & wastewater treatment; Biogeochemistry; Computational & experimental studies on the transformation, fate & effects of chemical pollutants; interactions between trace elements & microbiota in aquatic systems.

Waller, S Travis
Professor and Deputy Dean (Research)
BSc Ohio State, MSc, PhD Northwestern

Research Interests: Transportation network modelling, particularly systems characterized by dynamics, uncertainty & information; large-scale integrated transport optimization & planning. Specific applications or problem domains include Dynamic Traffic Assignment (DTA), routing algorithm development, network equilibrium, stochastic optimization, integrated demand/supply modelling, network design, adaptive equilibrium, system analysis of public-private partnerships, & bi-level optimization of transport networks.

Wang, Jinling
Associate Professor
BSc, MSc Wuhan, PhD Curtin

Research Interests: Global Navigation Satellite Systems - GNSS (GPS, Glonass, Galileo, BeiDou System-BDS) & their Integration: Multi-Sensor Integration for Positioning, Mapping & Navigation: Statistical Theory & its Applications in Positioning, Mapping & Navigation.

Wiedmann, Thomas
Associate Professor
MSc, PhD Ulm

My main research question is how to achieve human wellbeing without increasing environmental impacts. My expertise is in integrated sustainability assessment & environmental footprint analysis. I develop & apply environmental input-output analysis as part of a holistic concept to life cycle assessment, industrial ecology & sustainable consumption & production research.

Zhao, Xiao Lin (Joshua)
Professor and Associate Dean (International), Faculty of Engineering
BE, ME Shanghai Jiao Tong University, PhD and Doctor of Engineering,University of Sydney
MBA (Executive) UNSW/USyd

Professor Xiao Lin (Joshua) Zhao's current research focuses on hybrid construction utilising seawater, sea sand concrete and fibre reinforced polymers; rehabilitation of aging infrastructure using advanced composite materials; and ultra-high strength steel structures.

ARC Future Fellows

Collins, Richard
Senior Lecturer and Scientia Fellow
UNSW Water Research Centre
BSc, PhD University of Adelaide

Research Interests: Environmental Molecular Geochemistry of trace elements (metals, metalloids and actinides) in both natural and engineered systems. Research covers aspects related to metal(loid) bioavailability and speciation, redox chemistry and biogeochemical transformations assessed through field/laboratory studies, computational approaches (e.g. DFT) and X-ray Absorption Spectroscopy.

Marshall, Lucy
Associate Professor and Associate Dean (Equity and Diversity)
BE, MEngSc, PhD UNSW

Lucy's research expertise is in hydrologic modelling, model optimization, and quantification of uncertainty in water resources analysis. She is an expert on the assessment of uncertainty in water resource models, and more specifically in the application of formal Bayesian methods for model optimization and diagnostics.

O'Carroll, Denis
Professor and Director WRC
B.A.Sc. Civil Engineering Ottawa,
M.S., Clarkson, PhD.,
U Michigan

Research Interests: Development of novel water remediation technologies, including technologies to effectively degrade PFAS contaminated water. Transport of nanoparticles in the environment – in particular evaluating the fate of engineered nanoparticles that have leached out of commercial products (e.g., release from sunscreens, tennis racquets) and their ecotoxicity.

Rashidi, Taha Hossein
Associate Professor
Discovery Early Career Researcher Award (DECRA)
BSc MSc Sharif UT Tehran; PhD UI Chicago

Research Interests: Travel Behaviour Analysis: Transportation Planning: Activity-Based Travel Demand Modelling: Housing Search & Land Use Modelling: Integrated Land-Use & Transportation Models: Goods Movement Modelling: Microsimulation Modeling Methods for Urban Activities

Professor of Practice

Care, Robert
Professor of Practice
BE, PhD UNSW

My interests include the development of management and leadership in engineering and in business with a strong engineering focus, in major infrastructure projects and in the development of sustainable cities. Specific interests include road and rail transport systems, procurement methods, collaborative and relationship contracting, the development of humanitarian engineering and sustainable communities and climate change adaptation.

Emeritus Professors

Acworth, Ian

Tin Loi, Francis

Black, John

Trinder, John

Fell, Robin

Valliappan, Somasundaram

Gilbert, Ian

Rizos, Chris

Visiting/Adjunct Academics 2019

CIES	
Akbarzadeh Chiniforush, Alireza	Visiting Fellow
Aldred, James	Adjunct Associate Professor
Delhomme, Fabien	Visiting Fellow
Eisentrager, Johanna	Visiting Fellow
Geha, Shane	Adjunct Professor
Gong, Weijia	Visiting Senior Lecturer
Gravenkamp, Hauke	Visiting Fellow
He, Yiqian	Visiting Fellow
Kayvani, Kourosh	Adjunct Professor
Koenke, Carsten	Adjunct Professor
Krahulec, Slavomir	Visiting Senior Lecturer
Li, Haifeng	Visiting Fellow
Li, Jianbo	Visiting Fellow
Liang, Heng	Visiting Senior Lecturer
Rosso, Kevin Michael	Adjunct Professor
Salmanpour, Amir Hosein	Visiting Fellow
Shi, Junjie	Visiting Fellow
Voo, Yen Lei	Adjunct Associate Professor
Wei, Minghai	Visiting Fellow
Yu, Bo	Visiting Fellow
Zhang, Zihua	Visiting Fellow
CVEN	
Swarbrick, Gareth	Visiting Fellow
rCITI	
Al Jassmi, Hamad	Visiting Fellow
Amini, Nima	Adjunct Associate Lecturer
Doust, Kenneth Harold	Adjunct Senior Lecturer
Duell, Melissa	Adjunct Lecturer
Jian, Sisi	Visiting Fellow
Maghrebi, Mojtaba	Visiting Fellow
Moylan, Emily Kate McNeil	Visiting Fellow
Vandebona, Upali	Honorary Senior Lecturer
Wijayaratna, Kasun	Visiting Fellow
Zhang, Fangni	Visiting Fellow
SAGE	
Huang, Lei	Visiting Fellow
Kearsley, Arthur Harry William	Visiting Professor
Lian, Xugang	Visiting Fellow
Liu, Huiyun	Visiting Fellow
Ng, Alex Hay-Man	Visiting Fellow
WRC	
Ajami, Hoori	Visiting Fellow
Barbeau, Benoit	Visiting Professor
Barczak, Radoslaw	Visiting Fellow
Bellie, Sivakumar	Adjunct Associate Professor
Cordery, Ian	Honorary Associate Professor
Crosbie, Nicholas	Adjunct Senior Lecturer
Froemelt, Andreas	Visiting Fellow
Fu, Xue	Visiting Fellow
Guan, Jing	Adjunct Associate Professor
Hadjikakou, Michalis	Visiting Fellow
He, Jie	Internal Contractor
Heinonen, Jukka	Visiting Snr Research Fellow
Holt, Camille Elouise	Adjunct Associate Lecturer
Huang, Hui	Visiting Fellow
Lundie, Sven	Adjunct Associate Professor
Payne, Timothy Ernest	Adjunct Associate Professor
Peters, Gregory	Adjunct Associate Professor
Pui, Alexander	Adjunct Lecturer
Rocheta, Eytan	Adjunct Associate Professor
Schofield, Nicholas	Visiting Professor
Short, Michael	Visiting Fellow
Smith, James	Visiting Professor
Tang, Yating	Visiting Fellow
Townley, Lloyd Richard	Visiting Snr Research Fellow
Wang, Yafei	Visiting Professor
Wang, Yuan	Conjoint Senior Lecturer
Zamyadi, Arash	Visiting Fellow
WRL	
Blenkinsopp, Christopher Edwin	Adjunct Lecturer
Cathers, Bruce	Visiting Fellow
Cox, Ron	Honorary Associate Professor
Greenslade, Diana Jane Macleod	Adjunct Associate Professor
Illangasekare, Tissa	Internal Contractor
King, Ian	Visiting Professor
Mao, Xi	Visiting Fellow
Rau, Gabriel Christopher	Visiting Fellow

Welcome

Dr Elena Astroshchenko

Dr Elena Astroshchenko joined the academic staff at CVEN in 2019 as a Senior Lecturer specialising in computational mechanics and numerical methods.

Raised in Russia, Dr Astroshchenko completed her undergraduate and Masters Science degree there, focusing on developing mathematical models for ophthalmology. Then, off to Canada for 6 years and a PhD. It was there, at the University of Waterloo, that Elena's focus shifted to civil engineering, working as a teaching and research assistant while she completed her own research in computational modelling for fracture mechanics. This research earned her the position of Assistant Professor at the University of Santiago, Chile.

One current project with her colleagues from Santiago is about harvesting energy from piezo-electric plates, but Elena's main focus will be in acoustics: design optimisation for acoustic devices and structures and health monitoring of structures using sound waves. This work in acoustics takes Elena to the University of Luxembourg each year, where she is an associated member of the international Legato team in computational mechanics. Led by Professor Stephane Bordas, Legato "aims at building intuitive and interactive platforms for computational mechanics problems which allow the users to interact with their models and hence gain insights into unconventional and counter-intuitive phenomena."

Finite Element Method is the central thesis of computational mechanics. It is employed widely, through software, at commercial levels. Elena Astroshchenko propels her field forward by merging this established numerical method with computer-aided design. Isogeometric Analysis (IGA) is a recent innovation that improves modelling of new designs during development, making modelling easier and quicker. Only developed in the last decade Elena is an expert in an elite but growing field. "It is yet to be licenced commercially, but the many advantages of IGA are making it a popular area for research."

While Elena and her family loved Chile, she hopes to stay still for a little while, here in Sydney, here at CVEN. "I am very impressed with this School and UNSW. It seems big, not only in terms of size, but in its development and possibilities. But the people are very, very friendly, very supportive. I feel like I am home. I love the multi-cultural society here."

Dr Asal Bidarmaghz

Arriving in Sydney from her position as a Research Associate with the Centre for Smart Infrastructure and Construction at Cambridge University, Dr Asal Bidarmaghz has found her CVEN welcome enthusiastic, warm and practically helpful: "like they were waiting for me". As a Lecturer in Geotechnical Engineering, Asal brings to us her extensive knowledge and experience in the nascent field of subterranean geo-energy systems, having received her PhD in Civil Engineering (Geothermal Technologies) from the University of Melbourne in 2015.

"There is a problem, a big problem," she says. World leaders are not fully acknowledging nor acting upon the true impacts of climate change. Moreover, underground climate change is very rarely considered or discussed. Nor is geo-energy utilised as a resource, even though it is ever present, available and the technology to access it has been developed. But Asal Bidarmaghz is a gently hopeful engineer, who believes in the power of hard work and persistence, bolstered by collegiate support and right-minded institutions.

"The challenge with industry is to create business cases for geo-energy system projects. I feel confident, this is do-able. We cannot go backwards."

Asal's research, begun during her PhD in Melbourne and continued at Cambridge, reveals the particular climate change challenges created by

ever increasing urbanisation. Cities create 'urban heat islands', where temperatures far exceed those of the surrounding rural areas. This promotes the need for electric cooling, the need for resources.

We need to be asking what effect do our underground structures, such as basements, car parks and activities like transport tunnelling, have on the surrounding environment? Could the heat generated by such activities be extracted and exploited as 'smart heat'? "In city-scale, there are gigawatts of ground energy freely available to us, but there is a lack of understanding as we continue to burn coal. We need the different sectors working together in urban planning."

The benefits of geospatial research to city planners, asset owners, local authorities and citizens are many and seemingly obvious: alternative, sustainable and free energy sources, optimal use of subterranean spaces in city planning and positive impacts on general wellbeing of urban inhabitants. Frustratingly, Australian industries and governments are not yet fully convinced; perhaps revealing "a resistance to anything new and expensive", so this continued research is vital to enacting change in our cities.

Dr Andrew Dansie

Dr Andrew Dansie joined us in 2019 as Senior Lecturer in Humanitarian Engineering, a position held jointly with the School of Chemical Engineering. Dr Dansie has been on campus since 2017, as program manager for the UNSW Global Water Institute (GWI).

Humanitarian engineering is about developing projects that address a real human need. It is not about profit, it is about building capacity and serving the disadvantaged. This is a new approach to international assistance with an emphasis on suitability, sustainability and the desires of the community it intends to serve.

After completing his Bachelor of Science at Flinders University, and a Masters at Adelaide University on coastal land use and erosion, three years in Perth followed, working as a microbial and environmental scientist in the private sector before Andrew won a position at the UN University's Institute for Water, Environment and Health as a researcher in the Freshwater Ecosystems Program in Ontario, Canada.

Here he was project director for a global synthesis of science across transboundary marine and freshwater bodies. "We were analysing US$7 billion and 20-years' worth of investment and national government partnership by the Global Environment Facility (GEF). The GEF is the largest funder of environmental projects in the world and an organisation that works collaboratively, across borders in their International Waters portfolio. Coordinating 75 leading scientists from 6 continents in 5 different water research areas, was a fascinating project."

Dansie was offered a Clarendon scholarship to the University of Oxford in the School of Geography and the Environment, investigating sediment and nutrient dynamics between hydrological, aeolian and oceanic systems of southern Africa. While undertaking his PhD he also worked on the UNICEF-Oxford REACH global research programme that looked at the water security of poor communities in Ethiopia, Kenya and Bangladesh. He also joined the Board of the Sumatran Orangutan Society, preserving the Leuser Ecosystem in partnership with local communities, assisting them to diversify their income-generating activities, discouraging unsustainable land clearing.

In all of his work Dr Andrew Dansie believes in listening to local expectations: an 'ears open mouth shut' approach. "I want to develop, here at UNSW, an internationally recognised Humanitarian Engineering program that is applying appropriate and sustainable humanitarian solutions to disadvantaged communities in Australia and overseas. This is made achievable by the good will and collegiality that already exists here. UNSW has become a great place to be."

Dr Sascha Eisentrager

Dr Sascha Eisentrager arrived in Sydney In June 2019 from Otto von Guericke University in Magdeburg, Germany. He is, however, no stranger to Australia, having completed some of his postgraduate studies in Adelaide. As a CVEN Lecturer and a member of the Centre for Infrastructure and Engineering Safety (CIES), Sascha will be developing his research in Computational Mechanics, especially in high order Finite Elements Methods (FEM).

Dr Eisentrager's enthusiasm for computational mechanics began early in his career and he has continued to refine his approach. "Computational mechanics (CM) is a broad range of different methods, commonly based in numerical approaches, and used to solve partial differential equations. All physical problems present a certain set of partial differential equations (PDEs) to which we have to apply numerical (approximative) methods. I concentrate on Finite Element Methods in the context of high order shape functions. Commercially, FEMs often utilize linear or quadratic shape functions, but I try to exploit the inherent advantages of high order ones."

Simultaneously, Eisentrager is developing proposals for the German Research Foundation and the Australian Research Council. These projects will investigate modelling the behaviours of complex acoustic materials like dampening foams. These materials exhibit both open and closed cell structures that make modelling a complex challenge, necessitating high performance computing technology. "We will look at the relationship of these complex materials to the environments in which they are used. In urban areas, uses such as engine encapsulation can reduce noise pollution. Engine heat can be retained to increase start up efficiency, reducing emissions and fuel consumption. These materials could have positive effects on urban well-being."

Eisentrager would also like to build more understanding between the engineering academy and the engineering industry. "Certain commercial computational methods are based in knowledge from the 1980s and 1990s, while the newer computational research has the potential to greatly increase industrial efficiency. Sometimes industry can be a little conservative, reluctant to invest either time or money to adopt new methods." He sees the distinction between academic researchers and industry as being neatly articulated by the Pareto Principle. "80% of the work is completed in 20% of the time. To get to that final 20% of the work, a big time and resource investment is needed, but it is here that innovation, academic rigor and excitement lie."

Professor Nancy Glenn

Professor Nancy Glenn joined the School in November 2019 to lead our surveying and geospatial group as Professor of Geospatial Engineering. Nancy is an expert in remote sensing of the environment, dryland ecology and geological engineering, and an innovative researcher and leader in multidisciplinary projects.

Most of her research is focused in dryland ecosystems and understanding how these ecosystems respond to changes in climate and disturbance. Her current research focuses on soil and vegetation characterization with lidar and imaging spectroscopy (hyperspectral) for ecological structure and function, and modelling.

Nancy comes to Sydney from the Department of Geosciences at Boise State University, Idaho. Her research at Boise Center Aerospace Laboratory (BCAL) focused on methodological development of point cloud analysis tools, hyperspectral data fusion, and unmanned aerial systems (UAS). Most recently, she expanded research to incorporate the human dimension. Professor Glenn was a Founding Director of the Human-Environment Systems Initiative, an intensive research effort at Boise State University that couples the human and biophysical sciences.

An award-winning researcher, Professor Glenn has won over $US25 million in research grant funding. She is also a Licensed Professional US engineer.

Professor Glenn's experience in remote sensing processing and interpretation ranges from synthetic aperture radar (SAR), hyperspectral, multitemporal multispectral, and lidar (airborne laser scanning (ALS), and terrestrial laser scanning (TLS)). Her work also incorporates visualization, geostatistics, machine learning, high resolution global positioning systems (GPS) and the use of geographic information systems (GIS) for field validation and analysis of spectroscopy, ALS, and TLS data.

We are delighted to have a scholar of her standing and vision join the School, and hope that we can both benefit from and support Professor Glenn's extensive expertise and innovative research projects.

Dr Ailar Hajimohammadi

Dr Ailar Hajimohammadi joined the academic staff of CIES and the School of Civil and Environmental Engineering as a Senior Lecturer. Originally interested in chemical engineering, Dr Hajimohammadi's PhD research on sustainable cementitious materials shaped her current focus on innovative construction materials and techniques.

This shift to civil and environmental engineering has allowed her research to become more multi-disciplinary and collaborative. "The most innovative way I can approach my research is to look at the problem from different angles," she reflects. "Rather than just focusing on what I already know, I want to know how others see the problem, how other disciplines are approaching it. In this way new methods, new solutions appear. Useful, important, but also very interesting for me. Multi-disciplinary university structures allow for increased communication, visibility and opportunities for academics to work in less isolated ways."

For the last 4 years Ailar has been working with a waste recovery group she led under an ARC Linkage program to uptake landfilling wastes and convert them to valuable products.

She also works with industry and the academy on the many innovative applications of sustainable construction materials. These materials can utilise recycled waste products, can create cheaper, more durable materials as alternatives to traditional concrete. Also, they can be designed to provide insulation, retard fire and dampen noise. In fact, sustainable materials and technologies research has the potential to revolutionise the civil engineering and construction industries. Not only does it represent green innovation in its use of waste materials, but it can transform the affordability of our built environment.

"We may have started with concretes, but sustainable alternatives have evolved into more complicated composites, with more load bearing construction potential. There is tremendous growth in its applications for fire-resistant high-rise buildings and for sound dampening road barriers", both so important in a city like Sydney where high-rise buildings sprout like seedlings and the noise of traffic and construction threatens liveability. "The use of sustainable materials in construction can also extended to other civil applications such as water treatment technologies and soil stabilisation methods, so it is beneficial and interesting to find mutual interest between disciplines.

"Generally, I hope that my research will lead to an increase in the resilience of construction materials while decreasing their negative environmental impact."

Dr Ali Kashani

In 2019 we welcomed Dr Ali Kashani – a 2018 Churchill Fellow, and expert in the field of sustainable concrete design and technology - specifically waste valorisation and circular economy in concrete design, lightweight concrete, geopolymer concrete, and automated construction 3D printing.

Dr Kashani has extensive experience in research, development, and commercialisation of advanced and sustainable construction materials. His primary research area is 'Construction Automation' via development of novel high-performance materials and techniques for construction 3D printing. His other main area of research is sustainable construction materials for the 'Circular Economy' including waste valorisation and low-carbon construction materials.

Ali received his BSc and MSc from Iran's leading technical and engineering university, Amirkabir University of Technology in Tehran. He obtained his PhD in 2015 from The University in Melbourne with research into the rheology and fresh properties of low-carbon geopolymer concrete. As a postdoctoral researcher at The University of Melbourne, his focus widened into development of sustainable lightweight concrete, design of concrete with waste tyre and waste glass, and exploration of the innovative field of construction 3D printing.

He has been the Project Leader in several R&D projects funded (to a total of $645,000) by government entities and construction industry leaders in Australia, to promote research in advanced and sustainable concrete. He continues to look at partnerships with industry. "We are looking forward to working with cement and concrete industries and

building standard regulators to prove the viability of using sustainable concrete with recycled materials in different applications"

Automation in construction by 3D printing is another main research interest. And this area is proving equally exciting and fruitful. One of Dr Kashani's recently papers as a corresponding author about 3D printing was published in the high-impact Elsevier Journal 'Composites: Part B' in June 2018. It has attracted 331 citations so far.

It was this area of research which won Ali a prestigious Churchill Fellowship in 2018. The 3D project has the potential, he notes, to assist with more sustainable, faster and safer construction of affordable houses and to provide housing solutions to disadvantaged Australian communities and homeless people. These technologies could also be used to provide rapid accommodation for affected communities after natural disasters such as floods and bushfires.

Professor Xiao-Lin (Joshua) Zhao

In 2019 we were delighted to welcome Professor Xiao-Lin (Joshua) Zhao to the School.

Professor Xiao-Lin (Joshua) Zhao has very recently taken up an appointment as the new Associate Dean (International) for UNSW Engineering.

Professor Zhao's very impressive academic background began at Shanghai Jiao Tong University where he commenced study at just 16 years of age. Graduating in 1984, with a Bachelor of Mechanical Engineering, he went on to study his Masters degree in the same field. He graduated in 1987 and came to Australia in 1988 to study at the University of Sydney, this time in the field of Civil Engineering, receiving his PhD in 1993. He completed an MBA from the AGSM in 2007, making him an alumnus of UNSW. He also received a Doctor of Engineering (higher doctorate) from the University of Sydney in 2012.

In 2001 Professor Zhao was appointed Chair of Structural Engineering at Monash University.

Zhao has received several prestigious fellowships, such as the von Humboldt Fellowship of Germany, JSPS (Japan Society for Promotion of Science) Invitation Fellowship of Japan, Distinguished Visiting Fellowship Award from the Royal Academy of Engineering, UK, Visiting Professorship Award from Swiss National Science Foundation, National "1000-Talent" Chair Professorship and Chang Jiang Professorship of China.

He has received 25 grants from the Australian Research Council and served on the ERA (Excellence in Research for Australia) Research Evaluation Committee for Engineering and Environmental Sciences Cluster in 2015 and 2018. He has also supervised 40 PhD students to completion.

More recently, Professor Zhao was Head of the Department of Civil Engineering at Monash University for four years after being Deputy Head and Director of Research in the Department for seven years. Professor Zhao has extensive experience working in international environments leading the Department in several major international initiatives such as the Monash-Sichuan University alliance, Monash-IIT-B academy, Monash-Warwick alliance and Monash-Southeast University Alliance.

We look forward to many opportunities for Professor Zhao to share his extensive knowledge and experience with us.

Congratulations – promotions

Image Credit: Mike Gal

Congratulations to Dr Fiona Johnson for her well-deserved promotion to Associate Professor. Fiona is based in the School's Water Research Centre. Her research focuses on understanding the science of rainfall extremes, how rainfall and hydrology will change in the future and how these impacts can be mitigated through improved engineering for Australia and communities in the developing world. Her passion has always been to translate scientific knowledge into practical outcomes. A/Prof Johnson's teaching areas are hydrology and humanitarian engineering. She has been one of the key drivers of the humanitarian engineering stream offered within the UNSW Faculty of Engineering,

Farewell and Best Wishes

During 2019 the School farewelled the following academic staff – we congratulate them on their wonderful new positions and wish them all the very best in their future careers.

Associate Professor Arnaud Castel is now Professor at School of Civil & Environmental Engineering, University of Technology, Sydney.

Dr Milad Ghasrikhouzani is now Transport Lecturer in the School of Engineering and Information Technology at UNSW Canberra (ADFA).

Dr Lauren Gardner is now Associate Professor in the Department of Civil and Systems Engineering at Johns Hopkins Whiting School of Engineering, Baltimore.

Professor Chuyang Tang is now Professor of Environmental Engineering at the University of Hong Kong.

OH&S Committee

OH&S Committee	
Paul Gwynne	Chair
Robert Steel	Deputy Chair/WRC Rep
Theresa Wisniewski	CIES
Laarni Caluducan	Secretary/Health and Safety
Zhen-Tian Chang/Ron Moncay	Heavy Structures
Julius Secadiningrat	rCITI
Yincai Zhou	SAGE
Gautam Chattopadhyay/ Artur Ziolkowski	WQL
Francois Flocard	WRL
Alex Ong	iCinema
Samsung Lim	Academic Rep.
Rehnuma Tarannum	Undergrad Rep
Jiayi Fu	Postgrad Rep
Denise Lee	Admin Rep
Blathnaid Farrell	Faculty Advisory
Head of School is an ex officio member of all committees	

Centre Research Staff

Visiting/Adjunct Academics	Title
CIES	
Chen, Jun	Postdoctoral Fellow
Chhor, Allen	Senior Research Associate
Chilwesa, Masuzyo	Research Associate
Hassanieh, Amirhossein	Research Associate
Liu, Lei	Postdoctoral Fellow
Makki Alamdari, Mehrisadat	Postdoctoral Research Fellow
Masoumi, Saeed	Research Associate
Parvez, Md Ahsan	Postdoctoral Fellow
Saputra, Albert	Postdoctoral Fellow
Shahbodaghkhan, Babak	Senior Research Associate
Vahab, Mohammad	Research Associate
Vo, Thanh Liem	Research Associate
Wu, Di	Research Associate
Xing, Weiwei	Research Associate
Yu, Yuguo	Research Associate
Zhang, Junqi	Research Associate
CWI	
Rutlidge, Helen	Postdoctoral Research Fellow
rCITI	
Akhtar, Mahmood	Senior Research Associate
Chand, Sai	Research Associate
Grzybowska, Hanna	Senior Research Associate
Jayakumar Nair, Divya	Research Associate
Jian, Sisi	Research Associate
Prabhakharan, Prasannah	Research Fellow
Robson, Edward	Research Associate
Saxena, Neeraj	Research Associate
Wijayaratna, Kasun	Research Associate
Zhang, Xiang	Research Associate

Visiting/Adjunct Academics	Title
WRC	
Abdala Prata Junior, Ademir	Research Associate
Bligh, Mark	Research Associate
Branch, Amos	Research Associate
Farzanehsa, Marshid	Research Associate
Fisher, Ruth	Research Associate
Garg, Shikha	Senior Research Associate
Hayes, James	Research Associate
Jamali, Behzad	Associate
Jones, Adele	Research Associate
Kim, Seokhyeon	Research Associate
Kinsela, Andrew	Research Associate
Kuller, Martijn	Research Associate
Le, Minh Nhat	Senior Engineer
Lee, Matthew	Research Fellow
Li, Xiaomin	Senior Research Associate
Ma, Jinxing	Postdoctoral Fellow
McDonald, James	Research Fellow
Mehrotra, Rajeshwar	Senior Research Fellow
Miller, Christopher	Senior Research Associate
Pham, An Ninh	Senior Research Associate
Pham, Hung	Research Associate
Prodanovic, Veljko	Research Associate
Roser, David	Research Associate
Stephens, Clare	Research Associate
Sun, Yingying	Research Associate
Tang, Yating	Research Associate
Teh, Soo Huey	Research Associate
Xing, Guowei	Research Associate
Zhang, Changyong	Research Associate
Zhang, Kefeng	Research Fellow

Visiting/Adjunct Academics	Title
WRL	
Harley, Mitchell	Scientia Fellow & Senior Lecturer
Anibas, Christian	Research Associate
Chen, Chris	Research Associate
Heimhuber, Valentin	Research Associate
Prakash, Om	Research Associate
Sadat-Noori, Mahmood	Research Associate
Simmons, Joshua	Research Associate
Anderson, Douglas	Principal Engineer
Blacka, Matt	Principal Engineer
Carley, James	Principal Engineer
Flocard, Francois	Principal Engineer
Miller, Brett	Principal Engineer
Modra, Benjamin	Principal Engineer
Rayner, Duncan	Principal Engineer
Herold, Judy	Engineer
Coghlan, Ian Ross	Engineer
Deiber, Mathieu	Engineer
Drummond, Christopher	Engineer
Harrison, Alice	Engineer
Howe, Daniel	Engineer
Juma, Dauglas Wafula	Engineer / Field Assistant
Lumiatti, Gabriela	Engineer
Montano, Laura	Engineer
Rahman, Priom Faria	Engineer
Ruprecht, Jamie	Engineer
Simpson, James	Engineer
Tucker, Toby	Engineer

Professional Staff (Administrative)

School Office

Anthony Dever
School Manager

Warassamon Kate Brown
Web Coordinator

Denise Lee
Facilities Officer (Faculty embedded)

Laarni Caludugan
Health, Safety & Environment Advisor (OH&S embedded)

Patrick Vuong
Computer Systems Officer (IT embedded)

Jiaqi Yang
Administrator (Faculty embedded)

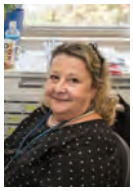
Paula Ploysarak
Administrator (Faculty embedded)

External Relations

Patricia Tesoriero
Community Outreach Projects P/T

Tamara Rouse
Industry Relations Special Projects P/T

HDR & Teaching Support



Patricia McLaughlin
Higher Degree Research (HDR) Support Officer (Faculty embedded)

Ellie Williams
Student Services Officer

Liam Orchard
Administrative Officer (Timetable)

Ozair Turabi
Administrative Officer

Lucia Wong
Executive Assistant

Professional Staff (Research Centres & Technical)

Technical Services (Water)

Gautam Chattopadhyay Professional Officer

Kelvin Ong Technical Officer

Artur Ziolkowski Technical Officer

Technical & Professional (SAGE/Transport)

Peter Mumford Technical Officer (SAGE/ Transport)

Julius Raditya *Secadiningra* Technical Officer (Transport)

Yincai Zhou Professional Officer (SAGE)

Research Centre Management

Maria Lee Administrative Officer rCITIT

Sylvia Brohl Project Officer rCITI

Robert Steel Manager WRC

Technical & Professional (Heavy Structures Laboratory Randwick)

Research and commercial activities are conducted with extensive physical laboratory resources, such as those of the Heavy Structures Research Laboratory, Advanced Materials Research Laboratory, Geotechnical Laboratory and the Advanced Computational Analysis Laboratory (ACAL). Through these state-of-the-art facilities we are able to conduct our blue sky and applied research, for industry and government partners.

Zhen-Tian Chang Laboratory Manager

Ronald Moncay Senior Technical Officer

Benjamin Pauley Technical Officer

Rudino Salleh Technical Officer

Sanjeewa Herath Senior Technical Officer

Tuan Le Postdoctral Technical Assistant

Greg Worthing Technical Officer

Technical Services (Kensington)

Paul Gwynne Lab Manager

Anthony MacKen Senior Technical Officer

William Terry Senior Technical Officer

Luiz Pettersen Technical Officer

Timothy Weston Technical Officer

Technical (WRL)

Fang Bian, Technical Officer WR

Robert Byron Jenkins Technical Officer WRL

Larry Paice Technical Officer WRL

Dr Kristina Palmer Technical Officer WRL

Robert Thompson Technical Officer WRL

Grantley Smith Manager WRL

Gracie Carlino Administrative Assistant WRL

Coral Johnson Administrative Assistant WRL

Patricia Karwan Administrative Officer WRC

Ross Mathews Administrative Assistant WRL

Theresa Wisniewski Manager-CIES

He really loved the University

Vale founding academic Peter Stephen Balint 19.08.1921–23.12.2019

Our dear Peter Balint, one of the founding brotherhood of the School of Civil & Environmental Engineering has passed away.

Peter, a structural engineer from Hungary, joined the School in 1952. The university had been established only three years previously to teach and conduct research in scientific and technological disciplines - the only Australian university founded with this unique focus. It began with three Faculties: architecture, engineering (civil, electrical, mechanical and mining) and science.

The School of Civil Engineering was at that time housed in a tiny terrace in Ultimo. Although their surroundings were humble, morale and excitement were high. For Peter Balint, a post war immigrant, Australia was 'the land of opportunity' and he recalled the enthusiasm, hard work and ambitions of the early school and its founding staff.

By 1955 the School, now more comfortably housed within Sydney Technical College grounds at Ultimo, had the largest number of full-time student enrolments of the then twelve schools in the new University.

Peter Balint was studying, teaching and researching in structural design and stress analysis. His work at the School structural testing labs – where each research project brought in a little more money for further equipment and further research – was underpinned by a good working relationship with the Civil Engineering leadership, in particular Prof Stan Hall. 'I trusted him, and Stan trusted me, and he gave me the freedom you need if you want to progress. "

In 1959 Peter, despite being busy teaching and rearing a young family, completed his own Masters of Engineering thesis on the topic of the elastic behaviour of prestressed concrete slabs on an elastic foundation. In the early 1960's Peter was involved in one of the most prestigious projects awarded to the emerging school, the model testing of the Sydney's Australia Square Tower. Designed by the famous Modernist architect Harry Seidler and completed in 1967, its daring roundness and 50 floors impressed many at the time. Architectural critic Elizabeth Farrelly believes that the sleek, shiny modern tower 'gave Sydney a sense of growing up, a sense of confidence.' It would become a symbol of an emerging modern Australia.

Peter was commissioned to build a model of the tower, to assess its response to a variety of loads. Deep in the school's Ultimo laboratories, Peter led a team conducting model studies to determine the lateral stiffness characteristics of the great tower for wind load stress conditions. The stiffness parameters from the model tests were fed into a computer model that was set up to predict the response of the structure to wind and involved solving about 11,000 simultaneous equations. The three biggest computers in Australia at CSIRO in Sydney, Melbourne and Canberra were interconnected to solve the equations.

Peter was also involved in the assessment of another iconic Sydney structure, the Sydney Harbour Bridge, when there was a proposal to increase the number of rail lines crossing the Bridge. Peter valued these opportunities to research and utilise the techniques that he was teaching his students.

Peter continued to teach and research at the School till the 1980s. He is remembered as a knowledgeable, kindly and hardworking colleague. He was an enthusiastic teacher and mentor and his open-door approach is remembered by many previous students. He was always recalled with respect and affection by alumni contacted during the School history project, for which he provided many precious photos and memories.

Although retired, Peter was always interested in the life and work of the School and kept in touch with many of his colleagues and ex-students. He was proud of the School's twenty first century rise to number one civil engineering school in Australia and into the top global rankings. Like many of the founding staff, his connections were both deeply intellectual and emotional, as his beloved wife Margaret said, "He really loved the University".

Our Research

Research Management Committee

The School's Research Management Committee (RMC) manages and supports research activities within the School. In 2019, the RMC met every month to oversee and progress all research related aspects of the School's operation. The RMC liaises with and contributes directly to the Faculty's Research Management Committee.

Research Management Committee (RMC)	
Denis **O'Carroll**	Chair
Hamid **Vali Pour**	Deputy Chair; Postgrad Research Student Coordinator
Adrian **Russell**	CIES Representative
Mitchell **Harley**	HDR Admissions and Scholarships Coordinator
Chongmin **Song**	CIES Director
Mark **Bradford**	CIES Research Director
Martin **Andersen**	CWI Director
Taha **Rashidi**	Practicum Students
Will **Glamore**	WRL Representative
Wei **Gao**	ToR Coordinator
Tommy **Wiedmann**	WRC Representative
Jinling **Wang**	SAGE Representative
Jiayi **Fu** (Jerry)	CERSA Representative
Mehri Makki **Alamdari**	Early Career Researcher
Johnson **Shen**	Construction Representative
Theresa **Wisniewski**	Administrator
Head of School is an ex officio member of all committees	

Postgraduate Research Student Management

In 2019, the School had 172 Higher Degree Research candidates.

An important aspect of the Committee's work involves the management of the School's postgraduate research student program. This involves the assessment of applications to undertake higher degrees within the School, the formulation of specific research plans for each student accepted into the program, the nomination of suitable supervisors, reviewing the progress of students at regular intervals, making recommendations on progress to the Faculty's Higher Degree Committee, and finally, nominating examiners when the thesis is completed and, where necessary, following up on the examination process.

Review committees

Each candidate is assigned a review committee of three academic staff chaired by a member of the RMC. The review committee meets to interview the student and supervisor(s) at 6 or 12 monthly intervals, depending on the student's progress, and, at these reviews, the student is invited to present a brief seminar outlining progress since the last review. Most of our academic staff and several research only staff participated in the student review panels in 2019. Much of the heavy administrative workload in this area is carried by the School's HDR Coordinator Associate Professor Hamid ValiPour and the HDR Student Administrators Ms Pattie McLaughlin and Ms Sunhee Lim.

Graduation

2019 saw 41 of our PHD researchers and 8 MEs successfully graduate. Our congratulations and very best wishes for the future go out to all of them. Their achievements and those of their research supervisors create a scholarly critical mass, providing high quality knowledge contributions for the practice of civil, environmental and geospatial engineering across Australasia and the world.

ARC Research Grants

The RMC also provides input to the preparation and coordination of research grant applications. This includes ranking the School's applications for internal grants and UNSW Major Research Equipment and Infrastructure Initiative (MREIIs) and reviewing applications for competitive external grants such as the Australian Research Council (ARC) Grants and from industry.

In 2019 the School continued on its ARC success story – winning 5 highly sought-after ARC Discovery Grants, one ARC Discovery Early Career Research Award (DECRA) and one ARC Linkage Project – to a total of $2.8M - fuller details on following pages. School researchers were also

involved in 3 ARC Linkage projects totalling over $1.5M coordinated through other UNSW Schools or other universities.

Applied Research Income 2019

In 2019 School researchers worked with an amazing number of industry and government partners on a wide variety of applied research projects. Our work with and for 135 external partners brought in a total annual income of $13 million. More importantly it places the School at the heart of contemporary engineering practice in serving community needs.

The total annual research grant income from all our research centres was $14,715,507, including $1,768, 085 from ARC Discovery, DECRA and Future fellowships.

2019 Publications Output:

Book	1
Book chapter	6
Conference	45
Journal article	364

Research Rankings:

In April 2019 the ARC Excellence in Research for Australia (ERA) results for 2018 were released.

Civil Engineering was once again rated as 5 Star (performing well above world standard) and in 2019 our Geomatic Engineering research also received the maximum rating of 5 Stars.

Our Laboratories:

None of our research achievements and awards would be possible without our high functioning and very high-use laboratories, (for research and teaching purposes) staffed by a highly skilled team of technical officers and managers, with oversight by the Technical Services Committee.

Technical Services Committee (TSC)

Technical Services Committee (TSC)	
Vinayak **Dixit**	Chair
Stefan **Felder**	Deputy Chair; WRL Rep
Gautam **Chattopadhyay**	Environmental Labs
Paul **Gwynne**	Geotechnical and Materials Research Labs
Zhen-Tian **Chang**	Heavy Structures Laboratory
Yincai **Zhou**	SAGE Rep
Julius **Secadiningrat**	TRACSLab Rep
Hamid **Valipour**	Academic-in-charge Heavy Structures and Materials Labs
Stuart **Khan**	Academic-in-charge Water Quality Labs
Richard **Collins**	Academic-in-charge Radiation Labs
Adrian **Russell**	Academic-in-charge Geotechnical Labs
Sylvia **Brohl**	Administrator
Head of School is an ex officio member of all committees	

ARC Grants 2019

In 2019 School researchers won $2.8M in a total of five ARC Discovery Projects grants, 1 ARC Linkage and one Early Careers Researcher Award. School staff were also involved in 3 ARC Linkage projects totalling over $1.5M which are being coordinated through other UNSW Schools or other universities.

Details of the Grants are as follows:

ARC Discovery Project Grants 2019

Professor Stephen Foster (CI).
DP200103764 — Mixed Mode Torsion-Shear-Bending Failure in SFRC Elements.

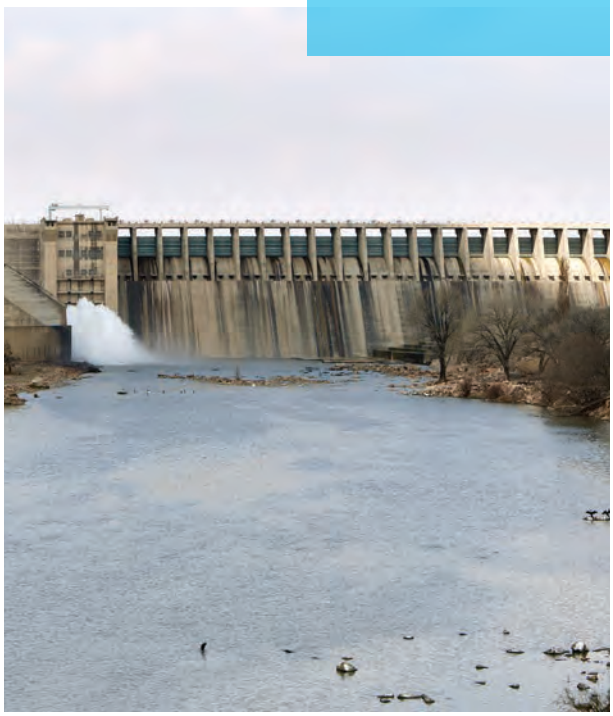
Summary: In 2017 and 2018 the Australian Standards for the design of concrete bridges and structures were released; these are some of the first in the world, to include design procedures for steel fibre reinforced concrete (SFRC) in a comprehensive way. While rules have been introduced for shear and bending of SFRC girders, the rules exclude the use fibres to carry torsional moments. This study investigates the torsion-bending-shear interaction performance of SFRC members. The study will provide vital data needed for adoption by engineers and Standards bodies.
Funding: $380,000

Em Prof Raymond Gilbert (CI) UNSW, Dr Ali Amin (CI)USyd
DP200102114 — Time Dependent Behaviour of Fibre Reinforced Concrete Structures.

Summary: The project aims to quantify the initial and long-term cracking and deformation of fibre reinforced concrete structures such as tunnel linings and slabs under sustained in-service loads and conditions. Concrete structures with and without conventional steel reinforcement and containing either steel or polypropylene fibres mixed in the concrete will be tested experimentally and modelled analytically and numerically. Expected outcomes are benchmark experimental data on structural behaviour under sustained loads, development of reliable simulation models and robust design procedures for the control of time-dependent cracking and deformation in fibre reinforced concrete, with reduced maintenance costs and more sustainable concrete structures.
Funding: $405,000

Professor Ashish Sharma (UNSW); Dr Conrad Wasko (U Melbourne); Associate Professor Rory Nathan (U Melbourne):
DP200101326 — Assessing Water Supply Security in a Nonstationary Environment.

Summary: About 25% of the global population currently has inadequate access to safe and secure water. This number is expected to rise to 50% by 2050 due to increased populations and reduced river flows. While a visible water crisis (such as the one in Cape Town in 2018) can culminate in the funding of new water supply infrastructure, a planned push for infrastructure augmentation often stalls due to contradictory projections of how much water will be available in the future. To address this, a novel alternative for assessing water security is proposed. Our approach assesses change using historical information on river flow and water demand, adapting these to form projections that exhibit greater reliability than currently existing alternatives.
Funding: $345,000



Professor Chongmin Song (UNSW):
DP200103577 — Computational fracture analysis of structures and materials.

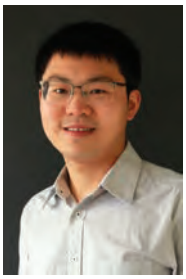
Summary: This project aims to develop a computer simulation technique to address the safety of engineering structures. A novel numerical framework based on the scaled boundary finite element method will be developed to model the fracture process critical to assessing structural integrity. The expected outcomes of this project include an innovative technology for numerical simulation and improved capabilities to generate high-fidelity predictions of structural safety at minimum human efforts. The fully automatic and robust numerical tool developed in this project will help engineers and government authorities to perform safe and cost-effective design and management of engineering structures that are vital to modern economies.
Funding: $425,000

Dr Kristen Splinter(CI); Professor Ian Turner (CI)(UNSW); Associate Professor Giovanni Coco (PI) -University of Auckland, NZ; Dr Margaret Palmsten (PI) - United States Naval Research Laboratory
DP200100134 — Quantifying the impact of infiltration on dune erosion under waves & surge.

Summary: Through a series of controlled laboratory experiments and numerical model development, this project aims to determine and quantify for the first time the role of water infiltration on sandy soil stability at actively eroding coastal sand dunes. This project expects to generate much-needed understanding of fundamental dune erosion processes using innovative instrumentation to obtain continuous measurements of wave-dune interactions, dune profile evolution, and water infiltration. Expected outcomes of this project include improved coastal engineering models to predict dune erosion under waves and increasing water levels. This should provide significant benefit to the future management of coastal assets using nature-based solutions.

Funding: $370,000

2019 ARC Discovery Early Career Research Awards (DECRA)



Dr Wei Liu, a cross-disciplinary researcher from the Schools of Civil & Environmental Engineering and Computer Science & Engineering will explore how to manage the network impacts of transport sharing services such as ridesharing and parking sharing to encourage people to use them.

DE200101793 - Quantifying and managing the network impacts of transport sharing services.

Summary: This project aims to address the challenge of effectively modelling multiple transport sharing services (e.g., ridesharing and parking sharing) in a multimodal network, and efficiently operating these services, and incentivising people to use them. The project expects to generate new knowledge in shared transport by developing an innovative approach to systematically reproducing and optimising network impacts of sharing services on travel choices, sharing demand-supply matching patterns, movement trajectory features and traffic dynamics. Expected outcomes include new models and strategies to improve decision support for transport planners and operators. This should provide significant benefits for human mobility and city sustainability.
Funding: $423,038

2019 ARC Linkage Projects

Professor David Waite (UNSW Sydney); Professor David Cliff; Dr Richard Collins; Dr Bharath Belle; Professor Huaiwei Ren:
LP180101146 - Elemental release and oxidant production from mixed coal mine dusts.

Summary: The aim of this project is to understand the implications of physical and chemical characteristics of mixed coal mine dusts to their elemental release and oxidant production. The re-emergence of occupational lung diseases in recent years has revealed a major knowledge gap in the area of respirable particle reactivity. This research will examine the role between coal mine dust and their capacity to produce reactive oxygen species, with the focus being on the role of physical and chemical properties of particles and how they transform with age. The findings will be used to develop screening protocols and develop novel monitoring / mitigation strategies for coal mine workers.
Partner organisations: ACARP; ANGLO AMERICAN METALLURGICAL COAL PTY LTD; CHINA COAL TECHNOLOGY & ENGINEERING GROUP CORP
Funding: $459,000

2019 ARC Linkage Projects coordinated through other UNSW Engineering schools.

Professor Serkan Saydam (CI) (UNSW Minerals and Energy Resources); Dr Hamed Lamei Ramandi; Professor Naresh Kumar; Professor Alan Crosky; Professor Michael Manefield; Professor Ismet Canbulat; Associate Professor Scott Rice; Dr Peter Craig
LP190100122 - Microbiologically Induced Stress Corrosion Cracking in Underground Mines.

Summary: Premature brittle failure of rock & cable bolts due to stress corrosion cracking can cause fatalities and serious damage and has been reported in several mining operations across Australia and world-wide. The evidence suggests that microbial activity is a contributing factor. The project aims to implement experimental methodologies to determine the specific conditions responsible for bolt failure and develop novel prevention techniques applicable in underground mines. The benefits of this research will be improved understanding of the environment causing catastrophic failure of bolts and avoidance of potential hazards & economic loss in mining projects. This will lead to improved safety & increased productivity in mining operations.
Partner Organisations: ACARP, JENNMAR AUSTRALIA PTY LTD, ILLAWARRA COAL HOLDINGS PTY LTD, SPRINGVALE COAL PTY LIMITED, ANGLO AMERICAN LTD
Funding: $675,318

2019 ARC Linkage Projects coordinated through other universities

Professor Richard Manasseh (Swinburne University); Dr Luke Bennetts; Dr Tom Denniss; Professor Ian Turner (CVEN – UNSW); Professor Benjamin Cazzolato; Dr Francois Flocard (CVEN – UNSW); Associate Professor Justin Leontini; Mr Oliver Moles
LP180101109 - Controlling coastlines while generating power.

Summary: The Project aims to produce strategies for protecting coasts from storms using farms of wave-energy machines, which also generate electricity. Increasing lengths of coast need protection as the climate changes, but conventional barriers create permanent environmental impacts and are a sunk cost usually borne by the taxpayer. The Project expects to derive a strategy for the setting of each machine in the farm, so that they collectively absorb or reflect damaging waves under severe conditions. Under normal conditions, enough wave energy to sustain environmental processes would pass through. Sales of electricity would help to pay back the capital cost. Outcomes would include reduced coastal-erosion costs and a low-intermittency energy supply.
Partner Organisations: WAVE SWELL ENERGY LTD; SHIRE OF MOYNE
Funding: $427,000

Professor Yu Bai (Monash University); Dr Mehrdad Arashpour; Professor Xiao Lin (Joshua) Zhao (CVEN – UNSW); Dr Wenchi Shou; Mr Tai Hollingsbee; Professor Lawrence Bank:
LP180101080 - Structural assembly for remote housing using fibre reinforced composites.

Summary: This project aims to address construction challenges in remote housing by off-site manufacturing and on-site assembly using fibre reinforced composites and digital made-to-measure approach. Its goal is to generate interdisciplinary knowledge and practical technologies for reliable, affordable and durable housing in remote harsh environments. Intended results include innovative connections and systems with valuable understanding of their performances under various loading scenarios and accurate digital visualization for remote construction. The outcomes expect to unlock remote development, enhance our competitive strengths for manufacturing and construction industries, and further offer new solutions in post-disaster recovery applications.
Partner Organisations: NORTH CO SYSTEMS PTY LTD
Funding: $420,000

Research Centres

The School is a research powerhouse – with ninety professional researchers and 172 PhD candidates led by our world-renowned academic staff. We consistently rate a five out of five ranking from the Australian Government's ERA (Excellence in Research in Australia). Our success is based upon the detailed, rigorous, collaborative and visionary work of our research centres and discipline groups. Research at the School is about our people working together, with academic and industry colleagues to address global challenges.

In 2019 our Centres worked with over 130 industry, government and community partners on a wide range of research projects. See Grant Income tables on pp47-57 for specific details.

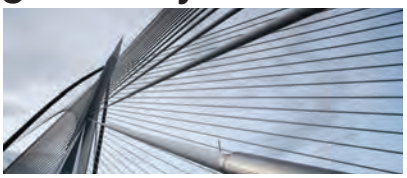
We continue to welcome all enquiries about partnership opportunities to link our remarkable researchers and facilities with industry and community needs. More detailed information can be found on our website: www.engineering.unsw.edu.au/civil-engineering/research

CWI Connected Waters Inititiative Research Centre

CWI Director: A/Professor Martin Andersen
www.connectedwaters.unsw.edu.au
Research enquiries: m.andersen@unsw.edu.au

Australia is often said to be the driest inhabited continent on Earth, but that's only because of its low rainfall. In fact, we have massive reserves of the most precious of natural resources right beneath our feet in our groundwater. Our mission is to undertake the fundamental and applied multidisciplinary research needed to improve our understanding of groundwater systems both nationally and internationally.

CIES Centre for Infrastructure Engineering & Safety



CIES Director: Professor Chongmin Song
www.cies.unsw.edu.au
Enquiries: t.wisniewski@unsw.edu.au

The Centre for Infrastructure Engineering and Safety is focused on high-level research in structural engineering, geotechnical engineering, engineering materials and computational mechanics. Specifically, we apply our skills to engineering and safety assessments and with the risk management of buildings, bridges, dams, roads and other infrastructure when subjected to both in-service conditions and overload (or limit) conditions, such as may occur in fire, earthquake, cyclone or blast situations, or when structures are exposed to hostile environments.

We are making an impact that matters with the following research priorities:

1. Resilient and sustainable infrastructure
2. Innovative low-carbon materials and structural systems
3. Enabling fundamental research for analysis, design and monitoring of infrastructure

In 2019 our members secured more than $2.1M research funding, graduated 24 PhD students and published 123 refereed journal papers. In 2019 CIES staff secured three new ARC Discovery grants totalling $1.21M.

rCITI Research Centre for Integrated Transport Innovation

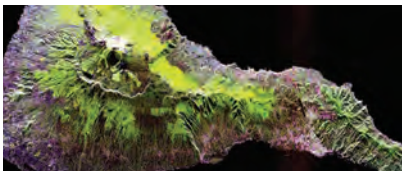
rCITI Director: Professor Vinayak Dixit
www.rciti.unsw.edu.au
Enquiries: maria.lee@unsw.edu.au

rCITI is a world-leading organisation in integrated interdisciplinary transport research and development with a range of research initiatives investigating sustainable approaches to transport infrastructure and operations, with extensive liaison with industry and government.

We pursue world-leading interdisciplinary solutions for transport planning and management that integrate three critical aspects of societal impact: (i) emerging mobility technology, (ii) human behaviour & choice and (iii) institutional/market landscape.

SAGE Surveying and Geospatial Engineering Research

SAGE



SAGE Academic Leader: Professor Linlin Ge
www.sage.unsw.edu.au
Research enquiries: l.ge@unsw.edu.au

The SAGE Research group conducts world-class research in the sub disciplines of geodesy, photogrammetry, positioning measurement and remote sensing. Broad research topics include Satellite Navigation Technology and Applications, Geodetic Infrastructure and Analysis, Geospatial Information Systems and Remote Sensing.

WRC Water Research Centre

water@ UNSW water research centre

WRC Director: Professor Denis O'Carroll
www.wrc.unsw.edu.au
Enquiries: water@unsw.edu.au

Australia's water management needs innovative and integrated solutions in terms of environmental, energy and social considerations. WRC conducts pure and applied research in surface and groundwater hydrology, public health and water treatment, and water quality. We also undertake commercial activity in collaboration with industry.

Our expertise and priorities:

Over the last few years, the Centre has focused on building expertise in developing techniques to treat water of poor quality. We are making an impact that matters with the following research priorities:

1. Development of next generation membranes to improve water quality
2. Development of advanced oxidation processes to treat emerging contaminants
3. Address the need for technologies to treat PFAS contaminated water and sites

WRL Water Research Laboratory

WRL

WRL Director: Professor Ian Turner.
www.wrl.unsw.edu.au
Enquiries: info@wrl.unsw.edu.au

The Water Research Laboratory (WRL) is a world-leading research and consulting laboratory on a four-hectare site at Manly Vale that tackles the most challenging and pressing water engineering problems faced by the world today. Our areas of expertise include coastal, ocean, ecosystems engineering, estuarine and wetland management; riverflow and floodplain management; civil engineering hydraulics; and climate change adaptation.

We are the largest coastal/hydraulics research laboratory in Australia, home to state-of-the-art facilities, equipment and personnel comprised of the most experienced and creative problem solvers in their respective areas of research and industry. WRL researchers are specialists in solving problems related to water and the environment. The unique blend of fundamental and applied water research that is undertaken by School staff and postgraduate students at the WRL site delivers both academic and industry/government-based research outcomes that are unmatched at any other water research facility in Australia

In addition to its major role within the School's UNSW Water Research Centre (WRC), WRL is a foundation member of the UNSW Global Water Institute (GWI) and also co-hosts the UNSW Connected Water Initiative (CWI) directorship.

Our specific areas of expertise include:

- Coastal, ocean and estuarine engineering and management
- River flow, floodplain management and catchment hydrology
- Environmental studies & climate change adaptation
- Groundwater research and management
- Offshore renewable energy
- Ecosystems engineering
- Civil engineering hydraulics

Grant Income 2019 - Research Centres

CVEN Research Grants 2019 Total: $14,715,507

UNSW Investigators	Project Title	Sponsor Name	2019 Amount
CIES - Centre for Infrastructure, Engineering & Safety			
Bradford, MA	Buckling capacity of high-strength steel flexural members	Australian Research Council / Discovery Project	130000
Bradford, MA	The National Key Laboratory of China for Disaster Reduction in Civil Engineering	Tongji University / International Contract	49333
Foster, SJ ; Parvez, MA	Milestone report - Review of total outputs completed and low carbon materials, products and designs for large scale residential and commercial buildings with supporting IT design tools implemented.	CRC For Low Carbon Living Limited / Research Grants	7550
Gao, W	New generation of sustainable building structures	Beijing Engineering Research Center / International Contract	120000
Gao, W Li, G Zhang, Y	ARC Research Hub for nanoscience based construction material manufacturing (Project 1)	Monash University / ARC Industrial Transformation Research Hub Shared Grant & Shared Industry Partner contributions	68293
Gilbert, RI	Shrinkage, cracking, self-healing and corrosion in blended cement concrete	Australian Research Council / Linkage Project- Industry Partner CEMENT CONCRETE & AGGREGATES AUSTRALIA	154000
Hamed, E	Coupled service and ultimate behaviour of high strength composite columns	University of Sydney / ARC Discovery Project Shared Grant	30000
Kashani, A	Melbourne University Lightweight Concrete R&D Grant Project	University of Melbourne / Sustainability Victoria Research and Development Grant Shared Grant	20000
Kashani, A	Concrete Road Barriers Project	University of Melbourne / Tyre Stewardship Australia Research Grant Shared Grant	20000
Khalili-Naghadeh, N	Warragamba Dam Raising - Soil Testing	GHD PTY LTD / Water NSW Subcontract	2000
Khalili-Naghadeh, N Khoshghalb, A	Non-isothermal dynamic strain localisation in unsaturated porous media	Australian Research Council / Discovery Project	95000
Khalili-Naghadeh, N; Russell, A	Modelling creep and time-dependency in unsaturated soils	Australian Research Council / Discovery Project	100000
Khalili-Naghadeh, N; Russell, A	Experimental investigation and constitutive modelling of reactive soils	Australian Research Council / Linkage Project Industry Partner Contribution - PSM Consult Pty Ltd & Department of Planning, Transport and Infrastructure (SA)	155960
Niven, R; Khalili-Naghadeh, N; Pashley, RM	PFAS Source Zone Remediation by Foam Fractionation and In Situ Fluidisation	Australian Research Council Special Research Initiatives/ Industry Partner Contribution - Opec Systems Pty Ltd	350000
Oldfield, PF; Carmichael, DG	Carbon Value Engineering	CRC For Low Carbon Living Limited / Research Grants	24137

UNSW Investigators	Project Title	Sponsor Name	2019 Amount
Russell, A	Evaluating potential static liquefaction of tailings to prevent failures	ARC Linkage Project Industry Partners - Anglo American Services (UK) Limited / Freeport-McMoRan Inc / Teck Resources Limited	84827
Russell, A	Understanding Earthquake-induced Ground Deformation Risk to Inform City Resilience	ARUP Pty Ltd / Contract Research	18182
Shen, X; Carmichael, DG	Evaluating Light Detection and Ranging (LiDAR) Sensors for Construction Mapping	Linke & Linke Surveys / Contract Research	50000
Song, C	Deterioration of structural integrity of ageing ships and marine platforms	University of Newcastle / ARC Linkage Project Shared Grant: Shared Partner Organisation Contribution DSTG, & Pacific ESI	28370
Song, C	Seismic analysis of cracking and deformations in concrete gravity dams	Australian Research Council / Linkage Project Industry Partners Melbourne Water Corporation / Goulburn-Murray Water / Murray-Darling Basin Authority / Sunwater Limited /	173422
Song, C; Tin Loi, FS	3D contact and fracture analysis for safety assessment of structures	Australian Research Council / Discovery Project	128000
Song, C ; Zhang, J	3D numerical modelling of an underground complex	PSM Admin Pyt Limited / Contract Research	8261
Li, B ; Saydam, S ; Guivant, J ; Shen, X; Rizos, C ; Sammut, C; Katupitiya, J ; Zlatanova, S	Development of the mobile robot for underground mine 3D mapping and environment monitoring	Jiangsu Tianqin Patent & Technology Co / International Contract	250000
Total CIES			**2,067,335**

Namoi River
Mcgillaus

UNSW Investigators	Project Title	Sponsor Name	2019 Amount
CWI - Connected Waters Institute Research Centre			
Andersen, MS; Glamore, W; Rau, GC; Johnson, FM	Geological mapping and geophysical surveys of the Thirlmere Lakes area	NSW Office of Environment and Heritage (OEH) / Thirlmere Lakes Research Program	80386
Andersen, MS; Rau, GC; Glamore, W; Johnson, FM	Surface water-groundwater interactions at Thirlmere Lakes	NSW Office of Environment and Heritage (OEH) / Thirlmere Lakes Research Program	110000
Baker, AB; McDonough, LK; Andersen, MS	Research in the study of groundwater organic matter using isotopic and accelerator-based techniques - Scholarship for Liza McDonough	Australian Nuclear Science & Technology Organisation (ANSTO) / Postgraduate Student Scholarship	7500
Total CWI			**197886**

UNSW Investigators	Project Title	Sponsor Name	2019 Amount
rCITI - Research Centre for Integrated Transport Innovation			
Dixit, V	Driving Behavior and Insurance Contracts	Georgia State University / Contract Research	33099
Dixit, V	Insurance Research for Autonomous Vehicles	iMOVE CRC / iMOVE CRC Research Project UNSW, IAG Partner Organisations	73001
Dixit, V; Hossein Rashidi, T	Improving Fuel Efficiency in the NSW Road Transport Sector	CRC For Low Carbon Living Limited / Research Grants	63300
Dixit, V; Waller, ST; Most, SB	Understanding Impact of Autonomous Vehicles on Behaviour and Interactions	Australian Research Council / Linkage Project - Partners ARRB Group/ Robert Bosch (Australia) Pty Ltd / Roads Corporation (VicRoads) /Transport Accident Commission Victoria / Transport for NSW	152668
Gibson, IR ; Waller, ST ; Saberi Kalaee, M ; Jian, S ; Sivaraman, V ; Dixit, V ; Seneviratne, AP	Innovation Fund to develop new capabilities for Intelligent Transport enabled IoT and networking technology innovation	CISCO Systems Australia Pty Ltd / Innovation Fund	100000
Grzybowska, H	Research into freight and supply chain constraints and improvements in the Northern Rivers	Southern Cross University / Regional Development Australia Northern Rivers Subcontract	6880
Gu, Z; Saberi Kalaee, M	Mapping urban greenery and noise in Sydney with crowd-sourced mobile data	City of Sydney / Environmental Performance Innovation Grant	5000
Hossein Rashidi, T	Integrating social media with conventional data sources to model land use	Australian Research Council / Discovery Early Career Researcher Award (DECRA)	117000
Hossein Rashidi, T	Empirical Estimation of Time Use and Disutility of Travel Time in the Context of New Mobility Technologies	UChicago Argonne LLC (Argonne National Laboratory) / International Contract	243822
Hossein Rashidi, T ; Ardeshiri, A ; Ghasrikhouzani, M	Freight Data Requirements Study	iMOVE CRC / Research Project	90400
Hossein Rashidi, T ; Dixit, V	An evolutionary model for interactions of land use and travel behaviour	Australian Research Council / Linkage Project - NSW DEPARTMENT OF PREMIER AND CABINET	27042
Hossein Rashidi, T ; Dixit, V ; Robson, EN ; Jayakumar Nair, D ; Ghasrikhouzani, M	Economic Impacts of Expanding the Greater Sydney Commuter Rail Network Project	NSW Department of Premier and Cabinet / State Government Contract	107550
Hossein Rashidi, T ; Waller, ST ; Dixit, V ; Ghasrikhouzani, M ; Liu, W ; Rey, D ; Saberi Kalaee, M	Integrated Smart Parking System: Emerging and Shared Approaches	Randwick City Council / DIIS Smart Cities and Suburbs Shared Grant	287192
Regan, MA ; Prabhakharan, P	Feasibility of Integrating Advanced Driver Assistance Systems in Driver Education	AUSTROADS LTD / Contract Research	90748
Regan, MA ; Prabhakharan, P	Distracting Vehicles: Testing the Human-Machine Interface	Australian Automobile Association / Contract Research	10733

UNSW Investigators	Project Title	Sponsor Name	2019 Amount
Regan, MA ; Prabhakharan, P	Assessing the Visual and Cognitive Demands of In-Vehicle Information Systems: Australian Replication Study	Australian Automobile Association / Contract Research	124948
Regan, MA ; Prabhakharan, P ; Secadiningrat, JR ; Dixit, V	Use of perceptual countermeasure treatments to reduce crash risks in tunnels	AUSTROADS LTD / Contract Research	43589
Rey, D ; Hossein Rashidi, T	On Demand Transport Pilots	Australian Transit Enterprises Pty Ltd / Contract Research	7770
Saberi Kalaee, M	Australian Connected and Automated Vehicle Summit	NSW Department of Industry / RAAP - Conference Sponsorship Program	7500
Saberi Kalaee, M ; Waller, ST ; Jian, S ; Moylan, EK	Travel Time Reliability Measurement Research	University of Sydney / Transport for NSW Shared Grant	5240
Waller, ST	Feasibility of Rapid Preliminary Planning for Transport Infrastructure Evaluation	Cintra Global / International Contract	61712
Waller, ST ; Dixit, V	Engagement Of Dr Vinayak Dixit To Network And Asset Intelligence	Roads and Maritime Services / State Government Contract	163759
Waller, ST ; Rey, D	Incentivised Strategic Traffic Assignment: Bi-level Transport Optimization	Australian Research Council / Discovery Project	122000
TOTAL			1944953

UNSW Investigators	Project Title	Sponsor Name	2019 Amount
SAGE			
Ge, L	Joint Development of Smart Spatial Technologies	Huitian Jiuzhou Technologies Co Ltd / International Contract	200000
Li, B ; Dempster, A ; Rizos, C ; Cheong, JW	Positioning Integrity for Autonomous Vehicles	Jiangsu Tianqin Patent & Technology Co / International Contract	250000
Rizos, C ; Wang, J	Trustworthy Positioning for Next Generation Intelligent Transport Systems	Australian Research Council / Discovery Project	160000
TOTAL			**610000**

Chris Drummond surveying

UNSW Investigators	Project Title	Sponsor Name	2019 Amount
WRC			
Collins, RN	Subcontract with PNNL	Pacific Northwest National Laboratory (USA) / International Contract	14728
Dansie, AP ; Stuetz, R	Wind-borne soil erosion and the nutrient and microbial characteristics of dust in major Southern Hemisphere source areas	Australia Africa Universities Network (AAUN) / Partnership Research and Development Fund	10000
Deletic, A ; Zhang, K	Advancing water pollution emissions modelling in cities of the future	Australian Research Council / Linkage Project Partners: Environmental Protection Authority Victoria/ Knox City Council / Melbourne Water Corporation /	159526
Deletic, A ; Zhang, K	Sino-Australian Centre on Sponge City	Jiangsu Easthigh Environmental Holdings Co Ltd / International Contract	62756
Deletic, A ; Zhang, K	All-solid-state Z-scheme photocatalysts for water treatment	Monash University / ARC Discovery Project Shared Grant	26300
Deletic, A ; Zhang, K	Sino-Australian Centre on Sponge City.	Dajiang Environment Corporation / International Contract	124347
Dever, SA	NSW EPA Landfill Gas Training Course 1 Day	GHD PTY LTD / Contract Research	3750
Dong, ZY ; Wiedmann, T	Key Index Approach Study - Stage 2	Mitsubishi Heavy Industries, Ltd. / International Contract	80006
Johnson, FM ; Sharma, A ; Mehrotra, R	Development Of Bias-Correction And Downscaling Methodology For Preparation Of Hydrological Modelling Inputs	Bureau of Meteorology / Commonwealth Government Contract	75500
Khan, SJ	Can wastewater treatment increase the ecotoxicity of chiral chemicals?	Australian Research Council / Discovery Project	93000
Khan, SJ	Smart Management of Disinfectant in Chloraminated Water-Supply Systems	Western Sydney University / ARC Linkage Project Shared Grant - Industry Partners: CSIRO, CENTRAL SEQ DISTRIBUTOR-RETAILER AUTHORITY, Sydney Water Corporation, Logan City Council, South East Queensland Water, UnityWater, U Melbourne,	13000
Khan, SJ	Validation and monitoring of advanced oxidation for potable water reuse	Australian Research Council / Future Fellowship	255782
Khan, SJ	UNSW Assistance in analysis of membrane operating data	BAE SYSTEMS AUSTRALIA (NSW) / Contract Research	4080
Khan, SJ	UNSW Assistance in Identification of Unknown Precipitate	BAE SYSTEMS AUSTRALIA (NSW) / Contract Research	3050
Khan, SJ	Work Order 1 for Sydney Water Expert Panel Participation	Sydney Water Corporation / State Government Contract	8100
Khan, SJ	UNSW Assistance in Review of Operational Data and Trial Report	BAE SYSTEMS AUSTRALIA (NSW) / Contract Research	1700
Khan, SJ ; Leslie, GL ; Le Clech, P ; Tng, KH	Analysis of biofouling potential using LC-OCD	Southern Seawater Joint Venture / Contract Research	1440
Le Clech, P ; Khan, SJ	UNSW Infinite Water Validation Assistance	Infinite Water Holdings Pty Ltd / Contract Research	23800
Leslie, GL ; Dansie, AP	LME:LEARN Policy Briefs assignment - Strategy for Showcasing Best Practices	United Nations Educational, Scientific And Cultural Organization (UNESCO) / International Contract	15430

UNSW Investigators	Project Title	Sponsor Name	2019 Amount
Leslie, GL ; Henderson, RK ; Sharma, A	Adapting catchment monitoring and potable water treatment to climate change	Australian Research Council / Linkage Project Industry Partner - Water NSW	110000
Leslie, GL ; Miller, BM	Project Development Specification	Water NSW / State Government Contract	32833
Manefield, M ; O'Carroll, DM ; Khan, SJ ; Lee, M	Biogeochemical remediation approaches for PFAS contaminated environments	Australian Research Council / Linkage Project - Industry Partner: Coffey Services Australia	181000
Marshall, LA	Advancing uncertainty quantification in terrestrial hydrologic systems	Australian Research Council / Discovery Project	40076
O'Carroll, DM	Machine Learning Pattern Recognition for Foresenic Analysis of Detected Per- and Polyfluoroalkyl Substances...	The University of Oklahoma / FDP Cost Reimbursement Foreign Research Subaward	15554
O'Carroll, DM ; Khan, SJ	ZIP Thermocare Validation Support (WRL2018085)	Zip Heaters (Aust) Pty Ltd / Contract Research	114605
O'Carroll, DM ; Manefield, M ; Lee, M ; Kumar, N	Development of electrochemically activated sorbents for PFAS defluorination	Australian Research Council / Special Research Initiatives; Industry Partners: Orica Australia/ Property NSW / Shimadzu Scientific Instruments	435713
Roser, D	Turning antimicrobial resistance in residential aged care inside-out from the patient to facility level	University of South Australia / NHMRC TCR - Antimicrobial Resistance (MRFF) Shared Grant	36000
Sharma, A	A Fourier approach to address low-frequency variability bias in hydrology	Australian Research Council / Discovery Project	107910
Sharma, A	The changing risk of very rare to extreme floods in a warming climate	Commonwealth Government Contract: Murray-Darling Basin Authority / Contract Research: Hydro Tasmania, Snowy Hydro Limited / State Government Contracts: Department of Energy and Water Supply (QLD), Melbourne Water Corporation, SEQWater, Sunwater Limited , Water NSW, Water Corporation WA,	274000
Sharma, A ; Mehrotra, R	Climate Data review and modelling	Water NSW / State Government Contract	72000
Sharma, A ; Mehrotra, R	Climate Modelling Work	Water NSW / State Government Contract	86100
Stuetz, R	Analytics to predict anaerobic codigestion & downstream process performance	University of Technology, Sydney (UTS) / ARC Linkage Project Shared Grant Linkage Partner - Sydney Water Corporation	50579
Stuetz, R ; Barczak, R	Endeavour Research Fellowship for Dr Radoslaw Barczak	Scope Global / Department of Education and Training - Endeavour Leadership Program	1500
Stuetz, R ; Henderson, RK ; Neilan, BA ; Schofield, N ; Glamore, W ; Johnson, FM ; Zamyadi, A	Nuisance & Harmful Algae Science-Practice Partnership	Melbourne Water Corporation / State Government Contract	300000
Taylor, R ; Chen, V ; Wang, Y ; Leslie, GL	Membrane Distillation Development for Concentrated Solar Thermal Systems	Australian Research Council / Linkage Project partners: Vast Solar Pty Ltd / Beijing Origin Water Technology Co Ltd /	89657
Tng, KH ; Leslie, GL ; Khan, SJ	Improving Understanding of Pretreatment Process Selection and Operability for Seawater Reverse Osmosis Plants	Water Corporation (WA) / State Government Contract	30560
Waite, TD	Biomimetic ligands for catalytic iron-mediated degradation of contaminants	Australian Research Council / Discovery Project	130000
Waite, TD ; Collins, RN	Reactive Oxygen Species Production on Oxygenation of Subsurface Sediments	Australian Research Council / Discovery Project	110000

UNSW Investigators	Project Title	Sponsor Name	2019 Amount
Waite, TD ; Collins, RN	Elemental release and oxidant production from mixed coal mine dusts	Australian Research Council / Linkage Project Partner - Australian Coal Research Limited	212500
Waite, TD ; Fletcher, J	Optimising CDI Water Treatment for Ion Removal and Energy Recovery	Australian Research Council / Linkage Project - Partners: Jaycar P/L, Goldwind Environmental Protection Co. Ltd	476020
Waite, TD ; Fletcher, J ; Ma, J	Ammonia recovery from wastewaters using flow electrode-membrane systems	ARC Linkage Project / Industry Partner - Beijing Origin Water Technology Co Ltd	265000
Waite, TD ; Foster, SJ ; Arns, C	Development of innovative cement binders with low carbon footprint	Australian Research Council / Linkage Project. Industry Partner: BORAL CONSTRUCTION MATERIALS LIMITED	120000
Waite, TD ; Leslie, GL ; Chen, V ; Wang, Y	Overview of options for wastewater treatment and resource recovery (Main Account & Project 1)	Beijing Origin Water Technology Co Ltd / International Contract	198884
Waite, TD ; Liu, X	Development and use of conducting ceramic membranes for fouling prevention, contaminant degradation and ion removal by electrosorption	Jiangsu Industrial Technology Research Institute / International Contract	119632
Wiedmann, T	Integrated Carbon Metrics Tool Alignment with the National Carbon Offset Standard for Precincts	CRC For Low Carbon Living Limited / Research Grants	4600
Wiedmann, T	Key Index Approach Study	Mitsubishi Heavy Industries, Ltd. / International Contract	101580
Wiedmann, T	Assessing absolute sustainability of global cities	Australian Research Council / Discovery Project	123017
Wiedmann, T	IPCC Sixth Assessment Report	Department of the Environment and Energy / Intergovernmental Panel on Climate Change (IPCC)	13500
Wiedmann, T	Environmental Footprints of Cities: A New Approach (BYMARKA)	Norges Teknisk-Naturvitenskapelige Universitet (NTNU) / Research Council of Norway R&D Project Shared Grant	24755
TOTAL			**4,853,870**

UNSW Investigators	Project Title	Sponsor Name	2019 Amount
WRL			
Blacka, MJ	Port of Napier 6 Wharf Physical modelling of revetment armour stability under wave or vessel prop wash action (WRL2019015)	BECA Ltd / International Contract	80800
Blacka, MJ ; Blacka, MJ ; Harley, MD ; Howe, D ; Thompson, RG ; Drummond, C ; Paice, L ; Lumiatti, G	LG314/621/19/127 Coastal imaging and reporting for the monitoring of littoral areas	Gold Coast City Council / Local Government Contract	137433
Blacka, MJ ; Cox, R	Hay Point Berth 2 Physical Modelling Advisory Services (WRL2018023)	Aurecon Australasia Pty Ltd / Contract Research	5375
Blacka, MJ ; Drummond, C ; Howe, D ; Lumiatti, G ; Harley, MD ; Thompson, RG ; Paice, L	TRESBP coastal monitoring and surveillance services (TPO-ENG-1819-26) (WRL2019003)	NSW Department of Industry / State Government Contract	201327
Blacka, MJ ; Flocard, FD ; Howe, D ; Carley, JT	Port of Townsville Bund Wall Revetment Physical Modelling (WRL2018018)	SMEC Australia Pty Limited / Port of Townsville Subcontract	184500
Blacka, MJ ; Flocard, FD ; Howe, D ; Carley, JT ; Paice, L	Port of Apia Breakwater Upgrade Physical Modelling (WRL2017103)	BECA Ltd / International Contract	73540
Blacka, MJ ; Howe, D ; Carley, JT ; Paice, L	Wave Overtopping Surveillance and Early Warning System, Fairy Bower (WRL2018092)	Northern Beaches Council / Local Government Contract	26800
Blacka, MJ ; Miller, BM ; Ainsworth, T	Muri Outfall Oceanographic Data Collection and Modelling (WRL2019016)	GHD Limited / International Contract	120631
Blacka, MJ ; Miller, BM ; Deiber, M ; Drummond, C ; Rahman, PF	Coastal Hydrodynamic Modelling and Data Collection to Support the Mei Te Vai Ki Te Vai Project (WRL2017063)	Ministry for Finance and Economic Management - Cook Islands / International Contract	80197
Carley, JT ; Flocard, FD ; Harrison, AJ	Concept Design of a Seawall for Pipe Clay Esplanade, Cremorne (WRL2018090)	Clarence City Council / Local Government Contract	9900
Carley, JT ; Harrison, AJ ; Miller, BM	Port Macquarie ocean pool preliminary design (WRL2019025)	Port Macquarie Tidal Pool Committee Inc / Contract Research	35000
Carley, JT ; Miller, BM ; Coghlan, IR ; Harrison, AJ	Hallett Cove Sea Pool Feasibility Study	City of Marion / Local Government Contract	9000
Coghlan, IR ; Flocard, FD ; Howe, D ; Carley, JT	Waves Forces on Seawall Walkway Darwin Luxury Hotel (WRL2019036)	Wallbridge Gilbert Aztec / Contract Research	54350
Coghlan, IR ; Glamore, W ; Carley, JT ; Howe, D ; Smith, G	Preliminary Testing of Oyster Clumps (WRL2019007)	Ocean Watch Australia Limited / Contract Research	6500
Coghlan, IR ; Howe, D ; Blacka, MJ ; Carley, JT ; Johnson, CR ; Smith, G ; Paice, L ; Modra, BD ; Drummond, C	Caseys Beach North Seawall Physical Modelling (WRL2018093)	Eurobodalla Shire Council / Local Governments Contract	47000

UNSW Investigators	Project Title	Sponsor Name	2019 Amount
Deiber, M ; Miller, BM	Desalination Water Quality Zone Investigation for the Hunter River Estuary (WRL2018089)	Hunter Water Corporation / State Government Contract	20000
Drummond, C	TOMAGO SALTWATER INTRUSION STUDY (WRL2018086) Stage 1 &2	NSW Office of Environment and Heritage (OEH) / State Government Contract	8160
Drummond, C	TOMAGO SALTWATER INTRUSION STUDY (WRL2014129) Stage 3 & 4	NSW Department of Primary Industries / State Government Contract	16725
Drummond, C ; Carley, JT ; Harrison, AJ	Umina-Ocean Beach Erosion Management Study Revision 1 (WRL2018024)	Haskoning Australia Pty Ltd / Contract Research	85060
Drummond, C ; Paice, L	Belongil UAS Survey (WRL2019011)	International Coastal Management / Contract Research	5980
Glamore, W	Clybucca Wetlands Tidal Restoration	NSW Local Land Services / State Government Contract	132000
Glamore, W	Port of Hay Point - Beneficial Reuse of Maintenance Dredged Material Habitat Restoration Feasibility Assessment	North Queensland Bulk Ports Corporation Limited / Contract Research	10000
Glamore, W	Biodiversity Response Planning: Victorian Coastal Wetland Restoration	Deakin University / VIC Dept of Environment, Land, Water & Planning Subcontract	100000
Glamore, W	Develop guidance material on effects-based assessments for NSW estuaries	NSW Office of Environment and Heritage (OEH) / State Government Contract	27272
Glamore, W ; Coghlan, IR ; Cox, R ; Lumiatti, G ; Smith, G ; Johnson, CR	Gold Coast Ferry Trial Vessel Wash Study and Shoreline Assessment (WRL2018091)	Jeremy Benn Pacific / Contract Research	34125
Glamore, W ; Harrison, AJ ; Ruprecht, JE	Big Swamp Acid Sulfate Soil Restoration Project: Economic Analysis of Remediation Management Options (WRL2019010)	Mid-Coast Council / Local Government Contract	50000
Glamore, W ; Johnson, FM ; Andersen, MS ; Rau, GC	Developing an Integrated Water Balance Budget for Thirlmere Lakes To Provide a Detailed Understanding of Hydrological Dynamics	NSW Office of Environment and Heritage (OEH) / Thirlmere Lakes Research Program	78505
Glamore, W ; Rayner, D ; Drummond, C ; Harrison, AJ	Area E - Restoration site (WRL2014062)	Newcastle Coal Infrastructure Group Pty Ltd / Contract Research	52875
Glamore, W ; Rayner, D ; Ruprecht, JE	Clyde Terminal Conversion: Restoration of Green and Golden Bell Frog Habitat & Field Monitoring and Assessment of Clyde Terminal Wetland	Viva Energy Australia Pty Ltd / Contract Research	6500
Glamore, W ; Sadat-Noori, M	Independent Review of the Impacts of the Bottled Water Industry on Groundwater Resources in the Northern Rivers Region of NSW (WRL2019002)	NSW Office of the Chief Scientist & Engineer / State Government Contract	50000
Glamore, W ; Sadat-Noori, M ; Harrison, AJ	Independent Review of the Impacts of the Bottled Water Industry on Groundwater Resources in the Northern Rivers Region of NSW (The Bottled Water Review WRL2019002)	NSW Office of the Chief Scientist & Engineer / State Government Contract	50000
Glamore, W ; Smith, G ; Miller, BM ; Rayner, D ; Ruprecht, JE ; Tucker, TA ; Harrison, AJ	Evaluation of Hydrological Impacts on Highland Swamps - WNSW Project 4945	Water NSW / State Government Contract	55264
Keith, DA ; Mason, TJ ; Glamore, W	Implementing an action toolbox to conserve Coastal Upland Swamps in the Sydney Basin.	NSW Office of Environment and Heritage (OEH) / Saving our Species Research Grant	126907
Kingsford, R ; Felder, SM ; Suthers, IM ; Harris, JH	LF015 - Pump Fishway Project: Phase 2 - Fish transfer	NSW Department of Industry / Recreational Fishing Trust	8601
Miller, BM	Conceptual Design of Desalination Intake and Outfalls Spencer Gulf, South Australia, Siviour and Cultana (WRL2018096)	ARUP Pty Ltd / Contract Research	33000

UNSW Investigators	Project Title	Sponsor Name	2019 Amount
Miller, BM	Water Trade Assessments - Hotspots (WRL2018094)	NSW Department of Industry / State Government Contract	90200
Miller, BM ; Carley, JT ; Coghlan, IR ; Rahman, PF	Lucky Bay Grain Project Proposal for Coastal Engineering Studies (WRL2018032)	T-Ports Pty Ltd / Contract Research	92885
Miller, BM ; Glamore, W ; Smith, G ; Rayner, D ; Deiber, M	Hydrodynamic Fate and Dispersion Modelling (WRL 2017029.01)	Hunter Water Corporation / State Government Contract	96000
Miller, BM ; Howe, D	Millers Reserve Flooding (WRL2019062)	Northern Beaches Council / Local Government Contract	25850
Miller, BM ; Howe, D ; Paice, L ; Modra, BD	Laboratory Testing - Halgan GPT2-P2 Gross Pollutant Trap (WRL2018072)	Halgan Pty Limited / Contract Research	43500
Miller, BM ; Lumiatti, G	Dispersion Modelling of Discharges to the Hunter River from Tomago Aluminium (WRL2019028)	Tomago Aluminium / Contract Research	24620
Miller, BM ; Lumiatti, G	Oil, Grease and Total Nitrogen Impacts from the Sydney Deepwater Ocean Outfalls (WRL2019027)	Sydney Water Corporation / State Government Contract	65135
Miller, BM ; Lumiatti, G ; Smith, G	Warren groundwater management plan (WRL2018027)	Warren Shire Council / Local Government Contract	26700
Modra, BD ; Miller, BM ; Glamore, W ; Drummond, C ; Tucker, TA ; Paice, L ; Howe, D	SPEL Filter Performance Testing (WRL2016030)	SPEL Environmental / Contract Research	32000
Modra, BD ; Smith, G	Somerset Dam Physical Hydraulic Modelling - Configuration 5 Testing of Somerset Dam (WRL2017049)	SEQWater / State Government Contract	80950
Modra, BD ; Smith, G ; Howe, D ; Jenkins, RB	Hydrosystem Performance Testing (WRL2017066)	SPEL Environmental / Contract Research	67930
Modra, BD ; Smith, G ; Miller, BM ; Felder, SM ; Harrison, AJ ; Deiber, M ; Paice, L ; Jenkins, RB	Lake Macdonald 3D Physical Model (WRL2018046)	AECOM AUSTRALIA PTY LTD / Queensland Bulk Water Supply Authority Subcontract	162717
Modra, BD ; Smith, G ; Paice, L ; Jenkins, RB ; Felder, SM ; Deiber, M ; Lumiatti, G ; Montano Luna, LE ; Miller, BM	Scrivener Dam physical Modelling (WRL2019056)	National Capital Authority / Commonwealth Government Contract	306000
Rayner, D ; Blacka, MJ ; Harrison, AJ ; Miller, BM ; Carley, JT ; Smith, G ; Coghlan, IR ; Tucker, TA ; Glamore, W ; Flocard, FD	Lake Illawarra Entrance Channel Management Options Development (WRL2017104)	Wollongong City Council / Local Government Contract	254772
Rayner, D ; Deiber, M ; Miller, BM	Lake Illawarra Bridge Modelling (WRL2019057)	Manly Hydraulics Laboratory / State Government Contract	20000
Rayner, D ; Glamore, W	Yeramba Lagoon Restoration (WRL2018006DSR)	NSW Office of Environment and Heritage (OEH) / State Government Contract	41016
Rayner, D ; Glamore, W	Variation: Tuckean Hydrologic Options Study - Additional modelling scenarios	NSW Department of Industry / State Government Contract	14850
Rayner, D ; Glamore, W ; Smith, G ; Tucker, TA ; Johnson, CR	Manning Floodplain Management Scoping Study (WRL2019018)	NSW Local Land Services / State Government Contract	9500
Rayner, D ; Harrison, AJ ; Blacka, AC ; Smith, G	Water quality data analysis and characterisation, conceptual understanding and planning of future datalogger monitoring program: RCC datalogger network, Richmond River estuary (WRL2019035)	Rous County Council / Local Governments Contract	31500
Rayner, D ; Harrison, AJ ; Glamore, W	Survey of Keith Hall Drainage System (WRL2018066)	Rous County Council / Local Governments Contract	14500

UNSW Investigators	Project Title	Sponsor Name	2019 Amount
Rayner, D ; Tucker, TA	Manly Lagoon Acid Sulphate Soil Testing and Borelog Digitising (WRL2018040)	Northern Beaches Council / Local Government Contract	34950
Ruprecht, JE ; Glamore, W ; Harrison, AJ	Big Swamp Monitoring Program (WRL2014086)	Mid-Coast Council / Local Government Contract	20000
Ruprecht, JE ; Glamore, W ; Rayner, D ; Harrison, AJ	Pampoolah Floodplain Remediation Investigation (WRL2019026)	MidCoast Council / Local Government Contract	83775
Smith, G ; Glamore, W ; Miller, BM ; Rayner, D ; Deiber, M ; Rahman, PF ; Heimhuber, VF	Provision hydraulic and cost benefit assessment of the impact of climate change on the Hunter Valley Flood Mitigation Scheme (WRL2018101)	NSW Office of Environment and Heritage (OEH) / State Government Contract	86729
Smith, G ; Rayner, D ; Glamore, W ; Ruprecht, JE ; Tucker, TA ; Harrison, AJ ; Lumiatti, G	Coastal Floodplain Prioritisation Study (RFQ 18-772) (WRL2018064)	NSW Department of Primary Industries / State Government Contract	872250
Smith, G ; Tucker, TA ; Rayner, D ; Glamore, W	Approach to re-introduce Tidal Flows and Land Management Options for Woodberry Swamp (WRL2017074)	NSW Local Land Services / State Government Contract	49940
Splinter, KD ; Turner, IL ; Harley, MD	Delivering a Beach Erosion Forecasting System	NSW Environmental Trust / Environmental Research Program	35865
Tucker, TA ; Carley, JT	Review of Impacts of Coastal Protection at Collaroy-Narrabeen Beach (WRL2018075)	Manly Hydraulics Laboratory / Northern Beaches Council Shared Contract	34732
Turner, IL ; Flocard, FD	Controlling coastlines while generating power	Swinburne University of Technology / ARC Linkage Project Shared Grant - Industry Partners: Shire of Moyne, University of Adelaide, Wave Swell Energy,	17590
Turner, IL ; Splinter, KD ; Harley, MD	An Australian storm wave damage and beach erosion Early Warning System	ARC Linkage Project- Partner Organisations: Bureau of Meteorology, City of Mandurah, Northern Beaches Council, NSW Office of Environment & Heritage (OEH),	213000
WRL Total			**4972783**

A | | H

PhD Graduates

Alireza **Akbarzadeh-Chiniforush**
Serviceability of Steel-Timber Composite (STC) floors
Supervisor/s: A Akbarnezhad & H Valipour

Golnaz **Alipour Esgandani**
Elasto-viscoplastic modelling of unsaturated soils under static and dynamic loading in 3D stress space
Supervisor/s: N Khalili & A Khoshghalb

Abdulmajeed Sulaiman M **Alsultan**
Macroscopic emission modelling for urban networks
ST Waller & V Dixit

Tomas **Beuzen**
Modelling coastal storm erosion using bayesian networks
Supervisor/s: KM Splinter & IR Turner

Mohana Naga Sai Chand **Chakka**
Evaluating Fluctuations in Urban Traffic Data and Modelling Their Impacts
Supervisor/s: ST Waller & V Dixit

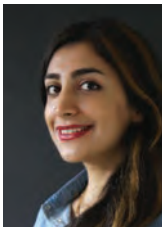
Yingyue **Chang**
Development and application of biomimetic high valence state iron complexes for contaminant oxidation
Supervisor/s: TD Waite & C Miller

Nan **Chen**
Application of biomimetic high valence state iron complexes to contaminant oxidation
Supervisor/s: L Gardner & D Rey

Dion Dilina **Dissanayake**
Automatic image-based adaptive damage analysis (AIBADA) with the scaled boundary finite element method
Supervisor/s: C Song

Jinwen **Feng**
Unified probabilistic and interval analysis of structures with hybrid uncertainties
Supervisor/s: W Gao & G Li

Qishuo **Gao**
Spectral-spatial classification techniques for hyperspectral imagery
Supervisor/s: S Lim & X Jia



Maryam **Ghareh Chaei**
Investigating early age thermal cracking of concrete
Supervisor/s: A Akbar Nezhad& A Castel

Milad **Ghasrikhouzani**
Disaggregate behavioural land use modelling: Integration of housing search, job search and households' dynamics
Supervisor/s:T Rashidi & ST Waller

Ziyuan **Gu**
Dynamic Congestion Pricing in Urban Networks with the Network Fundamental Diagram and Simulation-Based Dynamic Traffic Assignment
Supervisor/s: M Saberi & ST Waller

Dinesh **Habaragamu Arachchige**
Durability of Geo-Polymer Concrete with respect to Alkali Aggregate Reaction (AAR)
Supervisor/s: A Castel

Mohammad Nurul **Hassan**
A Comprehensive Analysis of Discrete Choice Modelling Specifications for Modelling Route and Stop Choice Behaviour of Transit Users
Supervisor/s: TH Rashidi & ST Waller

Ying **Hong**
BIM adoption criteria: measuring potential advantages of BIM before implementation
Supervisor/s: A Akbarnezhad

Qian **Huang**
Time-dependent behaviour of precast concrete sandwich panels
Supervisor/s: E Hamed

Nor Hidayaty Binti **Kamarulzaman**
Treatability of odorants in odours abatement system
Supervisor/s: R Stuetz

Nicka **Keipour**
Assessment of beam-to-column joint behaviour in steel-timber composite systems
Supervisor/s: H Valipour

Hammad Anis **Khan**
Durability of alkali-activated mortar in sewage environment
Supervisor/s: A Castel

Miriam **Kronen**
Anaerobic microbial metabolism of isoprene
Supervisor/s: M Manefield & M Lee

Haiwen **Li**
Dynamic properties of sand-fiber mixtures
Supervisor/s: A Khoshghalb

Keyan **Li**
Spectral Stochastic Isogeometric Analysis
Supervisor/s:W Gao

Li **Liu**
Aboveground biomass estimation of individual trees with airborne Lidar data
Supervisor/s: S Lim & X Shen

Hugh David **Miller**
Surface treatment of steel fibres and carbon nanotubes to develop chemical bonds with concrete
Supervisor/s: A Akbarnezhad & SJ Foster

Hamed **Moghaddasi Kelishomi**
Constitutive modelling of bonded geomaterials subject to the mechanical and moisture degradation
Supervisor/s: N Khalili & A Khoshghalb

Laura Elizabeth **Montano Luna**
An experimental study of free-surface dynamics and internal motions in fully aerated hydraulic jumps
Supervisor/s: S Felder, R Cox & IL Turner

Masoud **Moradi**
Reserve of strength in prefabricated reinforced concrete slab of bridge decks and RC culverts
Supervisor/s: H Valipour

M | | Z

Farshid **Nouri**
Experimental and numerical study of steel-timber composite beam-to-column connections with shear-tabs/double web-angles
Supervisor/s: H Valipour

Daniel **O'Shea**
Hyperelasticity for soft biological tissues and fibre-reinforced composites using orthotropic fourth-order tensors
Supervisor/s: M Attard

Thanh Hung **Pham**
The utility of satellite remote sensing for flood prediction in sparsely gauged catchments
Supervisor/s: F Johnson & L Marshall

Mohammad Ridhwan **Tamjis**
Satellite imagery processing
Supervisor/s: S Lim & JX Shen

Arash **Tootoonchi**
Numerical aspects of the application of smoothed point interpolation methods in computational geomechanics
Supervisor/s: A Khoshghalb

Mohammadali **Torbaty**
Development of a vortex risk index for use with single-phase computational fluid dynamics in the simulation of intake structures
Supervisor/s: B Cathers & GH Yeoh

Siti Aisyah Binti **Tumiran**
An improved community structure method for catchment classification
Supervisor/s: S Bellie

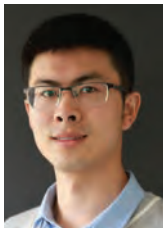
Jia **Wang**
Behaviour and design of demountable composite frames with beam-to-column bolted joints
Supervisor/s: C Song & B Uy

Rumman **Waqas**
The behaviour of composite beam-to-column flush end plate connections using blind bolts
Supervisor/s: B Uy

Weiwei **Xing**
A scaled boundary finite element based node-to-node scheme for contact problems.
Supervisor/s: C Song & FS Tin-loi

Nazly **Yasmin**
A complex networks-based approach to streamflow dynamics
Supervisor/s: A Sharma & S Bellie

Junqi **Zhang**
Integrating geometric modeling and structure analysis: towards the digital future of engineering
Supervisor/s: C Song



Changyong **Zhang**
Selective abatement and recovery of nutrients from wastewaters using electrochemical technologies
Supervisor/s: TD Waite & J Ma

ME Graduates

Shuangqing **Gong**

Domestic and international tourists' behaviour on the length of stay and selection of destination in Australia
Supervisor/s: TH Rashidi

Nina **Homainejad**

Application of multiple unmanned aircraft systems (UAS) for bushfire mitigation
Supervisor/s: C Rizos

Sijia **Jiang**

Evaluation of Lateral Earth Pressure for Unsaturated Soils
Supervisor/s: A Khoshghalb

Jianming **Kuang**

Integration of DInSAR and GPS for Co-seismic Modelling and Assessment of Potential Seismic Hazard
Supervisor/s: L Ge

Calvin Pengfei **Li**

Groundwater hydrology
Supervisor/s: M Andersen & G Rau

Zhanpeng **Liu**

Stability analysis of advanced composite arches
Supervisor/s: W Gao & G Li

Jingyi **Sun**

A Study of the Distributional & Structural Characteristics of Australian Remnant Forests in Major Structural Types Using a Data Collation Method & Airborne Lidar Data
Supervisor/s: S Lim

Qihan **Wang**

Machine learning aided stochastic analysis for funcionally graded structures
Supervisor/s: W Gao & FS Tin-Loi

Our Teaching

Our Teaching

The School is one of the largest of its kind in the world, with 3,597 students - 26% of them women - enrolled in 2019.

In 2019 the School taught 2,060 undergraduate students, 1365 postgraduate coursework students and supervised 172 Higher Degree research students.

Teaching & Learning Committee (TLC)	
Steven **Davis**	Chair
Richard **Stuetz**	Deputy Chair (Technology and Innovation)
Mario **Attard**	Associate Head (Academic) Civ Eng Program Coord. Civil with Arch. Prog Coord. Structures teaching rep.
Stuart **Khan**	Env Eng Program Coord
Milad **Ghasrikhouzani** (Till Aug)	Transport teaching rep.
David **Rey** (From Aug)	Transport teaching rep.
Tommy **Wiedmann**	Postgrad Coursework Co-ord; Ali Kashani
Milad **Ghasrikhouzani**	Co-Year 1 Coord (Till Aug)
Elena **Atroshchenko**	Co-Year 1 Coord (From Aug)
Arman **Khoshghalb**	Co-Year 2 Coord
David **Rey**	Co-Year 2 Coord
Ehab **Hamed**	Co-Year 3 Coord
Juan **Alvarez Gaitan**	Co-Year 3 Coord
Bruce **Harvey**	Co-Year 4 Coord; surveying teaching rep
Robert **Holdom**	Co-Year 4 Coord
Arman **Khoshgalb**	CIT&ET Liaison; Geotech teaching rep.
Stuart **Khan**	Water and Environmental Teaching Rep.
Fiona **Johnson**	Elite Students Coordinator
Ellie **Williams**	Student Services Representative

What We Do:

The Teaching and Learning Committee (TLC) of the School is responsible for all academic matters relating to all undergraduate and postgraduate coursework programs; these involve:

- encouraging teaching quality,
- providing teaching aids to staff,
- monitoring courses through student focus group surveys,
- interaction with student representatives of CEVSOC and research student demonstrators through CERSA,
- setting policy regarding academic aspects of undergraduate and postgraduate examinations and enrolments,
- providing a focal point for student assistance in un¬dergraduate and postgraduate coursework matters. The major drive behind the Committee's agenda is to improve the learning experience of students.

From Two to Three

2019 saw the School successfully implement the new UNSW teaching timetable of trimesters.

As part of the UNSW 2025 Strategic Plan, the University's academic year structure changed from two 12-week semesters (maximum of 4 courses each semester) to three 10-week trimesters (maximum of 3 courses each semester) beginning in 2019.

The School TLC had commenced revision of our BE Hons and related programs in 2017 and we continued throughout 2018 to fit the trimester model. This involved integrating and optimising the sequence of courses over the trimesters and required only minimal changes to the content of the courses themselves.

Lunchtime Teaching Discussions

The lunchtime teaching discussions begun in 2017 by the School's education focussed academics continued in 2019. Academics share on a set topic how they organise their work, the challenges they face, and the solutions they use to deal with them. The discussions were attended by both permanent academic staff and post-doctoral teaching assistants. This gives a good mix of both the voice of experience and new ideas shared by up and coming staff. On occasion members of staff from other parts of the University attend, adding diversity to the opinions expressed. Support from Kate Brown, the School's IT coordinator, meant that in addition to discussing the pedagogy we can discuss the practical technical issues of implementing solutions on UNSW online teaching systems.

School Teaching Initiative Grant Scheme (STIGS)

The School continued with its support for teaching innovation in 2019 with STIGS awards to three academic staff members for their work on improving the student learning experience.

Dr Steven Davis - Automated Graphical Feedback for Assessment of Graphical Modeling, $15,000

Dr Kurt Douglas - Digital introductory modules for CVEN9511, Geotechnical Models And Site Investigations, $19,000

Dr Arman Khoshghalb - Development of an interactive module for simulation of soil mechanics laboratory tests in Plaxis, $35,000

2019 Student Enrolment Stats

2019 enrolments	Total Numbers	EFTSL	Total Female	% Female	Total International	% International
Undergraduate	2060	1525	488	23.7%	686	33.3%
Coursework	1365	956	392	28.7%	1078	79%
Higher degree	172	96	60	34.9%	113	65.7%
	3597	2577	940	26.1%	1877	52.2%

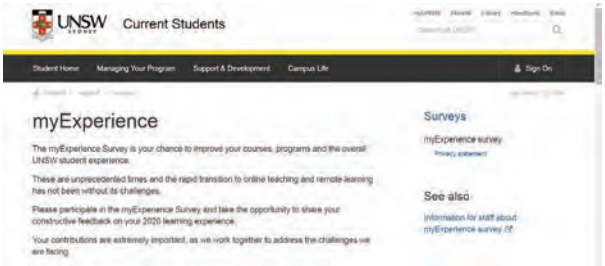
Student Satisfaction

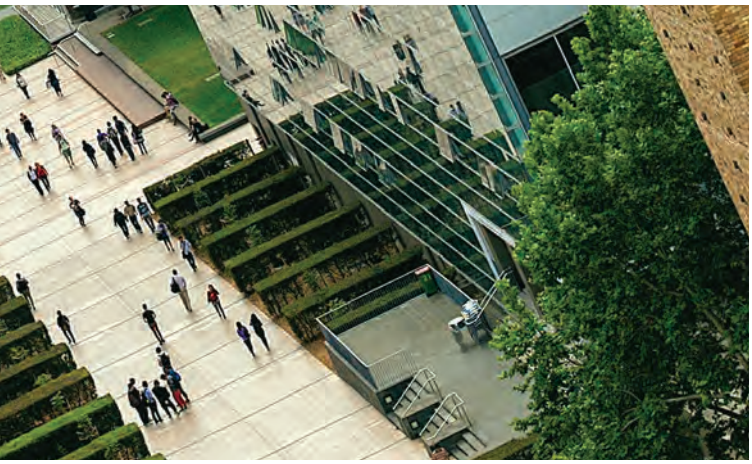
One of the ways of determining how well we are progressing towards this goal is by listening to our own students.

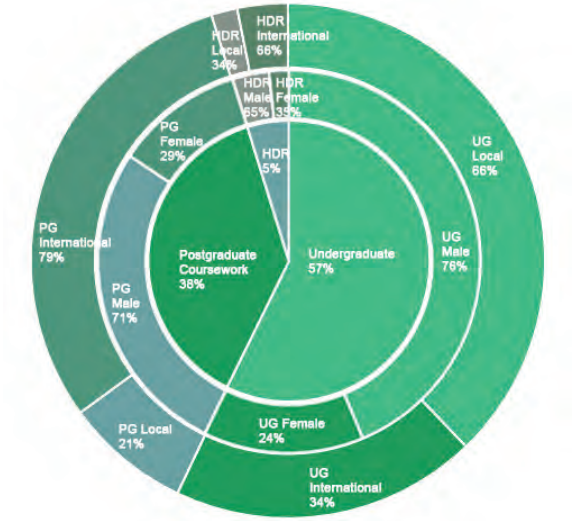
UNSW's myExperience aims to boost student feedback and to create a culture of continuous improvement by identifying, responding to and acting on student feedback.

A course is surveyed each time it is offered. The survey contains a set of standard questions on the student's overall experience with the course, teaching, and individual teachers. Completion of myExperience by students is voluntary.

The School's continuing efforts to provide high quality teaching and learning content and experience to its students is reflected back by positive satisfaction from students in MyExp feedback of >92%







Computing, IT & Ed Tech Cttee (CIT&ET)

School teaching, research and professional staff as well as our students require an enormous amount of computing, IT and educational technology support. Much is provided by UNSW centralised services but essential local support and School oversight is also provided through the School's CIT&ET.

The School has a range of different computer systems to cater for different applications and software requirements, with two main computer labs for teaching and individual learning, Labs 201 and 611.

Computing, IT & Ed Tech Cttee (CIT&ET)	
Linlin **Ge**	Chair
Wei **Gao**	Deputy Chair/ RMC Liaison
Chongmin **Song**	
Arman **Khoshgalb**	TLC Liaison
David **Rey**	
Yincai **Zhou**	
Kate **Brown**	
Head of School is an ex officio member of all committees	

Student External Awards

Jessica Athayde Transport Award

In 2019 CVEN student Jessica Athayde (BE/BCom) won the Institute of Transportation Engineers Australia and New Zealand (ITEANZ) Undergraduate Award.

Jessica, who now works with CVEN industry partner ARUP in their transport planning team, notes how her fourth year thesis on employment decentralisation policies in Sydney, looking at the transport and economic perspectives, enabled her to develop an appreciation for the importance of the planning phase and how infrastructure shapes urban cities like Sydney.

UNSW Surveying Student Shines at the Annual EISSI Awards

Kenneth Tsang (second from right) receives his University Student of the Year award from Michael Lamont (L-R) President of the Association of Consulting Surveyors, Richard Ingham representing C R Kennedy (platinum sponsor) and Tony Proust President of the Institution of Surveyors, NSW.

Kenneth Tsang won the University Student Project of the Year Award for his thesis **Developing a Bus Travel Speed Model for the Greater Sydney Area** at the Annual ESSI awards.

The NSW awards, which are jointly presented by the Association of Consulting Surveyors NSW and the Institution of Surveyors NSW, recognise outstanding achievement in surveying and spatial information.

Ken's thesis demonstrated how a travel speed model can be created using publicly available Automatic Vehicle Location (AVL) data.

Associate Professor Samsung Lim supervised the project and remarked, "The majority of the work in this thesis was focused on processing and analysing historical data to create a data model, however, the algorithms and techniques are also capable of real-time processing. Ken is a very impressive student."

Civil & Environmental Postgraduate Coursework Association (CEPCA)

Inception

A student society started in 2017 by two influential postgraduate international students which, over a span of 2 years has risen to a student society that stands as an icon of support to the international students of the School of Civil & Environmental engineering at UNSW.

Aim

CEPCA was founded with the primary objective of making life better for the international students studying in the school of CVEN at UNSW. Not only was the focus on academic support to the students but also to develop the much-needed professional skills and information that play a major role in a nation like Australia.

Action

CEPCA holds multiple events every term, a mix of professional, academic, industry, and social events to cater to the needs of international students to never sprout a feeling of 'being at a disadvantage' amidst fierce competition for jobs in the expanding Australian construction market.

Events

Following is a rundown of major events organised by CEPCA in the year 2018-2019.

1) First Step Into Professional World:

- Intent was to drive the initial motivation amongst students to take a challenging yet rewarding dive into the industry.
- Requisite information along with tips and secrets for succeeding in taking a leap into the civil engineering world abounded in this event. Guidance and examples for an individual to stand out and market themselves effectively through each stage of the job application process were presented by experts from UNSW Careers.

2) How To Get Recruited:

- Applying strategies for online job search (across LinkedIn, Seek and other platforms), analysing job advertisements, preparing effective resumes and nailing the interview were a few of the aspects covered.
- Involved professionals from three industries of civil engineering scanned student resumes and provided guidance and feedback on tailoring resumes to surpass the ATS.

3) Ace The Interview:

- Mock interview sessions for students to zero in and cut down the real- interview-jitters by sharing and implementing confidence boosters for interview success.
- Interview panel shone bright as teams from two CVEN industry partners assisted.

4) Thesis Night:

- Pivotal academic event that provided complete information about the changes in the Masters' thesis in 2019.
- Staff from school presented on key takeaways, to-dos, pitfalls in drafting thesis.
- Alumni from 3 majors with successful thesis submissions shared tips and accentuated upon vital phases of thesis and respective actions to be taken.

5) Field Trip:

- Provided international students with an excellent Australian construction site experience and answered queries related.
- A group of registered 30 students were taken on a field trip to one of the Sydney's most sustainable buildings being constructed: Quay Quarter Tower, by Multiplex (one among School's industry partners).

6) Pizza Night:

- An invigorating social meet at the start of term to aid students to socialize, make new friends while tucking teeth into piping hot pizzas.
- Opportune time given to the students to know about the student societies in the school and future event plans.

7) Executive Dinner:

- A social, rapturous meetup of the executive team with promising prospective students to take CEPCA forward.

8) EGM 2020:

- President and treasurer's reports were presented along with minor changes in constitution of CEPCA
- Subcommittee was elected by voting to identify promising candidates to take on the upcoming executive team by Dec 2020.

CEVSOC Report

Position	Member
President:	Brian **Au**
Vice President:	Charlotte **Gray**
Treasurer:	Rehnuma **Tarannum**
Secretary and Public Relations Manager:	Vanessa **Khuu**
Arc Delegate:	Mukund **Bhartiya**
Academic Events Manager:	Jordan **Cashel**
Career Development Events Manager:	Jordan **Jaafar**
International Students and Diversity Manager:	Frances **Xiao**
Marketing Manager:	Jake **Simiana**
Social (External) Events Manager:	Ernest **Yee**
Social (Internal) Events Manager:	Keona **Lee**
Sports and Charity Events Manager:	John **Trimmer**

CEVSOC

ARC 2019 Constituent Club Club of the Year

In 2019, CEVSOC continued its growth in becoming one of UNSW's most active, inclusive and diverse student societies. CEVSOC is UNSW's largest engineering school society, and the recipient of the **Arc 2019 Constituent Club of the Year**. We run events, create new initiatives, and develop merchandise and publications for over 2000 students enrolled in Australia's top civil and environmental engineering school. Our aim for this year was to refine and improve on our events from 2018 whilst creating new initiatives to broaden our scope to appeal to and engage as many students as possible. In addition to running events, CEVSOC offers the opportunity for members to get involved in event ideation and organisation in our subcommittee teams and through our 2 annual camps.

This year we expanded our recruitment to include 28 subcommittee members and 12 camp activity coordinators. Holding a position on the committee, subcommittee or as a camp coordinator gives students the opportunity to develop leadership, teamwork, communication skills and other skills that contribute to personal and professional development.

Building off the successes and feedback from past years' committees, we refined and delivered approximately 40 events, 15 publications, over 400 items of merchandise and a multitude of memories. Aside from the classic events, CEVSOC introduced new initiatives such as professional development workshops, trivia nights and a publication designed to help local and international students get involved during their university experience. CEVSOC has had the privilege of having an undergraduate representative on the School's Teaching and Learning Committee and has continued thriving as the link between the student body and the School. Further, the Academic Events Subcommittee ran Professional Electives and Thesis information Nights for students in

Cardno Cup Winners

their penultimate years as well as student feedback and focus groups to give our students a voice in the structure and delivery of courses.

Our Career Development Events

Subcommittee piloted CEVSOCs first CPB Case Competition , which gave students the opportunity to advance their job skills through an engineering tendering challenge, with feedback and support from the school sponsor CPB. In addition to other networking events, we hosted Industry Diversity Night, where we partnered up with a large panel of speakers, from school sponsors and engineering student societies, to inform the importance of diversity in the Australian workplace. The school's industry sponsors had the opportunity to present on the night and participate in open floor networking with our students.

Our Annual Professional Development

Retreat was yet again a resounding success. The camp provides an opportunity for 120 students from different years to engage in personal and professional development challenges over the course of a weekend. Networking can often be daunting for students, so the weekend provides an opportunity for casual networking with industry mentors and student mentors who have experience in varying industry disciplines. Similar to our annual First Year Camp, we are very lucky to be supported by the School with resources and guest speakers.

The International Students and Diversity

Subcommittee ran the CEVBuddy Mentoring Program. Previously the Program paired first year international students with older year local students to aid the transition to UNSW and Australian culture; it cultivates a support network through a number of checkpoints and events. This year, we opened up the program to local students inclusively, which was very beneficial for providing a multicultural environment, for newly transitioned first years.

Other highlights included collaborations with over 10 other student societies (including ArtsSoc, MechSoc, Psychsoc, MSOC, BESS and others), UNSW's largest off-campus social activity of the year, entering multiple sports teams into evening competitions and saving over 100 lives with our regular blood drives. We have been very grateful to lead beside such a wonderful society over 2019; it has been such a rewarding opportunity to give back to the student body and School. The success of this year has been the direct result of our enthusiastic and vibrant student body, dedicated committee and subcommittee and finally the ongoing support from the School and our industry sponsors.

CPB Case Competition Winners

Final Year Dinner

2019 ARC Awards - Constituent Club of the Year

Student Prizes and Achievements 2019

Year 4 Industry Prizes 2019

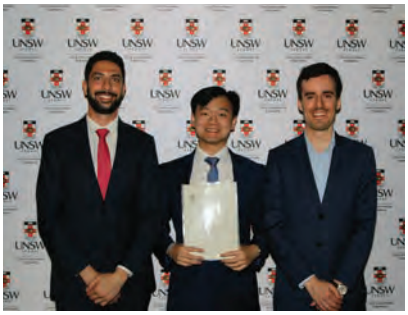
At the end of the hardworking year, 160 Civil & Environmental Engineering staff, industry friends and fourth year students celebrated their annual 4th year dinner at the Hyatt Regency, Sydney.

The dinner, organised by our student society, CEVSOC, with support from the School, was a great success and a wonderful opportunity to celebrate the outstanding accomplishments of our final year students. Nine prizes worth $1000 each and kindly sponsored by leading engineering companies, were also awarded on the night to high achieving students.

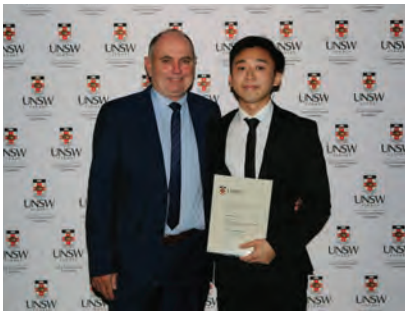
Many thanks to our generous sponsors of the night, Arup, Aurecon, Cardno, GHD, Jacobs, Multiplex, PSM, RPS and Turnbull Engineering, and congratulations to the prize winners:

Daniel Fowler - The Civil and Environmental Engineering Surveying Discipline Prize sponsored by RPS

Bhavik Magan - The Civil & Environmental Engineering Water Discipline Prize sponsored by GHD



William Kuswanto - The Civil and Environmental Engineering Practice Prize sponsored by Cardno



James Wang - The Civil & Environmental Engineering Geotechnical Discipline Prize sponsored by PSM

Professor Stephen Foster congratulated our students

Prashanth Gunasekaran - The Civil and Environmental Engineering Structures Discipline Prize sponsored by Aurecon

Igor Buvac - The Civil and Environmental Engineering Construction Management Discipline Prize sponsored by Multiplex

Taylor Oishi - The Civil and Environmental Engineering Civil with Architecture Discipline Prize sponsored by ARUP (OP Events)

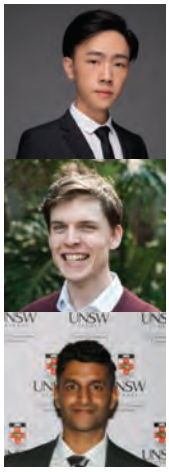
Ashvittha Santhaseelan - The Civil and Environmental Engineering Environmental Discipline Prize sponsored by Jacobs

Matthew Cen - The Civil & Environmental Engineering Transport Discipline Prize sponsored by Turnbull Engineering

Student Undergraduate Prizes 2019

2019 University Medallists

The University medal is one of the most distinguished awards to be bestowed on a UNSW undergraduate. We congratulate Josiah, Prashanth, and Xianxing on their tremendous achievements.



Xianxing Liu: **University Medal in Civil Engineering with Achitecture**

Josiah B Fajardo and Prashanth Gunasekaran **University Medal in Civil Engineering**

The School congratulates all our 2019 prize winners.

The Alexander Wargon Prize (E2K60U) For the best performance in the Structures Discipline in the Bachelor of Engineering in Civil Engineering degree program. Awarded to Prashanth Gunasekaran

The Australian Steel Institute Undergraduate Steel Design Award (E2K63U) For the best performance in CVEN3301 Structural Analysis and Modelling and CVEN3302 Structural Behaviour and Design. Awarded to William Liang

The Association of Consulting Surveyors' NSW Prize in Land Development (E0215U) For the graduating students with the best total mark in Cadastral and Land development courses. Awarded to: Omar Mohammad El Hassan

The Association of Public Authority Surveyors Prize (E0955U) For the best performance in GMAT courses, Year 1. Awarded to Simon De Feyter

The Bossi Medal (E0953U) For the most outstanding performance in the final year of the Bachelor of Surveying and Spatial Information Systems. Awarded to Daniel Fowler

The Crawford Munro Memorial Prize (E2K77E) For the best performance in CVEN3501 Water Resources Engineering. Awarded to Ian Lai

The EGM Memorial Prize (E0954U)For outstanding performance in GIS courses. Awarded to Daniel Fowler

Engineers Australia Civil and Structural Engineering Prize (E2K66U) For the best performance in structural design in the final year of the degree. Awarded to Jiayun Hao

The Full Time Class of 1962 Civil Engineering and Surveying Alumni Prize (S0478E) For the highest WAM at the end of 3rd Year to a local female in the School of Civil and Environmental Engineering. Awarded to Patricia Kesuma

The Institution of Surveyors New South Wales Incorporated Prize (E0216U) For the best performance by a graduating student in the Bachelor of Engineering in Surveying and Spatial Information Systems program. Awarded to Daniel Fowler

The Jacob N Frenkel Prize (E2K62U) For the best achievement in Civil Engineering for a first year student. Awarded to Shehan Wijesurendra

The JK Geotechnics Prize (E0179U) For the best performance in CVEN3202 Soil Mechanics. Awarded to Chang Chen

The Maurice Maughan Prize (E2K80E) For the best student with the best total marks in GMAT2500 and GMAT2550. Awarded to William Thiang

The RS Mather Memorial Prize (E0219U) For outstanding performance in Geodesy courses in the Bachelor of Engineering in Surveying and Spatial Information Systems program. Awarded to Guy Baumber

The Surveying and Spatial Sciences Institute Prize (E0210U) For the best performance in remote sensing and Photogrammetry courses in the Bachelor of Engineering in Surveying and Spatial Information Systems program. Awarded to Noah Tarlo

The Welding Technology Institute of Australia Prize (E0182U) For the best performance in CVEN3303 Steel Structures – Awarded to Yuxan Lin

Dean's Awards (2020) for CVEN students - studies completed in 2019

The Dean's Awards are highly prestigious awards offered by the Dean of the Faculty of Engineering. They are designed to recognise the Faculty's high-achieving students – those who have a minimum High Distinction average (an overall cumulative myUNSW WAM of 85). Dean's Awards are just one way we offer our students recognition for their hard work. Congratulations to CVEN's eighteen stars!

Chang Chen
Anthony Drinnan
Rachel Firmer
Jayden Fraser
Roy Fu
James Hong
Cameron Jenkins
Qi Jiang
Patricia Kesuma
William Liang
Daniel Negru
Glen Dimitri Odang
John Salvaris
Lachlan Jacob Sue
Aaron Tran
Coco Wang
Shehan Wijesurendra
Nathan Wei Chun Wong

Year 4 Dinner

Congrats to all our wonderful students!

Student Profile - Elia Hauge

"It's not the engineers who matter, it's the community"

Humanitarian engineering student Elia Hauge discovers more women taking on active roles in Nepal in managing water.

Elia Hauge (centre) meeting the acting mayor of Dharan Ms. Manju Bhandari (with research assistant Parbati Pandey

While on her way to Nepal to study the country's water management practices, UNSW humanitarian engineering student Elia Hauge was feeling a little apprehensive about what she'd gotten herself into.

"I felt extremely underprepared because I really didn't have my head around how the politics of water in Nepal worked," she says. "I was a bit nervous about walking into this unknown and frustrated with myself for not being able to find answers on the internet or in all the papers I read about how water is managed there."

But after meeting Nepal's ex-Minister for Water Resources who admitted that even he didn't have a complete grasp of the country's disparate water management practices, her original anxieties evaporated.

The fourth-year humanitarian engineering student's final year thesis is based on her research that examined how Nepalese people manage water resources with a special focus on the role that women play in it.

Elia's study, which involved meeting, interviewing and spending time with committee members responsible for water planning and management, concentrated on two different localities. Dhulikhel, which is a mountainous region about an hour and a half east of Kathmandu, and Dharan, a small city in the south-eastern part of the country.

In the two different communities that she studied; both rely on water being piped from nearby rivers to a reservoir in the town. From here, water is distributed to houses in the area that are connected.

In the more urban centre of Dhulikhel where 98% of houses are connected, water is more likely to be piped into the house, whereas on the outskirts of Dharan (48% connected), a tap in the garden must suffice. However, in both areas, each household draws all the water it needs for the day in the morning as it is quite common for the water supply from the reservoir to be shut off after only a few hours.

Nepal's infrastructure and management of resources is largely decentralised which means much of it is run at the local level in towns and cities. In a move to increase the role of women in decision making roles, the national government legislated in 2006 that one third of representation at the local level be filled by women, which is reflected in the committees that manage water.

Elia wanted to know how much the one-third representation rule empowered women and made for more effective management of this precious resource, or whether tokenism could play a part. While she found evidence of both, one thing she did discover was that women's involvement in the water management committee was directly affected by how much support they had at home.

"A really interesting finding was it doesn't matter how much training and how many quotas you have for women and how much you want them to join and be active in your water management committee, if they have children and still have to cook three meals a day and clean the house and have to make sure that they have enough water in their own house – then it's very difficult for them to have equality in the workforce."

"One of my findings was that if a woman's husband has left to earn money overseas, she was more likely to be interested in joining the local committee."

Elia has now completed two trips to Nepal as part of UNSW's humanitarian engineering program, the first of which she spent under the guidance of Associate Professor Fiona Johnson exploring the use of biochar as an environmentally friendly soil enhancer. She says she would love to continue to work on humanitarian engineering projects.

"My work in Nepal was a reminder of the people who really matter in engineering. It's not the engineers, it's the community – and working with the women of Nepal's communities has been a truly uplifting experience."

Our Community

External Relations Committee Report

External Relations Committee (ERC) 2019	
Kurt **Douglas**	Chair
Craig **Roberts**	Deputy Chair
Asal **Bidarmaghz**	
Robert **Holdom**	Scholarships
Ali **Kashani**	
Taehwan **Kim**	Scholarships
Tamara **Rouse**	Administrator
Kristen **Splinter**	
Tricia **Tesoriero**	Outreach Projects
Head of School is an ex officio member of all committees	

The strategic objectives of the External Relations Committee (ERC) of the School of Civil & Environmental Engineering (CVEN) include the development of effective outreach and profile-raising programs, as well as building and maintaining strong relationships with our industry and alumni communities.

ERC members organise the promotion and representation of the School at many presentations and functions on and off campus. In 2019, these included Engineering Information Days in May and September, UNSW's Information Day in December, UNSW's annual Open Day, High School visits on and off campus, the Women in Engineering Summer Camp, the Indigenous Australian Engineering Summer School, UNSW Nura Gili Winter School, the Honeywell Engineering Summer School, and the NSW Careers Advisors Annual Conference. Our thanks to all ERC members and CVEN staff who support these events through their participation and ideas.

Surveying continued to shine with support of additional outreach events including the inaugural Women in Surveying event at Hyde Park, the Maths in Surveying activities at Bicentennial Park, a special keynote presentation by the NSW Surveyor General to careers advisors at the NSW Careers Advisors Annual Conference in November and the ongoing work of the NSW surveying task force who coordinate careers market visits all over NSW in an effort to boost undergraduate student numbers to meet industry demand.

In 2019, the School continued to work closely with Faculty on its key objective of recruiting a minimum 30% females into our incoming engineering student cohort by 2020. It has been very rewarding to witness our Industry Partners contributing to the success of the various Women in Engineering activities organised by Faculty.

The annual Year 10 work experience week was held in May. The week was designed and organised by the School's external relations and industry advisory committees, approved by the NSW Department of Education and Communities, and co-ordinated by Ms Tricia Tesoriero. 2019 marked the tenth anniversary of this invaluable outreach activity. We accepted 90 students from 82 high schools. This included 30 females and 27 students from regional schools. This year, we had over 150 competitive applications so unfortunately could not accept a number of outstanding students.

We are continuing to explore ways to upscale the program to provide additional places for this very conscientious and committed cohort of high school students. A special thank you must go to our Industry Partners who helped to arrange a wide variety of civil engineering site visits for our program including Laing O'Rourke's 'Innovation Space', Jacobs Engineering in North Sydney, GHD in the Sydney CBD, Multiplex, ARUP, PSM support of the Seacliff Bridge visit, the NSW Transport Management Centre (TfNSW) and the Sydney Metro site visit at Barangaroo.

Visits to the Sydney Opera House, UNSW Water Research Laboratory, Centennial Parklands and Port Botany were supervised and supported by ERC members. As part of the Department of Education's Workplace Engagement Reference Group, Dr Douglas has been part of a pilot program working with schools to develop innovative work experience programs and increase engagement between industry and schools.

The ERC also coordinates a suite of undergraduate student-industry annual events including the highly regarded Elite Student/Industry Partner Breakfast, the CVEN 4th year dinner and the Industry Partners Careers Market as well as the CVEN Primary School Maths prize, and IAC meetings. The ERC also works with the School's Teaching and Learning Committee and student society CEVSOC to facilitate various functions that bring our industry partners and supporters onto campus to enhance our undergraduates' understanding of the engineering profession. And we continued to develop the School's relationship with our graduates, industry and academia through our various reports and e-newsletters.

For further information on external relations, alumni, the IAC and our Industry Partnership Program contact Dr Kurt Douglas, k.douglas@unsw.edu.au.

Industry Advisory Committee

it is impossible to not be impressed by the range and depth of the people in the School and the work they undertake

The Industry Advisory Committee is a sounding board for the Head of the School of Civil and Environmental Engineering and the School staff. It is an important means of access for the School to a broad range of relevant industry organisations and people at senior levels. The membership is a balanced coverage of public sector organisations, private sector consultancies, private sector constructors and secondary school careers advisers that brings a valuable range of perspectives and insights to the school. It meets four times each year.

The reports of the Head of School to the Committee have allowed us to join the celebration of the academic and research successes of the School in 2019. The School is a remarkable powerhouse organisation with which the Committee members are proud to be associated. It is impossible to not be impressed by the range and depth of the people in the School and the work they undertake.

The Committee again assisted the School staff to arrange for industry participation in the very popular and successful program of work experience for Year 10 Secondary School students. With that program being expanded in 2019 by 50% to include approximately 90 students from schools throughout NSW, additional activities and sites were necessary. The combined efforts of School of Civil and Environmental Engineering administrators Tricia Tesoriero and Tamara Rouse, and the various industry participating organisations again resulted in an impressively organised and very rewarding experience for students.

The feedback from the students, their teachers and their parents was quite remarkable, with clear evidence of the positive effect of the program on the understanding and awareness of Civil and Environmental Engineering on the part of the Year 10 participants, and also their friends, careers advisers, teachers and parents. This improved understanding of engineering by those in the secondary school communities was always the primary objective and rationale of the program which has now been running for ten years.

Committee members and other alumni also help to represent the School in the Primary School Mathematics prize program. This objective of this program is to convey a message as to the importance of mathematics to people and students in primary schools. While others now are voicing concern at the decline of advanced mathematics experience on the part of students at the end of their secondary school years, that was not the case when the program started ten years ago. The ubiquitous involvement of the School in primary schools is frequently noted with favourable comments by the local and state politicians who also frequent primary school presentation events. The School has been a significant contributor to the growing awareness on the part of schools, politicians and journalists of the mathematics crisis facing Australia.

The School is contemplating the future shape of graduate coursework programs and the Committee has been assisting with this initiative. This is part of an ongoing engagement and exchange of thinking between School academics and the industry-based members of the committee that continues to enliven the regular meetings of the Committee and also School planning days.

We look forward to a continued and enhanced engagement with the School in the context of emerging challenges that must be addressed.

Ian McIntyre
Chair,
Industry Advisory Committee

Ian McIntyre
Chair, CVEN Industry Advisory Committee and Director at Ian McIntyre & Associates Pty Ltd

Ian McIntyre was, until "retirement" in late 2017,a Principal of Advisian and the Service Lead, Contractual Services. He graduated in Civil Engineering from UNSW in 1974 with First Class Honours. As a consultant for the past 31 years, Ian has advised in relation to project delivery processes on a wide range of infrastructure, building and systems integration projects throughout Australia and Asia. His previous experience was in project management and construction engineering for a contractor on major civil engineering and multi-disciplinary projects throughout Australia and in Hong Kong.

He is frequently retained in "trouble shooting", independent review and due diligence roles and has considerable experience in analysis of the reasons for project delivery problems. As a result, he is particularly interested in promoting awareness of the factors which are typically associated with successful project delivery strategies leading to successful project outcomes.

Ian is an experienced expert witness in relation to project performance issues and is, notwithstanding retirement from Advisian, active on several expert evidence assignments and a member of two Project Dispute Boards.ustralasia) of the Dispute Resolution Board Foundation.

Deirdre Agnew
Student Careers Advisor

Deirdre Agnew has worked in banking, insurance broking and market research in the UK. She has also been employed in public relations/events management role for international conferences at the University of the Witwatersrand. She taught at Hornsby Girls' High School, before moving into careers counselling. She spent fifteen years at St. Ignatius' College, Riverview and ten years at St. Aloysius College at Milsons Point in that role. Deirdre is currently a director of Australian Careers Advice, a professional careers consultancy.

Christine Atkins
Transport for NSW

Christine Atkins is the Business Case Manager, Circular Quay Renewal at Transport for NSW.

Before taking up this role, she was Strategy and Policy Development Manager for Future Transport at Transport for NSW, working on the Long Term Transport Master Plan.

Prior to working for Transport for NSW, Christine was National Manager, Transport Policy at Infrastructure Partnerships Australia –the nation's peak infrastructure forum, comprising public and private sector CEO Members, advocating the public policy debate around solutions to Australia's infrastructure challenges.

Christine has over twenty years' experience in analysis and assessment of major transport and infrastructure projects, having worked on complex and high-profile projects both within Australia and overseas. Her experience spans the project development life-cycle, from strategy and policy analysis and development through financial modelling and business case development to government sector procurement and transactions including process design and tender evaluation.

Yasnna Blom
Director of Operations Water, Environmental & Spatial at Jacobs
BE Civil (Hons)
CPEng NER APEC
Eng IntPE (Aus Fellow
Roads Australia)

Yasnna is a Chartered Professional Engineer with over 20 years of experience across the Water and Transport sectors.

In her current role as Director of Operations Water, Environment and Spatial at Jacobs, she is responsible for a team of 200 staff working across the full project life cycle from business case development, environmental planning/approvals and design, to construction and operations. Yasnna also holds a number of executive project governance roles and is a member of several Joint Venture Steering Committees for large infrastructure projects including Westconnex 3B IC. With experience in both project delivery and operational leadership roles, she has worked on many large multi-disciplinary projects across a variety of delivery models including Design & Construct and Alliances. She is able to draw on her international experience across the UK and Australia to work with clients to bring value to projects and positive outcomes.

She is an advocate for greater gender participation in STEM related careers and sits on the mentoring panel for Engineers Australia's Women in Engineering Mentoring program and the Roads Australia Young Professionals mentoring program.

Her contribution to the industry has been recognised through two recent appointments as a Fellow of Engineers Australia and Fellow of Roads Australia.

Greg Bowyer
Principal, GHD

Greg is currently GHD's Manager Western Sydney, based in Parramatta, where he is driving GHD's expansion into new markets and clients.

Greg has a civil engineering degree from UNSW, University College (now known as ADFA). After 23 years as an engineering officer in the Australian Army in command, leadership, staff and training roles, Greg's final posting was Commanding Officer, School of Military Engineering. In that role he was able to apply his passion for training and development of future engineering professionals, working closely with ADFA academic staff. He was awarded a Conspicuous Service Medal for his service in this role in 2003.

After eight years at Jemena managing the engineering and capital delivery programs for multiple gas infrastructure asset owners, Greg moved to GHD. As a Principal of GHD, he specialises in managing consulting projects in the transport, energy & resources, water and property markets for projects in Australia and overseas. Being a Project Director on a range of structural, transport, property, demolition, rail infrastructure, power supply, gas transmission, due diligence, resource and mineral processing infrastructure projects, Greg has also developed complementary skills in managing risk, reliance and probity on complex projects.

Laurie Foy
Consultant

Laurie has over 30 years construction industry experience gained both locally and in South East Asia, and is currently providing consultant services in Development Management / Project Management to Indian company SHPL.

Prior to this Laurie worked for Brookfield Multiplex from 1991 to 2015, beginning with leading the Sheraton on the Park project. He then provided leadership to teams on some of Multiplex's most exciting and challenging projects, among them the $287m Parramatta Justice Precinct, the $360m BER Schools Program and more recently, Lifehouse at RPA and the Charles Perkins Centre at the University of Sydney.

Dr James Glastonbury
Technical Director, Laing O'Rourke

James is Technical Director for Laing O'Rourke's Australia business, with key executive level accountability for technical performance in work winning strategy and delivery assurance. He is a member of the Australia Hub executive leadership team with operational and strategic responsibilities for consultant engagement, design management, digital engineering, quality and specialist engineering/SME disciplines. He manages a team of internal technical specialists covering key market sectors including rail, buildings, airports, defence and resources.

Prior to taking up operational responsibilities, James was Engineering Director within Laing O'Rourke's in-house innovation .team - the Engineering Excellence Group. In this role he was responsible for establishing systems and processes to foster construction-related innovation within various project teams including for Alliance and Delivery Partner teams.

James was the Innovation Lead with the Pacific Complete Delivery Partner team on the $4.5B Pacific Highway Upgrade (Woolgoolga to Ballina) where circa 100 innovations were progressed realising approximately $120m in improved public value. He was also instrumental in establishing innovation processes for the North East Programme Alliance (NEPA) as part of Melbourne's level crossing removal programme.

His background includes over 20 years in consulting roles across a range of sectors including transport, mining, oil & gas and tunnelling before joining Laing O'Rourke.

Andrew Johnson
Principal, ARUP

Andrew is a structural engineer with a passion for design philosophies combining innovation with efficiency in holistic building or structure solutions to achieve better buildings. He leads an integrated multi-disciplinary buildings design group in the Sydney office of ARUP.

His experience in Australia and London includes collaboration with some of the world's leading architects on commercial, education, sport & leisure, industrial, retail, residential, and marine projects for both government and private sector clients.

His structural expertise includes tall buildings, long-term serviceability of structures, seismic analysis and design, and long-span lightweight roof structures.

Kourosh Kayvani
Global Managing Director – Design, Innovation & Eminence, Aurecon

Professor Kourosh Kayvani is the Global Managing Director – Design, Innovation & Eminence at Aurecon, covering a team of 7,000 people in engineering and advisory practices across 25 countries.

In his 30 years in the industry, Kourosh has played key roles in the engineering of many innovative, complex structures across the globe, including Wembley Stadium in the UK, West Kowloon Terminus in Hong Kong, Barito Suspension Bridge in Indonesia and in Australian projects such as ANSTO OPAL nuclear reactor, the Sydney Hockey Stadium, Brookfield Place in Perth, Melbourne Star Observation Wheel, and Civic Tower, 5 Martin Place and Liberty Place in Sydney. He specialises in long-span structures, tall buildings, stadiums, seismic design and forensic engineering. He has served on the Australian Standards code committees for Concrete Structures and Wind Loads for over 10 years.

Kourosh graduated as a Civil Engineer from Tehran University and has a master's degree and a PhD in Structural Engineering from UNSW Sydney. He is the winner of the 2016 John Connell Gold Medal from the Structural College of Institution of Engineers Australia. He has Professorial appointments at University of Sydney and UNSW. Kourosh is a Director of Australian Steel Institute (ASI) and the President of Lightweight Structures Association of Australasia.

Paul Plowman
Acting General Manager - Customer Delivery, Sydney Water

Paul Plowman is the Acting General Manager - Customer Delivery at Sydney Water.

Before taking up this role Paul was the General Manager, Liveable City Solutions at Sydney Water. Paul has led strategies to enable the delivery of products and services to Sydney Water customers to ensure that Sydney remains one of the most livable cities in the world.

Sydney Water is Australia's largest utility, providing drinking water, recycled water, wastewater and stormwater services to its customers, extending from Sydney to the Blue Mountains and the Illawarra.

Paul has more than 20 years' experience in the water industry with particular focus on the development and delivery of investment programs. He has successfully led large, complex infrastructure projects that have involved significant interaction with the community and stakeholders. Paul has held previous senior executive roles in the Northern Territory Power and Water Corporate and Melbourne Water Corporation. Paul is a qualified Civil Engineer and also holds a Masters of Business Administration.

Iain Scoular
Senior Advisor, E3 Advisory

Iain has more than 35 years' experience working with major contractors in the Australian construction industry. As a General Manager with Leighton Holdings for ten years, Iain was responsible for leading specialist engineering teams covering the fields of Pre-Contracts, Insurance and Risk Management, Planning and Controls, Carbon and Environmental Management, with the overriding objective of raising the standards of project delivery performance. Iain's 'hands-on' project experience includes road and railway infrastructure construction, dams and water supply, large multi-function public entertainment complexes and the restoration of heritage-listed buildings.

Iain has an Honours degree in Civil Engineering from UNSW, is a Member of the Institution of Engineers Australia and is a Chartered Professional Engineer.

Gareth Swarbrick
Principal, Pells Sullivan Meynink

Dr Gareth Swarbrick has a Bachelors degree in Civil Engineering from Adelaide University and a PhD in Geotechnical Engineering from UNSW. After a 14 year career as a UNSW academic he joined the engineering consultancy PSM in 2005 where his expertise centres on tailings dam design and operation, assessment and management of mine subsidence impacts and numerical analysis. Signature projects include protection of the Upper Canal and Hume Highway during undermining, prediction of steam pressures at Lihir Gold Mine, numerical analysis of hydromechanical coupling at Olympic Dam, Brisbane Airport Link tunnel design and investigation of the Lane Cove Tunnel collapse.

Gareth has continued close links with UNSW including several projects with researchers in the School of Civil and Environmental Engineering. He is currently a Visiting Fellow with the UNSW Water Research Centre.

Narelle Underwood
NSW Surveyor-General

Narelle Underwood is the Surveyor-General of NSW and Director of Survey Operations at Spatial Services, a division of the NSW Department of Finance, Services and Innovation. The Surveyor General is the leader and regulator of the land and mining surveying profession and plays a key advocacy role in the spatial industry in NSW.

Narelle graduated from UNSW in 2009 with a BE Hons 1 Surveying & Spatial Information Systems and the University Medal. She became a Registered Land Surveyor in 2010.

Prior to joining Spatial Services, Narelle worked in both private industry and state government. She was at NSW Roads and Maritime Services for over seven years and held a number of senior roles, including Southern Region Survey Manager and Principal Surveyor. Throughout her career Narelle has been actively involved in the surveying and spatial professional organisations in NSW. Narelle has won a total of nine industry awards for her innovation and commitment to quality outputs, including the Asia-Pacific Spatial Excellence Awards Young Professional of the Year in 2011, which she won from amidst a highly capable international field.

As Surveyor General she is the President of the Board of Surveying and Spatial Information (BOSSI), Chair of the Geographical Names Board, NSW Surveying Taskforce and the Surveying and Mapping Industry Council.

Athena Venios
Director Greater Sydney Project Office, Roads and Maritime Service

Athena leads a multidisciplinary team within the Technical and Project Services Division of NSW Roads & Maritime to develop and deliver projects across Greater Sydney.

Prior to this role she was Technical Director - Transport Group, AECOM, responsible for the delivery of complex transport projects including motorways, railways and multi-modal infrastructure, working closely with government and key stakeholders.

As AECOM Technical Director she was accountable for securing a pipeline of projects and setting the strategic direction for AECOM's transport business, and for leading multidisciplinary teams in the acquisition and execution of major transport infrastructure projects.

In 2016 Athena was awarded the Judy Raper Award for Leadership in Engineering, in recognition of her sustained and significant contribution through demonstrated leadership within the profession in Australia.

About Our Industry Partners

The UNSW School of Civil and Environmental Engineering has substantial and active links with industry to ensure a continuing real-world focus for our teaching and our research.

Our Industry Partners Program presents great opportunities to develop a productive relationship between the School, its staff, students and industry.

The annual Industry Partners Careers Market is an important activity where Industry Partner representatives meet with Year 3 and Year 4 students. This allows Industry Partners to identify students for industrial training placements or graduate employment. The School also hosts an annual Elite Student Breakfast at the Sydney Botanic Gardens where our top students engage with Industry Partner representatives in a relaxed setting. Industry supporters also may offer discipline prizes to outstanding fourth year students, presented at the annual Year 4 dinner.

The School will also directly email career information on behalf of Industry Partners to all relevant undergraduate and postgraduate students.

A big thank you to our current Industry Partners & Supporters:

- Advisian
- ANSTO
- ARUP
- Aurecon
- Bouygues Construction
- Cardno
- CIMIC
- CMS Surveyors
- E3 Advisory
- Jacobs
- JK Geotechnics
- GHD
- Laing O'Rourke
- Macquarie Geotech
- Melbourne Water
- Multiplex Ltd
- Pells Sullivan Meynink Pty Ltd
- RPS Group
- SMEC Australia
- Taylor Thomson Whitting (TTW)
- Turnbull Engineering
- WSP

For further information on the Industry Partners Program please contact Dr Kurt Douglas at k.douglas@unsw.edu.au

2019 Welcome New Industry Partner E3

L-R: Senior Advisors Lucas Jordan, Tennille Cheong, Iain Scoular - E3 Advisory

The School of Civil and Environmental Engineering (CVEN) warmly welcomes infrastructure strategy specialists, E3 Advisory to the Industry Partnership Program (IPP).

E3 Advisory began as a small firm of highly experienced professionals in August 2014 growing into an organisation of 80 staff across Sydney, Brisbane and Perth. E3 Advisory prides itself on providing tailored infrastructure advice to organisations which own, develop, deliver, manage and/or operate complex capital assets in the infrastructure and resources sectors.

Building its success on the key principles of Efficiency, Effectiveness and Economic Value, hence the name – E3 Advisory is involved in key infrastructure projects nationally, with teams currently working on the Circular Quay Renewal Precinct, the ongoing Sydney Metro project and Queensland's Cross River Rail as well as having worked on the award winning Westconnex transaction with E3 Advisory providing commercial due diligence for Sydney Transport Partners.

CVEN Industry Advisory Committee member, Iain Scoular joined E3 Advisory in 2016 as a Senior Advisor after spending his entire career with major Australian construction contractors in both project and general management. As an employee-owned, boutique group of infrastructure specialists, E3 Advisory was in his words 'a refreshing contrast to working for large contractors', and he has been able to draw on his 40 years' experience in delivering infrastructure projects to assist his clients to develop and deliver their own major projects.

On joining the School's IPP, Senior Advisor, Lucas Jordan said: "A number of E3 Advisory's staff are alumni of the School of Civil and Environmental Engineering, so we saw value in initiating a long-term partnership."

"Becoming an Industry Partner means that E3 Advisory can actively foster career development with students in the School through its participation in the many career events organised by CVEN and the Faculty exclusively for the Industry Partnership Program – the very events where many career conversations begin!"

"This partnership with the School of Civil and Environmental Engineering is important to us. As Industry Partners, we can create exciting opportunities for elite students to jump-start their careers in the infrastructure space."

The School looks forward to a fruitful partnership with E3 Advisory and the many opportunities for student engagement and mentorship that E3 Advisory is keen to pursue.

Primary School Maths Prize

SCHOOL	FIRST	LAST
Alexandria Park Community School	Ned	Gardner
	Grace	Hu
	Neil	Venkat
	Cristian	Villazon
Annandale North Public School	Anna	Cermak
	Rory	Howe
	Anna	Kepert
	James	Kriska
Armidale City Public School	Boki	Lay
	Dezi	Suddaby
	Dean	Repp
	Hugh	Watson-Rote
Arncliffe Public School	Neharika	Chand
	Matthew	Ng
Australia Street Infants School	Tor	Kenyon
	Jackson	Teoh
	Eamon	Ward
Australian International Academy	Miral	Alqasas
	Zuhayr	Haq
	Yusuf	Khan
	Nabiha	Showket
Avondale School	Kalan	Crosbie
	Alexander	Timms
Balgowlah Heights Public School	Wilson	Foo
Balgowlah North Public School	Joshua	Skinner
Bankstown West Public School	Hamzah	Ahmed
	Bella	Bui
	Fariha	Choiti
	Troy	Vo
Beaumont Hills Public School	Angela	Huang
	Vishnu	Priyesh
Beauty Point Public School	Jet	Louie
	Eden	Massarwa -Ferreri
	Edward	Shen
	Ted	Thomson
	Rex	Tyas -Halloran
Beecroft Public School	Qiyang	Ning
Bellevue Hill Public School	Kiara	Lapedus
	Rocco	Pager
Belrose Public School	Lachlan	Adamo
	Lucas	Figueira
	Tim	Fortescue
	Rhys	Penhale

SCHOOL	FIRST	LAST
Berowra Public School	Ryan	Hooworth
	Kaelan	Jones
	Charlie	Manns
	Max	Tesoriero
Berrima Public School	Lincon	Burling -Briggs
	Jarrah	McNally -Haddock
Beverly Hills Public School	Lucas	Cheung
Blackheath Public School	Alton	Freeman
	Eli	Roberts
Blacktown West Public School	Sehasa	Jayaratna
	Hunter	Ratnam
	Tayga	Sevdimbas
	Rhys	Staveley
Bondi Beach Public School	Fiona	Do
	Lydna	Khov
Bondi Public School	Rufus	Gordon -Heywood
	Farley	Hammond
Bronte Public School	Hugo	Bendeich
Cammeray Public School	Ethan	Feng
	Zach	Harvey
	Otto	McBride
	Dylan	Patel
Canterbury South Public School	Owen	Potas
	Olivia	Tsigaropou-los
Carlingford Public School	Adam	Ning
Carlton Public School	Aleksia	Ilic
	Selina	Lin
	William	Sun
	Kevin	Xu
Casula Public School	Rupantar	Nirvo
	Gopal	Raju
	Kevin	Santoro
	Gobind	Singh
Chifley Public School	Cruz	Cain
Claremont College	Harry	Awad
	Hannah	Gajus
	Huon	Groves
	Elsie	Yang
Clovelly Public School	Mac-kenzie	Palmer
Condoblin Public School	Jed	Neilsen
	Gemma	O'Bryan
Cowra Public School	Riley	McLeish
	Liam	Saunders

SCHOOL	FIRST	LAST
Crescent Head Public School	Alex	Gorline -Singleman
	Riley	Moffitt
	Luella	Robinson
	Isabella	Williams
Crown Street Public School	Joshua	Ang
	Anudari	Angar
	Eden	Evton
	Ishani	Purohit
Croydon Public School	Bruce	Cai
Daceyville Public School	Demetrios	Aivaliotes
	Hebe	Zines
Double Bay Public School	Jennifer	Chhun
	Crystal	Feng
	Joel	Gilmour
	Marko	Susa
Earlwood Public School	Marcus	Chung
Eastlakes Public School	Anas	Ahmadi
	Siyahrah	Chowdhury
	Darell	Fadila
	Surovi	Pandit
Epping North Public School	Hayden	Mercier
	Benita	Wang
Ermington Public School	Garv	Batavia
	Ethan	Le
	Joanna	Park
	Harrison	Pobje
Ermington West Public School	Evelyn	Brownett
	Yoona	Jee
	Kiana	Pavey
	Matthew	Santos
Ferncourt Public School	Eliza	El Mohamad
	Jackson	Ho
	Charlie	Lau
	Calvin	Le
Glenhaven Public School	Joshua	Maistry
Harbord Public School	Zachary	Butt
	Luke	Druery
	Ruby	Gordon
Illawong Public School	Grace	Butler
	Max	Chen
	Eric	Phung
Jasper Rd Public School	Max	Dai
	Rozana	Eshghi Ghadiri
	Helen	Liu
	Elizabeth	Truong

SCHOOL	FIRST	LAST
Kambora Public School	Taylor	Anderson
	Donnie	Duncan
	Joel	Kemmers
	Jack	O'Fee
Kensington Public School	Edward	Charleston
	Ethan	Saptura
	Chloe	Tisdell
	Jessica	Zhou
Lugarno Public School	Anthony	Kariotis
	Flynn	O'Sullivan
	Lucia	Rauch
	Andrew	Tran
Manly West Public School	Lachlan	Holley
	Gabriel	Lucas
	Rhys	Weaving
Maroubra Junction Public School	Ethan	Bastian
	Jeremiah	Chow
	Oliver	Richards
	Owen	Shum
Masada College	Leora	Bass
Matraville Public School	Rafio	Mostafa
Middle Harbour Public School	Hugo	Da Silva
	Dean	Lowe
Mosman Public School	Milo	Ludbrook
	Luca	Tressel
Mount Colah Public School	Gabrielle	Stacey
	Aylssa	Tran
Mount Druitt Public School	Nooreen	Ahmed
	Sneha	Chandra
	Yalina	Sayem
	Yasria	Sayem
Narrabeen North Public School	Xavier	Tosi
	Jye	Wormleaton
Niagara Park Public School	Blake	Evans
	Tyler	Wilde
Northhaven Public School	Makayla	Bambling
	Ella	Davey
	Adam	Drewitt
	Isaac	Meyers
Northmead Public School	Rachel	Allen
	Inupa	Maga-naarachchi
	Jerry	Yin
	Salman	Zabul
Oatley Public School	Chloe	Gu
	Lucas	Miljak

SCHOOL	FIRST	LAST
Our Lady of the Rosary Catholic Primary School	Sarah	Dunlop
	Edelyn	Lim
	Brody	McNally
	Sean	Yonatan
Pagewood Public School	Amelie	Babbage
	Shanze	Rahman
	James	Sarkissian
	Bonnie	Wu
Parramatta North Public School	Kay	Sharma
	Rosemary	Zhao
Pennant Hills Public School	Livia	Xie
Picnic Point Public School	Jason	Ho
	Daniel	Mikhail
	Ethan	Phillips
	Theo	Su
Rainbow Street Public School	Oliver	Cetin
	Zara	Scott
Randwick Public School	Rion	Iwano Min
	Aiden	McManus
Roselea Public School	Timmy	Lai
	Gagan-deep	Sodhi
South Coogee Public School	Nicholas	Fung
	Zoe	Groll
	Jordi	Hayim
	Sophie	Tanner
St Aloysius Catholic Primary School	Amelia	Buhagiar
	Levi	Christo-foridis
	James	Hughes
	Cadel	Wilkinson
St Declan's Catholic Primary School	Hayden	Ko
	Mikayla	Stevens
St Francis Xavier Catholic Primary School	Jasper	Cox
	Marcus	Kalinovski
	Jasper	Lehmann
	Jack	Mewburn
	Mirae	Shretha -Joshi
St John Bosco Catholic Primary School	Thomas	Hall
St Joseph's Catholic Primary School	Charlotte	Sydes
	Livinia	Wall
St Philip's Christian College	Jane	Power
St Spyridon College	George	Agiasotis

SCHOOL	FIRST	LAST
Sylvania Heights Public School	Domenic	Auciello
	Stephen	Liang
	Isaac	Lin
	Sienna	Mahmoud
Tacking Point Public School	Francis	Neild
	Cory	Thiele
Toongabbie Public School	Joonjin	Lee
	Katie	Liu
Toongabbie West Public School	Afsar	Mohamed
	Chelise	Rogers
Turramurra Public School	William	Chiu
	Jemima	Gallagher
	Ritesh	Saini
	Grace	Stuart
Warrawee Public School	James	Boardman
	Amy	Diao
	Anthony	Lamberti
	Tyler	Martin
West Pennant Hills Public School	Adrian	D'Amore
	Annabelle	Edwards
	Ajeet	Kasi
	Nathan	Sarah
Wheeler Heights Public School	Fraser	Beeby
	Lennox	Cleary
	Ben	Kinner
	Keilana	Stoten
Wollondilly Anglican College	Jackson	Malcolm
Woollahra Public School	Terry	Chen
	Luca	Dadic
	Wensen	Dong
	Robert	Lei

Civil and Environmental Engineering Industry Partners and Supporters

FUNDERS OF ACADEMIC POSITIONS

- Advisian (WorleyParsons Group)
- ANSTO
- Melbourne Water
- PSM

SCHOOL INDUSTRY PARTNERS

- ARUP
- Bouygues Construction Australia
- CMS Surveyors
- JKGeotechnics
- Multiplex
- TTW (Structural Civil Traffic Façade)
- aurecon
- CIMIC
- E3 Advisory
- Laing O'Rourke
- Macquarie Geotech
- SMEC (Member of the Surbana Jurong Group)
- wsp

SCHOOL INDUSTRY SUPPORTERS

- Cardno (Shaping the Future)
- GHD
- Jacobs (Challenging today. Reinventing tomorrow.)
- rps (Making Complex Easy)
- Turnbull Engineering (Infrastructure Design)