UNSW SYDNEY
Australia's Global University

School of Civil and Environmental Engineering

# Annual Report 2017

School of Civil and Environmental Engineering

# Annual Report 2017



UNSW SYDNEY 2052

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**PROJECT & CONTENT MANAGEMENT**

With thanks to Kate Brown, Anthony Dever, Pauline Manley, Kristen Splinter, Tricia Tesoriero, Ellie Williams, Lucia Wong

**GRAPHIC DESIGN**

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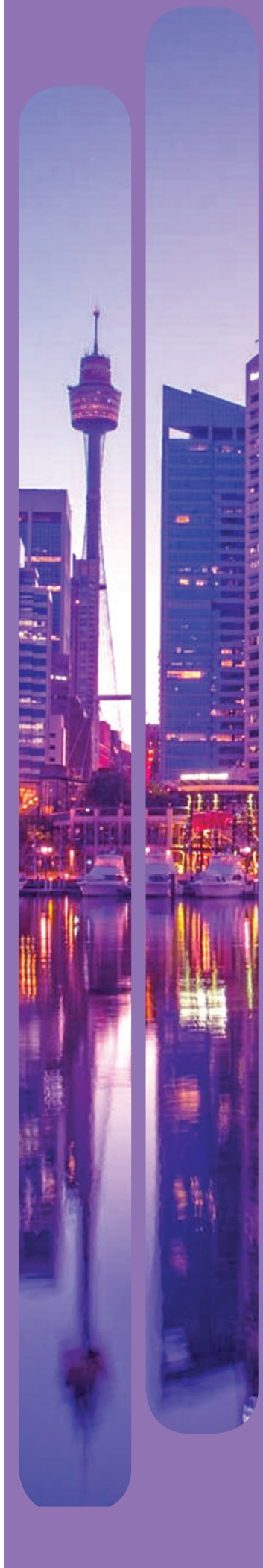



# 1 BIG PICTURE

# Welcome from the Head of School

Welcome to this report, a record of yet another action-packed year for the School. Engineers have always been people of action – driven to create, to solve problems, to make things happen, and to make a difference. UNSW Civil & Environmental Engineering alumni, staff and students are no exception.

Internationally ranked as the premier School of our kind in Australia and one of the world's top twenty, we continue to forge ahead with innovative research fields, new educational courses, and an ever expanding network of industry connections.

The School is committed to advancing a more prosperous, safe and just society. Our courses emphasise sustainability and a consideration of engineering impacts, with an integrated and inter-connected view of the world.

Our Centres and discipline groups provide focal points for our researchers to contribute to global efforts in innovative civil, environmental and geo-spatial engineering research.

With strong interdisciplinary and external industry collaborations - and with mentorship provided to our great young researchers – we aim to continue our leadership in research excellence.

A strong School does not happen without the efforts and collegiality of its staff; academic, research, professional and technical. I thank them all for their amazing dedication and hard work.

**PROFESSOR STEPHEN FOSTER**

# About Us

## School Stats 2017

| | |
|---|---|
| **Staff** | |
| School Academic Staff | 48 |
| School and Centres Research Staff | 80 |
| School Professional & Technical Staff | 32 |
| **2017 Enrolments** | |
| Higher Degree Research Students | 193 |
| Postgraduate Coursework Students | 1144 |
| Undergraduate Students | 2220 |
| **2017 Graduations** | |
| Higher Degree Research | 50 |
| Postgraduate Coursework | 390 |
| BE | 357 |
| **2017 Research** | |
| ARC Funding awarded in 2017 | $2.62M |
| Total Research Funding received in 2017 | $10.7M |
| Refereed Research Publications | 470 |
| 2017 Generated Teaching & Research Income | $80.5M |
| 2017 Operating Budget | $21.9M |

UNSW Civil & Environmental Engineering is internationally ranked as the premier School of its kind in Australia, by QS World University Rankings by Subject and by Shanghai Jiao Tong's Academic Ranking of World Universities (AWRU), and ranked by both as the only Australian civil engineering school in the world's top 20.

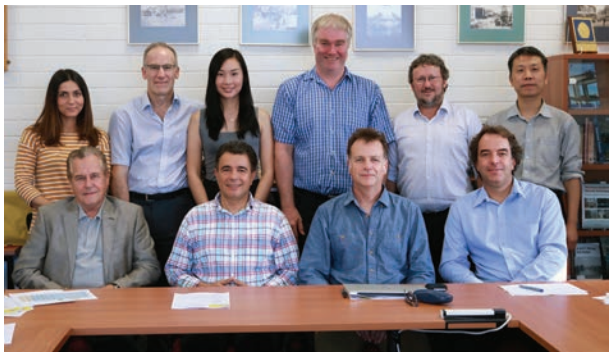
From our foundation in 1949, the School has pursued excellence and innovation in education and research. Our academic staff are recognised world leaders in their fields of expertise, while our alumni are to be found as innovators and decision makers in industry, government and the community.

The School is at the forefront of innovative 'blue sky' and applied research across the breadth of civil, environmental and geospatial engineering. Since 2001 our researchers have received industry and government funding of over $175M, including 146 highly sought after Australian Research Council (ARC) grants and fellowships totalling $53M.

Each year we work with over 100 industry and government organisations on specific industry and community related projects. The number and diversity of our academic staff, and the breadth of our engagement with industry through our activities, allows us to bring a tremendous level of expertise to our teaching.

We now offer 14 undergraduate degree programs, with one third of our undergraduate students enrolled in dual degrees. The School's programs continue to act as engineering education models, with a quarter of our academic staff having won Teaching Excellence awards.

# School and Management Committees



School Management Committee L-R back Kristy Guia, Anthony Dever, Lucia Wong, Steven Davis, Stephen Foster (HoS), Wei Gao
L-R sitting: David Carmichael, Nasser Khalili, Ian Turner, Kurt Douglas
Absent: Martin Andersen, Mario Attard, Ron Cox, Vinayak Dixit, Linlin Ge, Chongmin Song, Richard Stuetz, Travis Waller

| MEMBER | ROLE |
|---|---|
| **COMMITTEE: School Executive Group (SEG)** | |
| Stephen Foster | Chair |
| Travis Waller | Deputy Head (Research) |
| Mario Attard | Associate Head (Academic) |
| Nasser Khalili | Discipline Leader - Geotech |
| Richard Stuetz | Director WRC |
| David Carmichael | Discipline Leader - Construction |
| Ian Turner | Director WRL |
| Anthony Dever | School Manager |
| **COMMITTEE: School Management Committee (SMC)** | |
| Stephen Foster | Chair |
| Mario Attard | Associate Head (Academic) |
| Travis Waller | Chair RMC, Director rCITI |
| Steven Davis | Co-Chair, TLC |
| Kurt Douglas | Chair, ERC |
| Linlin Ge | Chair, CIT&ETC/Group representative - SAGE |
| Vinayak Dixit | Chair TSC |
| Richard Stuetz | Director WRC (Kens); Co-Chair TLC |
| Ian Turner | Director WRL |
| Chongmin Song | Acting Director CIES |
| Martin Andersen | Director CWI |
| Ron Cox | Director ACCARNSI |
| Nasser Khalili | Discipline Leader - Geotech |
| David Carmichael | Discipline Leader - Construction |
| Anthony Dever | School Manager |
| Kristy Guia, Lekana Toubia | Student Centre Manager |
| Lucia Wong, Betty Lai | Administration |

# Research Centres

Our research centres and discipline groups provide focal points for our academics, research staff and higher degree students to collaborate and contribute to innovative civil, environmental and geospatial engineering. In turn our research informs our teaching, to deliver not just the latest developments in engineering models and methods but the knowledge and tools which our graduates will use to push the boundaries of national innovation and leadership.

## ACCARNSI

### Australian Climate Change Adaptation Research Network for Settlements & Infrastructure

www.engineering.unsw.edu.au/civil-engineering/research/unsw-research-centres-and-research-hubs/the-australian-climate-change-adaptation-research

Supporting multi-disciplinary research, building research capacity, and promoting open exchange of information and resources.

**Director: A/Prof Ron Cox**

## CIES

### Centre for Infrastructure Engineering & Safety

www.cies.unsw.edu.au

An internationally recognised centre focused on high-level research in structural engineering, geotechnical engineering, engineering materials, and computational mechanics, for safe and sustainable civil engineering infrastructure.

**Director: Professor Chongmin Song**

## CIRI

### Construction Innovation and Research Initiative

www.engineering.unsw.edu.au/civil-engineering/research

Construction is the world's largest industry and its efficiency is of obvious importance. The School is a world resource centre for academic research in this field. We undertake real-world research in the sustainable design and management of large-scale field processes, and improved technology for construction activities.

**Academic Leader: Professor David G Carmichael**

## CWI

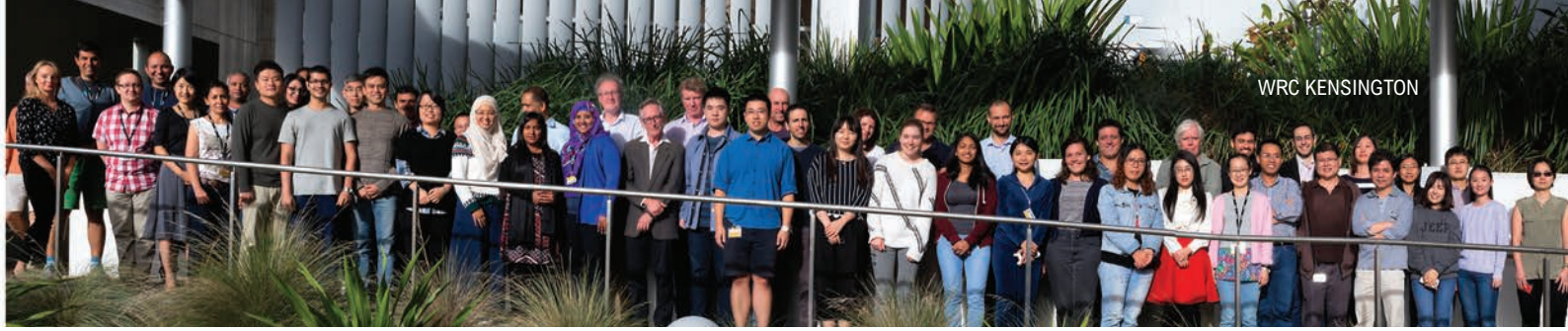
### Connected Waters Institute Research Centre

www.connectedwaters.unsw.edu.au

Our mission is to undertake the fundamental and applied research needed to improve our understanding of groundwater systems both nationally and internationally, and to continue to manage the national groundwater infrastructure program, the Groundwater EIF.

**Director: A/Prof Martin Andersen**

CIES


WRC KENSINGTON

# rCITI

## Research Centre for Integrated Transport Innovation

www.rciti.unsw.edu.au

rCITI aims to become a world-leading organisation in integrated interdisciplinary transport research and development through a range of research initiatives investigating sustainable approaches to transport infrastructure and operations, with extensive liaison with industry and government. Our research is based around five pillars: Integrated Transport Planning / ITS Communications /Improving Infrastructure /Energy&Fuel / Computational Sustainability

**Director: Advisian Professor of Transport Innovation Professor Travis Waller**

# SAGE

## Surveying and Geospatial Engineering Research

www.sage.unsw.edu.au

The SAGE Research group conducts world-class research in the sub disciplines of geodesy, photogrammetry, positioning measurement and remote sensing.

**Academic Leader: Professor Chris Rizos**

# SEI

## Sustainable Engineering Research

www.engineering.unsw.edu.au/civil-engineering/research

In response to the challenges of climate change, financial uncertainty, urban population growth and endangered ecologies, a group of academics at CVEN have formed the Sustainable Engineering Research Initiative. Our aim is to explore, research, define, assess and resolve issues of sustainability in engineering problems and practices in all areas of civil infrastructure.

**Academic Leader: A/Prof Tommy Wiedmann**

# WRC

## Water Research Centre

www.wrc.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.

**Director: Professor Richard Stuetz**

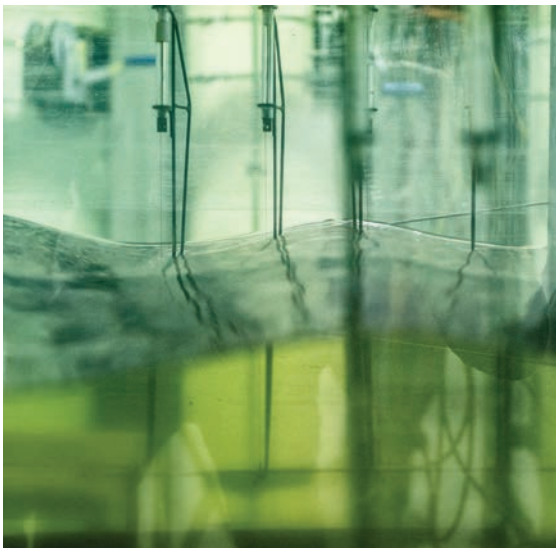
# WRL

## Water Research Laboratory

www.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, estuarine and wetland management; riverflow and floodplain management; civil engineering hydraulics; and climate change adaptation.

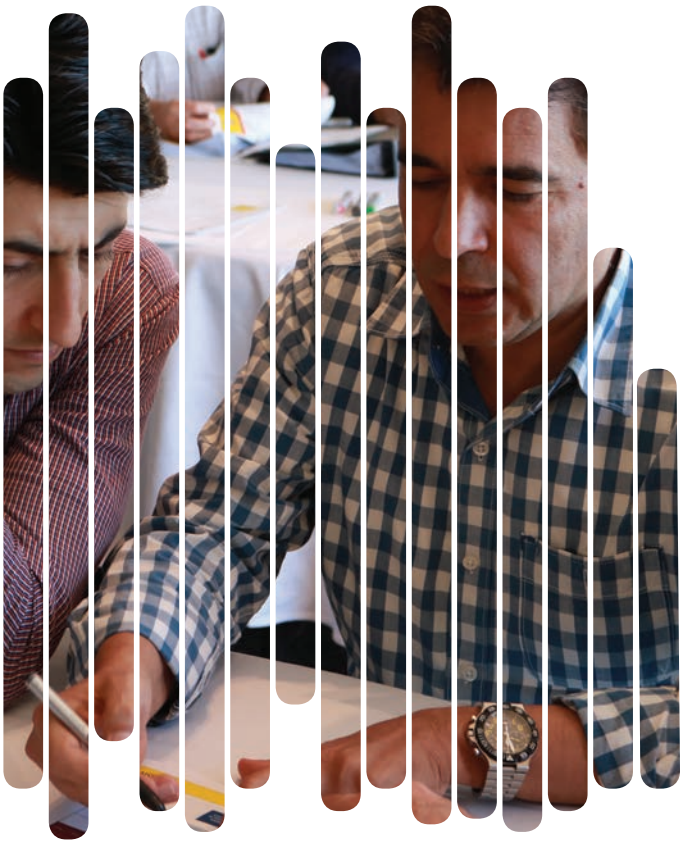
**Director: Professor Ian Turner**



CVEN Professional Staff L-R: Lena Comino, Liam Orchard, Chelsea Pham, Ellie Williams, Pattie McLaughlin

# 2 OUR PEOPLE

# ACADEMIC Staff



**Akbarnezhad**, Ali
Lecturer
BE AUT, Tehran, PhD NUS

Research Interests: Sustainable Construction: Sustainability Assessment: Information Modelling: Construction Technology: Non-Destructive Tests: Health Monitoring: Concrete Technology: Design for Deconstruction

**Amin**, Ali
Lecturer
BE (Civil) Hons 1, PhD, UNSW

My research is centred upon the use of fibres (steel, polypropylene or otherwise) in concrete. By adding fibres to concrete, the primary objective is to bridge cracks once they form and provide some post cracking resistance in tension. My research has led to the development of physical-mechanical models which describe this behaviour in a wide range of applications.

**Andersen**, Martin
Senior Lecturer
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.

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

Research Interests: Finite Strain Isotropic & Anisotropic Hyperelastic Modelling: Fracture in Concrete & Masonry: Crack Propagation due to Creep: Ductility of High Strength Concrete Columns: Buckling of Sandwich Columns: Lateral Buckling of Thin-Walled Beams.

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

Research Interests: Structures subjected to elevated temperatures, curved members, arches, steel structures, composite steel-concrete structures, concrete structures, numerical methods, stability, viscoelastic effects, non-discretisation techniques, design codes, structural retrofit.

**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 - Steel corrosion in concrete, concrete pathologies, SCM's: Concrete construction in chloride environment -Performance & service life design of reinforced/prestressed concrete affected by steel corrosion: Repair & Strengthening using CFRP - Failure analysis & modelling of CFRP strengthened beams including reinforcing steel corrosion.

**Cox**, Ron
Associate Professor
Convenor, ACCARNSI
BE PhD UNSW, FIEAust

Research Interests: Climate change adaptation for settlements & infrastructure: Coastal engineering & coastal zone management: Stability, design & safety of coastal structures: Application of sand filled geo-containers in coastal protection: Environmental monitoring & modelling: Desalination plant brine disposal: Hydraulics of water & wastewater treatment plants: Flood hydraulics & floodplain management: Life safety, emergency warning & evacuation.

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

Research Interests: Dr Dackermann's expertise lies in structural dynamics, damage detection, structural health monitoring, non-destructive testing, artificial intelligence (AI) and timber engineering.

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

Research Interests: Stochastic Systems: Evolutionary Programming: Parallel Computing Applications to Civil Engineering: Online Assessments

**Dixit,** Vinayak
Associate Professor
Chair, Technical Services
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 main interests lie in the field of rock mechanics. Predicting strengths of large-scale rock masses (hundreds of meters) continues to be a major challenge. I am attempting to improve our understanding using laboratory tests, field studies & numerical methods. I am also currently involved in an ARC & Industry sponsored project researching erosion of rock spillways & backward erosion of embankment dams.

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

Stefan is an expert in hydraulic engineering and environmental fluid mechanics. His research interests include: Physical modelling of turbulent flows; Design optimisation of hydraulic structures; Energy dissipation and aeration in high-velocity free-surface flows and hydraulic jumps; Air-water mass transfer across hydraulic structures; Design of instrumentation and advanced data processing tools.

**Foster,** Stephen
Professor
Head of School
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.

**Gardner**, Lauren
Senior Lecturer
BS ArchE, MSE, PhD U Texas at Austin

Research Interests: Network modelling for multi-domain integrated systems: congestion pricing models accounting for uncertainty, the role of real-time information & adaptive pricing: Sustainability models integrating transportation & electricity systems: developing network-based optimization models to predict the role of global transport systems in the spread of contagious disease.

**Ge**, Linlin
Associate 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.

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

Research interests: Estuarine hydrodynamics and water quality including restoration of estuarine environments, acid sulphate soils, and coastal wetlands; boat wake waves, outfall hydraulics and field testing, and related physical and numerical models. Will is particularly interested in restoring large wetland and riverine systems.

**Hamed**, Ehab
Senior Lecturer
BSc MSc PhD Technion

Research Interests: Viscoelasticity of concrete & composite materials, Creep buckling of concrete domes & shells, Strengthening of concrete & masonry structures with composite materials (FRP), Nonlinear dynamics of concrete structures.

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

Research Interests: Least Squares analysis of surveying measurements is my main interest, but I also investigate alternative analysis methods & the latest measurement technologies. Are there better ways to analyse surveying measurements & can we improve Least Squares, L1 norm & topological grid searches?

**Holdom**, Robert
Senior Lecturer
Year 4 Coordinator

Research Interests: construction management.

**Johnson**, Fiona
Senior Lecturer
BE, PhD UNSW

Research Interests: statistical hydrology & modelling; climate change impacts on water resources systems; bias correction methods that can be applied to climate model simulations; models for design rainfalls & flooding; models for regionalisation of rainfall data, questions on stationarity of large to extreme rainfalls & the impacts of climate change on these events & the resulting implications for engineering design.

**Khalili,** Nasser
Professor
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: large deformation analysis in geomechanics, advanced numerical methods in geomechanics, mechanics of unsaturated soils & coupled analysis of porous media.

**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 conduct geospatial information science & research that allow us to improve the way we view, understand, design, plan, manage, analyse, interpret, & extract spatio-temporal information such as patterns & trends of geospatial data. I investigate spatial information extraction from lidar (known as light detection & ranging) & aerial/satellite data e.g. data segmentation & classification, digital elevation modelling, feature extraction, building edge detection, & change detection.

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

Research Interests: Environmental microbiology with an increasing focus on applications. Research highlights include the discovery of the first bacterial quorum sensing inhibitors, the development of RNA based stable isotope probing, development of experimental models of activated sludge floc formation, discovery of the world's first chloroform degrading bacterial culture and the discovery of synthetic phenazine crystals for enhanced biogas production.

**Moore**, Stephen
Senior Lecturer
BE UNSW, MEngSc Adel., CPEng, MIEAust

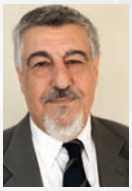
Research Interests: Development of environmental material accounting techniques, such as Material Flux Analysis, for regional & corporate environmental management systems; Simulation & decision analysis applied to waste management systems.

**Rau,** Gabriel
Lecturer
Diplom-Ingenieur, Stuttgart, PhD UNSW

I am a water engineer interested in physical and chemical hydrogeology, hydrogeologic processes, subsurface heat transport, hydrogeological responses to different forcing factors, and fundamental transport of heat and solute in natural porous materials. I love to get my hands dirty in the lab and in the field in order to quantify properties and processes from real-world observations.

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

Research Interests: Transportation networks, combinatorial algorithms, mathematical programming and operations research. Travel time prediction models, sustainable travel behaviour in urban networks.



**Rizos**, Chris
Professor
BSurv (Hons), PhD UNSW

Research Interests: How geospatial technology such as satellite-based positioning, modern geodesy & digital mapping is used for science, & by society in general; Political issues related to GNSS and geospatial information management; Modern geodesy's technologies & applications; Australia's new mapping datum; The technology & applications of satellite-, wireless- & inertial-based sensors for high accuracy positioning; The use of GNSS (GPS, BeiDou, Galileo, QZSS) for all classes of uses from Navigation to Geodesy; GNSS receiver design; GNSS positioning infrastructure.

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

Research Interests: High precision GPS/GNSS positioning and leveraging CORS infrastructure for practical application to surveying and geospatial engineering. The implications of kinematic 3D datum modernisation for professional and mass market users. GPS for cadastral surveying. Kinematic positioning with robotic total stations.

**Rashidi**, Taha Hossein
Senior Lecturer
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

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

Research Interests: Unsaturated soils: Fibre reinforced soils: Particle crushing in granular media: In situ testing of soils: Constitutive modelling of soils: Wind turbine foundations.

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

Research interests: Rapid As-Built Field Modelling in Construction; Sustainable Construction Operations; Construction Automation and Robotics; Structural Health Monitoring; Dynamic Data-Driven Project Management

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

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

**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
Director, Water Research Centre Kensington
Co- Chair Teaching & Learning
BSc, PhD UNSW

Research Interests: On-line instrumentation for monitoring water & wastewater quality: Biological monitoring for process control: Biotreatment of odours & volatile emissions: Bioprocesses for water & wastewater treatment: Biodegradation of micropollutants.

**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 including reinforced concrete & steel, steel-concrete, timber & timber-concrete composite materials: Behaviour of structures subjected to extreme loading scenarios such as seismic action, critical member loss, impact, blast and explosion: Computational mechanics and non-linear finite element modelling of structures: Constitutive modelling of concrete and timber.

**Waite**, T David
Scientia Professor,
Deputy Dean, Research, UNSW Engineering
BSc Tas, GradDip RMIT, MAppSc Monash, PhD MIT, FRACI

Research Interests: Separation processes involving colloids & particles in water & wastewater treatment; redox chemistry at the solid-solution interface; photochemistry in aquatic systems; hydrogeochemistry; theoretical & experimental studies on the fate & effects of chemical pollutants; interactions between trace elements & microbiota in aquatic systems.

**Waller,** S Travis
Advisian Professor of Transport Innovation.
Chair, Research Management Cmte
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.

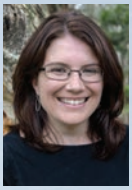
# ARC Future Fellows

**Bellie**, Sivakumar
Associate Professor
ARC Future Fellow
UNSW Water Research Centre

Research Interests: Water resources assessment, planning, and management. Sivakumar's research focuses on simplification and generalization in hydrologic modeling, especially using nonlinear dynamic and scaling theories

**Collins**, Richard
Senior Lecturer
ARC Future Fellow
UNSW Water Research Centre

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
ARC Future Fellow
BE, MEngSc, PhD UNSW

Research Interests: I use computer models to simulate rainfall & runoff processes in catchments, working to improve hydrologic forecasts through improved catchment model structures & methods for model calibration & uncertainty assessment. I quantify new conceptualizations of hydrologic processes & develop methods for model diagnostics & uncertainty analysis (especially via Bayesian statistics & multi-model methods).

**O'Carroll**, Denis
Associate Professor
ARC Future Fellow
B.A.Sc. Civil Engineering Ottawa, M.S., Clarkson, PhD., U Michigan

Research Interests: 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, in order to inform human and ecological health risk assessments and to assist regulators to develop appropriate legislation.

**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.

# EMERITUS Professors

**Black**, John Andrew

**Fell**, Robin

**Gilbert,** Raymond Ian

**Tin Loi**, Francis Shay Khiet

**Trinder**, John

**Valliappan**, Somasundaram

# VC Postdoc Fellows

| | |
|---|---|
| **Huichao**, Chen | VC Postdoctoral Fellow |
| **Jinxing**, Ma | VC Postdoctoral Fellow |

# ANSTO Postdoc Fellows

| | |
|---|---|
| **Kinsela**, Andrew | Reserch Fellow |

# Visiting / Adjunct Academics

| | |
|---|---|
| **Aldred**, James | Adjunct Associate Professor |
| **Blenkinsopp**, Christopher | Adjunct Lecturer |
| **Byrne**, Joshua | Adjunct Associate Professor |
| **Cathers**, Bruce | Visiting Senior Lecturer |
| **Cordery**, Ian | Honorary Associate Professor |
| **Geha**, Shane | Adjunct Professor |
| **Guan**, Jing | Adjunct Associate Professor |
| **Kayvani**, Kourosh | Professorial Visiting Fellow |
| **Kearsley**, Arthur | Visiting Professor |
| **Lundie**, Sven | Adjunct Associate Professor |
| **Nasirzadeh**,F arnad | Visiting Fellow |
| **Payne**, Timothy Ernest | Adjunct Associate Professor |
| **Peirson**, William Leslie | Adjunct Professor |
| **Peters**, Gregory | Adjunct Associate Professor |
| **Schofield**, Nicholas | Visiting Professor |
| **Swarbrick**, Gareth Edward | Visiting Fellow |
| **Vandebona**, Upali | Honorary Senior Lecturer |
| **Voo**, Yen Lei | Adjunct Associate Professor |
| **Zamyad**i, Arash | Visiting Fellow |

## In 2017 Dr Robert Care was appointed Professor of Practice in the School of Civil and Environmental Engineering

Dr Robert Care has not only been recognised as one of the University's most esteemed alumni, by winning a UNSW Alumni Award in 2012, but his significant contributions to society have been honoured at the highest national level too. In 2012, he was awarded an Order of Australia for his services to Engineering, Business, Humanitarian Programs and Athletics.

Since graduating from UNSW with a Bachelor of Civil Engineering in '73 and a Doctor of Philosophy in '78, Robert has enjoyed a career spanning over 40 years, many as a leader within global consulting group Arup, which has taken him all over the world. His leadership style is characterised by a unique combination of humility, humanity and commerciality, and his strong sense of purpose inspires others to achieve great things alongside him.

His commitment to the community is reflected in his deep involvement with the global charity Common Purpose, and also with RedR Australia – a not-for-profit organisation who send qualified engineers to disaster zones worldwide.

Engineers Australia has featured Robert in their Top 100 Most Influential Engineers five times since 2008, and named him as EA National Professional Engineer of the Year in 2014.

As Professor of Practice Robert will be able to share his enormous experience, knowledge and networks with CVEN students and staff.

# Welcome, farewell & congratulations


U. Dackermann


W. Glamore


R. Holdom


M. Manefield


K. Senetakis


B.Uy


M. Andersen

In 2017 the School **welcomed** four new academic staff, Dr **Ulrike Dackermann** – structural engineering, A/Prof **William Glamore** – expert in estuarine and eco engineering, **Robert Holdom**, construction management guru and A/Prof **Mike Manefield**, an environmental microbiological scientist with a joint continuing appointment in the Schools of Chemical Engineering and Civil and Environmental Engineering.

We **farewelled** Dr **Kostas Senetakis**, who left to take up a position at City University of Hong Kong, leading the Soil Mechanics Laboratory. We also farewelled our brilliant alumnus and former Director of CIES, Professor **Brian Uy** who left to take up the position of Head of School of Civil Engineering at the University of Sydney.

Heartiest **congratulations** to the six academic staff who received well deserved promotions in 2017.

Drs **Martin Andersen** and **Lucy Marshall** are now Associate Professors, Dr **Kristen Splinter** became senior lecturer, and the School had an astonishing hat trick of three new professors - **Wei Gao**, **Stuart Khan**, **Michael Manefield**.

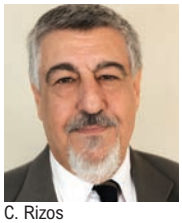
'Three new professorships in one year is a great result for the School,' said HoS Professor Stephen Foster 'and due recognition of Mike, Stuart and Wei's contributions to leadership in research and teaching and engagement with the university and profession.'


L. Marshall


K. Splinter


W. Gao


S. Khan


C. Rizos


N. Khalili


B. Lai

Our **congratulations** go also to Professor **Chris Rizos**, Professor of Geodesy and Navigation, who in 2017 was appointed by the Australia Academy of Science to sit on the National Committee for Space and Radio Science; and to Professor **Nasser Khalili**, leader of our geotechnical engineering group, who has been appointed Honorary Professor at the University of Shanghai for Science and Technology.

At the end of 2017 we also **farewelled Betty Lai**, another School icon.

Since 1994, Betty served as EA to five Heads of School. From her key position she has watched the School's changing fortunes, 'growing, then a fallow period, then expanding, then even more growth and expansion.' She herself needed to be prepared for new challenges and new experiences 'through every Monday to Friday.'

Working with each HoS, she learned each one's 'different character, personality, style of leadership' but all came to one end – 'Their transformation into 'grey' at the end of their term.'

Betty we so miss you!

# Research Staff

## Centre for Infrastructure, Engineering & Safety CIES

| | |
|---|---|
| **Agarwal**, Ankit | Research Associate |
| **Alamdari**, Mehrisadat Makki | Postdoctoral Fellow |
| **Ataei**, Abdolreza | Research Associate |
| **Chilwesa**, Masuzyo | Research Associate |
| **Hassanieh,** Amirhossein | Research Associate |
| **Khan**, Mohammad | Research Associate |
| **Liu**, Xinpei | Research Associate |
| **Parvez**, Md Ahsan | Postdoctoral Fellow |
| **Shahbodaghkhan**, Babak | Lecturer |
| **Vahab**, Mohammad | Research Associate |
| **Vo**, Thanh Liem | Research Associate |
| **Wu**, Di | Research Associate |
| **Yang**, Chengwei | Research Associate |
| **Yang**, GuoTao | Research Associate |
| **Yu**, Yuguo | Research Associate |

## Connected Water Institute CWI

| | |
|---|---|
| **Rutlidge**, Helen Therese | Postdoctoral Fellow |

## Research Centre for Integrated Transport Innovation rCITI

| | |
|---|---|
| **Ghasrikhouzani**, Milad | Research Associate |
| **Grzybowska**, Hanna | Research Associate |
| **Jayakumar Nair**, Divya | Research Associate |
| **Jian**, Sisi | Research Associate |
| **Moylan**, Emily Kate McNeil | Research Fellow |
| **Wijayaratna**, Kasun Pradeepa | Research Associate |

## School

| | |
|---|---|
| **Chen**, Xiaojun | Postdoctoral Fellow |
| **Hammad**, Ahmed W A | Research Associate |

## Water Research Centre WRC

| | |
|---|---|
| **Alvarez Gaitan**, Juan Pablo | Research Associate |
| **Bligh**, Mark William | Research Associate |
| **Branch**, Amos Daniel | Research Associate |
| **Garg**, Shikha | Senior Research Associate |
| **Guo**, Danlu | Research Associate |
| **Hayes**, James Emerson | Research Associate |
| **Jones**, Adele Manda | Research Associate |
| **Kim**, Seokhyeon | Research Associate |

| | |
|---|---|
| **Kinsela**, Andrew Stephen | Research Associate |
| **Le**, Minh Nhat | Research Associate |
| **Lee**, Matthew | Research Associate |
| **Li**, Jingwan | Research Associate |
| **Li**, Xiaomin | Senior Research Associate |
| **McDonald**, James Alexander | Research Fellow |
| **Mehrotra**, Rajeshwar | Senior Research Fellow |
| **Pham**, An Ninh | Lecturer |
| **Rashid**, Md. mamunur Mamunur | Research Associate |
| **Roser**, David | Senior Research Associate |
| **Saputra**, Albert Artha | Postdoctoral Fellow |
| **Schinabeck**, Judith | Research Associate |
| **Vohra**, Juee | Research Associate |
| **Wasko**, Conrad Dominic | Postdoctoral Fellow |
| **Yeung,** Anna Chi Ying | Research Associate |
| **Yuan**, Xiu | Senior Research Associate |
| **Zhang**, Kefeng | Research Follow |

## Water Research Laboratory WRL

| | |
|---|---|
| **Carley**, James Thomas | Senior Research Fellow |
| **Harley**, Mitchell Dean | Senior Research Associate |
| **Sadat-Noori**, Mahmood | Research Associate |
| **Zamani**, Kaveh | Research Associate |

## Engineers at WRL & WRC

| | |
|---|---|
| **Anderson**, Douglas | Principal Engineer WRL |
| **Blacka**, Matt | Principal Engineer WRL |
| **Carley,** James | Principal Engineer WRL |
| **Coghlan**, Ian | Engineer WRL |
| **Deiber**, Mathieu | Engineer WRL |
| **Drummond**, Christopher | Engineer WRL |
| **Flocard**, Francois | Principal Engineer WRL |
| **Harrison**, Alice Jill | Engineer WRL |
| **Howe**, Daniel | Engineer WRL |
| **Le**, Hung Viet | Engineer WRC |
| **Miller**, Brett | Principal Engineer WRL |
| **Modra**, Benjamin | Principal Engineer WRL |
| **Rahman**, Priom | Engineer WRL |
| **Rayner**, Duncan | Engineer WRL |
| **Tucker**, Tobias | Engineer WRL |

# Professional Staff

## School Office

| | |
|---|---|
| Anthony Dever | School Manager |
| Kate Brown | Web Coordinator |
| Denise Lee | Facilities Officer |
| Kevan Mooney | OHS Co-ordinator |
| Emilio Saliba | Workplace Safety Officer |
| Xiaobo Ni | Web Designer |
| Patrick Vuong | Computer Systems Officer |
| Danny Wu | Administrative Assistant |

## Student Centre

| | |
|---|---|
| Lekana Toubia, Kristy Guia | Student Centre Manager |
| Patricia McLaughlin | Administrative Officer (HDR) |
| Renata Melis | Administrative Officer (Timetable) |
| Lena Comino | Student Services Officer |
| Liam Orchard | Student Services Officer |
| Chelsea Pham | Student Services Officer |
| Ellie Williams | Student Services Officer |

## HoS Office

| | |
|---|---|
| Betty Lai | Executive Assistant |
| Lucia Wong | Project Officer |

## External Relations

| | |
|---|---|
| Mary O'Connell | External Relations Manager |
| Patricia Tesoriero | External Relations Project P/T |

## Technical Services (Water)

| | |
|---|---|
| Gautam Chattopadhyay | Professional Officer |
| Kelvin Ong | Technical Officer |
| Artur Ziolkowski | 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 |


A. Dever


K. Brown


D. Lee


E. Saliba

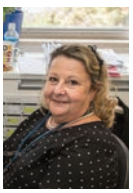

X. Ni


P. Vuong


D. Wu


L. Toubia


K. Guia


P. McLaughlin


R. Melis


L. Comino


L Orchard


C Pham


E Williams


B. Lai


L. Wong


M. O'Connell


P. Tesoriero


G. Chattopadhyay


K. Ong


A. Ziolkowski


P.J. Gwynne


W. Terry


L. P. Pettersen


T. Weston

## Technical and Professional (SAGE/Transport)

| | |
|---|---|
| Yincai Zhou | Professional Officer (SAGE) |
| Zhitao Xiong | Technical Officer |

## Technical and Professional (Heavy Structure Laboratory Randwick)

| | |
|---|---|
| Zhen-Tian Chang | Laboratory Manager |
| Sanjeewa Herath | Senior Technical Officer |
| Ronald Moncay | Technical Officer |
| Benjamin Pauley | Technical Officer |
| Greg Worthing | Technical Officer |
| Rudino Salleh | Technical Officer |

## Research Centre Management

| | |
|---|---|
| Irene Calaizis | Manager CIES |
| Patricia Karwan | Administrative Officer CIES/WRC |
| Maria Lee | Administrative Officer rCITI |
| Sylvia Brohl | Project Officer rCITI |
| Robert Steel | Manager WRC |
| Grantley Smith | Manager WRL |
| Ross Mathews | Administrative Assistant WRL |
| Gracie Carlino | Administrative Assistant WRL |
| Coral Johnson | Administrative Assistant WRL |

## Technical (Research Centre)

| | |
|---|---|
| Robert Byron Jenkins | Technical Officer WRL |
| Larry Paice | Technical Officer WRL |
| Robert Thompson | Technical Officer WRL |
| Iwona Buczek | Technical Officer CWI |


Z. Xiong


Y. Zhou


Z. Chang


S. Herath


R. Moncay


B. Pauley


G. Worthing


R, Salleh


I. Calaiziz


P. Karwan


M.Lee


S. Brohl


R. Steele


G. Smith


R. Jenkins


R. Mathews


G.Carlino


C. Johnson


L.Paice

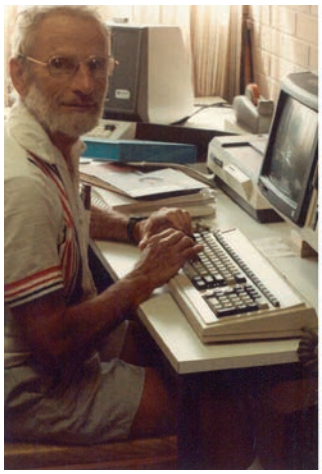

R. Thompson


i. Buczek

# Vale

## Dr John Cogill (1927 – 2017)

MS Cape T., MS Camb., PhD UNSW, FIEAust



John Cogill was two months short of 90 years old, when as his Church funeral notice said, he 'passed away doing what he loved, riding his bicycle in the Blue Mountains.' A railway camera tracked his last movements, showing him with his bicycle at the railway steps at Springwood, ready to embark on his last adventure. He died while pushing his bicycle to the top of a hill in 40 degrees heat, on 30th Jan 2017. He had reached the top.

John (whose name was actually William Henry) joined the UNSW graduate School of Highway Engineering at the King St campus, Randwick as a senior lecturer in 1962 and came to the School of Civil Engineering in 1975. He retired as Senior Lecturer in 1988 but he (and his bicycle) were a familiar sight around campus for many more years, being an Honorary Visiting Fellow at the School till 1998.

John was born in South Africa and obtained a civil engineering degree with first class honours at the University of Cape Town. He attained a Master of Science at Cambridge University, and completed his PhD here at UNSW. John lectured in soil mechanics, pavement design and related subjects at UNSW.

According to his great friend and colleague A/Prof Bill Yandell, "John was a brilliant mathematician and wrote his own version of the semi-infinite linearised elastic analysis for highways. At one stage all his pupils were graduate engineers but many of them couldn't follow his higher mathematics. At various times he spent his sabbatical leave in the University of Southampton, the road research laboratories in England, and public works departments in France. John was a fluent speaker in French and German. I believe he also stayed at Texas A&M University in 1970 where he was the leader in a number of research projects. John published a large number of refereed papers and a book on the mathematical treatment of SH and Rayleigh waves. Even after retiring he was allowed to have an office on the second floor of the Civil Engineering School for many years where he was able to help students with their programming problems."

John was a keen bush walker and cyclist – and not just in the bush. He was a frequent explorer of desert landscapes. Dr Gareth Swarbrick recalled that John was 'also famous for cycling from Sydney to Perth on a rusty clunker. A real character.' His son Henry Sheerwater recalled that "Dad in his 80s visited me in Southern Tasmania by getting on a plane with his bicycle to Launceston, then cycling up into the high country and down south into Hobart."

In a profile in his local parish newsletter in 2010 John said that he found 'cycling a great relief from the stresses and frustration of my research…. My work load as an academic has been reduced since my retirement but my interest in improving air transport safety remains unabated. So too is my desire for community living.' John wrote of his life, 'Isak Dinesen the Danish writer best captures my feelings '…difficult times have helped me to understand better than before, how infinitely rich and beautiful life is in every way, and that so many things that one goes worrying about are of no importance whatsoever.'

## Peter Throsby (1930 – 2017)

Professor Emeritus Desmond O'Connor has advised us of the death of a former Staff Member and Alumnus of the School of Civil Engineering, Peter Wentworth Throsby, in London on 3 March 2017.

Peter graduated in Aeronautical Engineering from Sydney University in 1954 and joined the staff of Civil Engineering in the late 60s as Teaching Fellow. He was awarded the degree of Master of Engineering in 1965 under Professor A. Carmichael.

His appointment in the School was in the early days, and Em Prof O'Connor recalls, " Peter was widely popular for his helpful and generous nature. He then went to London to Imperial College where he continued his research into the finite element approach to surface definition. Peter published widely in the International literature."


# 3 OUR RESEARCH

# Research Management Committee Report 2017

The School's Research Management Committee (RMC) manages and supports research activities within the School, including research undertaken by both the staff and the School's postgraduate research students, and liaises with and contributes directly to the Faculty's Research Management Committee. In 2017, the RMC met every month to oversee and progress all research related aspects of the School's operation.

## RMC Committee Membership 2017

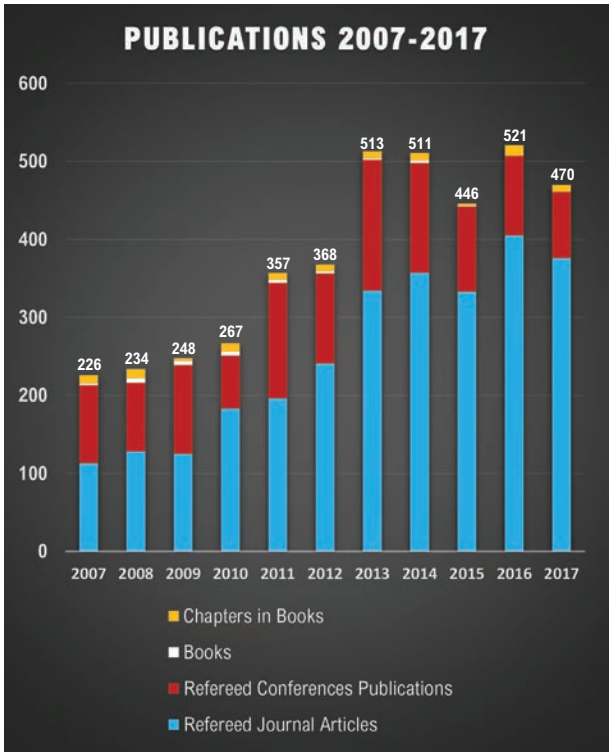
| | |
|---|---|
| Prof Travis **Waller** | Chair, RMC |
| A/Prof Arnaud **Castel** | Deputy Chair, Postgrad Research Student Coordinator |
| A/Prof Samsung **Lim** | Deputy Research Student Coordinator |
| Prof Chongmin **Song** | CIES Acting Director |
| Prof Mark **Bradford** | CIES Research Director |
| A/Prof Lucy **Marshall** | WRC Representative |
| A/Prof Denis **O'Carroll** | WRL Representative |
| A/Prof Martin **Andersen** | CWI Director |
| Dr Vinayak **Dixit** | RCITI Representative |
| A/Prof Adrian **Russell** | Practicum Scholarships |
| A/Prof Linlin **Ge** | International Relations Director |
| Dr Wei **Gao** | Taste of Research Coordinator |
| Ms Patricia **McLaughlin** | HDR Student Administrator |
| Prof Nasser **Khalili** | |
| Prof Ashish **Sharma** | |

Previous Page: 2017 PhD graduates husband and wife Drs Tingsong Xiang and Fang Yuan. Above: Prof Travis Waller

## Postgraduate Research Student Management

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.

In Semester 2 2017, the School had 193 higher degree research students.




## Review committees:

Each student 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 academic staff and several research only staff participated in the student review panels in 2017. Much of the heavy work load in this area is carried by the School's Postgraduate Coordinator Associate Professor Arnaud Castel, his deputy A/Prof Samsung Lim, and the Postgraduate Research Student Administrator Ms Pattie McLaughlin.

**Graduation:** 2017 also saw 46 of our PHD students and 4 ME students successfully graduate. Their achievements and those of their leading research supervisors extended scholarly critical mass – certainly the School now provides one of the largest regular, consistent and scholarly contributions towards civil, environmental and geospatial engineering knowledge 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 2017, and for the second year running, UNSW won the largest number of ARC Discovery grants in the country – leading its peers in the Group of 8 – a coalition of Australia's leading research universities. Not surprisingly 2017 also saw the School continue on its ARC success story –winning five highly sought after ARC Grants – 2 in Discovery, 2 in Linkage and one Future fellowship – to the total value of $2.62M.

| ARC Research Grants (year announced) | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Discovery | 3 | 6 | 8 | 3 | 9 | 3 | 4 | 7 | 6 | 6 | 2 |
| Linkage & LIEF | 3 | 3 | 4 | 2 | 0 | 1 | 6 | 2 | 8 | 3 | 2 |
| DECRA, Future Fellow | | | | 1 | 3 | 2 | 1 | 2 | | 1 | 1 |
| Other (NHMRC) | | | | | | | | 1 | | | |
| Total No | 6 | 9 | 12 | 6 | 12 | 6 | 11 | 12 | 14 | 10 | 5 |
| Total $ value | $1.74M | $2.89M | $4.32M | $2.54M | $4.93M | $2.31M | $4.47M | $4.97M | $4.88M | $3.66M | $2.62M |
| Total Research Income - ARC & Industry | $8.0M | $10.7M | $13.6M | $15.1M | $17.35M | $15.56M | $13.71M | $11.85M | $12.44M | $13.4M | $10.72 |
| Higher Degree Research Students | 76 | 77 | 65 | 90 | 105 | 124 | 195 | 216 | 214 | 206 | 193 |

# Grants

Grants total (5 research centres) for 2017 was $10,714,733.86

## CIES Construction Innovation and Research Initiative

| UNSW Personnel | Title | Sponsor & Scheme | Funding Amount |
|---|---|---|---|
| A.Castel | Modelling and testing corroding reinforced concrete structures | Australian Research Council/ Discovery Project | $ 66,089.16 |
| A.Castel | Use of ferro nickel slags in cement | Societe Le Nickel (New Caledonia)/ International Contract | $ 25,000.00 |
| A.Castel, S.Foster, A.Nezhad | A mix design approach to reduce early-age thermal cracking of concrete | Australian Research Council ,Boral Cement Limited/ ARC Linkage Project | $ 160,802.64 |
| A.Khoshghalb | DSI soil nail project | DSI Underground/ Contract Research | $ 4,400.00 |
| A.Nezhad | Design for Adaptability in Modular Construction and Advantages of BIM Integration into the Design Process | Modular Building Systems Pty Ltd/ Contract Research | $ 63,400.00 |
| A.Nezhad | Improving productivity through component tracking using barcode system | Imexx Pty Ltd (t/as Australian Cladding Specialists)/ Contract Research | $ 15,000.00 |
| A.Russell | Internal erosion of soils: microstructural modelling | Australian Research Council/ Discovery Project | $ 115,581.72 |
| B.Uy, E.Hamed | Coupled service and ultimate behaviour of high strength composite columns | University of Sydney/ ARC Discovery Project Shared Grant | $ 30,000.00 |
| C.Song | Scaled boundary framework for adaptive and multiscale structural analysis | Australian Research Council/ Discovery Project | $ 136,596.58 |
| C.Song | Deterioration of structural integrity of ageing ships and marine platforms | University of Newcastle/ ARC Linkage Project Shared Grant | $ 60,882.00 |
| C.Song | Maritime Future Technology Watch Presentation | Defence Science Institute/ Maritime Future Technology Watch Program | $ 10,000.00 |
| C.Song, A.Saputra, L.Liu, W.Xing, J.Zhang | Safety Assessment of industrial facilities based on hybrid models FEM-SBFEM | University of New South Wales/ Australia - Germany Joint Research Cooperation Scheme (DAAD) | $ 12,000.00 |
| C.Song, F.Tin Loi, S.Tangaramvong | From CAD and digital imaging to fully automatic adaptive 3D analysis | Australian Research Council/ Discovery Project | $ 136,596.58 |
| H.Vali Pour Goudarzi | Estimate the axial force generated by thermal daily gradient | Energy Tap Pty Ltd/ Contract Research | $ 8,100.00 |
| K.Douglas | PSM3031 - F6 Corridor Study - Stress Testing | PSM Consult Pty Ltd/ Contract Research | $ 3,000.00 |
| M.Bradford | Buckling capacity of high-strength steel flexural members | Australian Research Council/ Discovery Project | $ 147,104.02 |
| M.Bradford, B.Uy | Composite Structures of High-Strength Steel and Concrete | Australian Research Council ,China Construction Steel Structure Corp. Ltd/ ARC Linkage Project | $ 293,929.58 |
| M.Bradford, H.Vali Pour Goudarzi | Composite steel-timber structural system | Australian Research Council/ Discovery Project | $ 152,357.74 |
| N.Khalili-Naghadeh, A.Khoshghalb | Experimental investigation and constitutive modelling of weak rocks subject to mechanical and moisture degradation | Australian Research Council ,Roads and Maritime Services/ ARC Linkage Project | $ 86,701.18 |

| UNSW Personnel | Title | Sponsor & Scheme | Funding Amount |
|---|---|---|---|
| R.Gilbert, A.Castel | Shrinkage and cracking of concrete | CEMENT CONCRETE & AGGREGATES AUSTRALIA/ Contract Research | $ 50,000.00 |
| R.Gilbert, E.Hamed | Time-dependent behaviour of precast concrete sandwich panels | Australian Research Council/ Discovery Project | $ 105,074.30 |
| S.Foster | Characterisation of Shear and Tensile Fracture of UHPFRC | Australian Research Council/ Discovery Project | $ 135,225.40 |
| S.Foster | 3D Printing Facility using Concrete for Construction Automation Research | University of New South Wales/ ARC LIEF Central Contribution ,Faculty Matching Funds | $ 40,000.00 |
| S.Foster, A.Castel, A.Nezhad, J.Dang, X.Shen, S.Babaee | Reducing Barriers for Commercial Adaptation of Construction Materials with Low-Embodied-Carbon | CRC For Low Carbon Living Limited/ Research Grants | $ 72,212.00 |
| S.Foster, H.Vali Pour Goudarzi | Rotation Capacity of Joints in SFRC Moment Resisting Beams and Frames | Australian Research Council/ Discovery Project | $ 94,566.86 |
| S.Foster, H.Vali Pour Goudarzi | High Strength Concrete Beam-Columns with High-Strength Steel Reinforcement | Australian Research Council ,One Steel Reinforcing Pty Limited (Administrators Appointed)/ ARC Linkage Project | $ 102,537.15 |
| S.Foster, R.Henderson, F.Johnson | Sustainable solution for invasive species in rural Nepal | University of New South Wales/ PLuS Alliance Collaborative Research Seed Grants | $ 24,312.00 |
| W.Gao | New generation of sustainable building structures | Beijing Engineering Research Center/ International Contract | $ 20,000.00 |
| W.Gao, F.Tin Loi | Advanced analysis and safety assessment framework for structures under uncertainty | Lindenbaum Pty Ltd/ Contract Research | $ 20,000.00 |
| W.Gao, L.Keyte, G.Li | ARC Research Hub for nanoscience based construction material manufacturing (Project 1) | University of New South Wales ,Monash University/ ARC Industrial Transformation Research Hubs Central Contribution | $ 42,382.00 |
| W.Gao, Y.Pi, S.Tangaramvong | Unified nondeterministic dynamic safety assessment of softening structures | Australian Research Council/ Discovery Project | $ 136,596.58 |
| X.Shen | Real-time and Autonomous 3D Mapping of Construction Projects using Unmanned Aerial Vehicle (UAV) based Light Detection and Ranging (LiDAR) technique - NSW TechVoucher | NSW Department of Industry/ Boosting Business Innovation Program | $ 15,000.00 |
| X.Shen | Real-time and Autonomous 3D Mapping of Construction Projects using Unmanned Aerial Vehicle (UAV) based Light Detection and Ranging (LiDAR) technique | Linke & Linke Surveys/ Contract Research | $ 15,000.00 |
| Z.Chang | Boss Easy Build (CHD Architects) TechVoucher Project | NSW Department of Industry/ Boosting Business Innovation Program | $ 15,000.00 |
| Z.Chang | Boss Easy Build (CHD Architects) TechVoucher Project | Boss Easy Build/ Contract Research | $ 15,000.00 |
| Z.Chang, H.Vali Pour Goudarzi, R.Moncay | Investigation of SMC Spliced Steel-Timber Piles | SMC Marine/ Contract Research | $ 9,270.00 |
| Z.Chang, J.Gilbert | Investigation of performance of STS .5" and .6" anchor system | STS Systems/ Contract Research | $ 7,430.00 |
| A.Nezhad | Improving productivity through component tracking using barcode system - NSW TechVoucher | NSW Department of Industry/ Boosting Business Innovation Program | $ 15,000.00 |
| **TOTAL CIES** | | | **$ 2,462,147.49** |

# CWI Connected Waters Institute Research Centre

| UNSW Personnel | Title | Sponsor & Scheme | Funding Amount |
|---|---|---|---|
| A.Baker, D.O'Carroll, M.Andersen | Groundwater organic matter: carbon source or sink? | Australian Research Council/ Discovery Project | $ 176,104.52 |
| A.Baker, M.Norman | Unlocking the secrets of the groundwater cycle using Si and Li isotopes | Australian Research Council ,Australian Nuclear Science & Technology Organisation (ANSTO)/ ARC Linkage Project | $ 62,958.09 |
| A.Baker, M.Norman | Sulphur: a new proxy for wildfire in speleothem records - PGRA for Katie Coleborn | AINSE - Australian Institute of Nuclear Science and Engineering/ Postgraduate Research Award | $ 7,500.00 |
| B.Kelly, C.Iverach | Novel applications of isotopes in the environmental monitoring of CSG Developments - PhD Scholarship for Charlotte Iverach | Australian Nuclear Science & Technology Organisation (ANSTO)/ Postgraduate Student Scholarship | $ 7,000.00 |
| B.Kelly, M.Andersen, M.Manefield, C.Iverach | Baselining Lower Namoi Groundwater and Evaluating Pilliga CSG Developments | Cotton Research & Development Corporation (CRDC)/ Open Call Research and Development Projects | $ 120,608.00 |
| G.Rau, M.Andersen, A.Baker | NCRIS Groundwater Infrastructure Program | NSW Department of Industry/ RAAP - NCRIS | $ 30,106.00 |
| I.Acworth, M.Andersen | The Groundwater Project (NCRIS) | Department of Industry, Innovation & Science/ Collaborative Research Infrastructure Scheme(CRIS) | $ 450,079.40 |
| L.McDonough, A.Baker, M.Andersen | 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 | $ 7,500.00 |
| M.Andersen | Order 4000000697: OWS Ecology Adoption | Griffith University/ Department of the Environment and Energy Subcontract | $ 8,250.00 |
| M.Andersen, B.Kelly, C.Li | Spatial and temporal importance of diffuse and stream recharge in semiarid environments: implications for integrated water management PhD Student - Calvin Li | Cotton Research & Development Corporation (CRDC)/ PhD Scholarship | $ 2,507.00 |
| M.Andersen, G.Rau, W.Timms, W.Glamore, D.Anderson, F.Johnson | Surface water-groundwater interactions at Thirlmere Lakes | NSW Office of Environment and Heritage (OEH)/ Thirlmere Lakes Research Program | $ 139,000.00 |
| **TOTAL CWI** | | | **$ 1,011,613.01** |

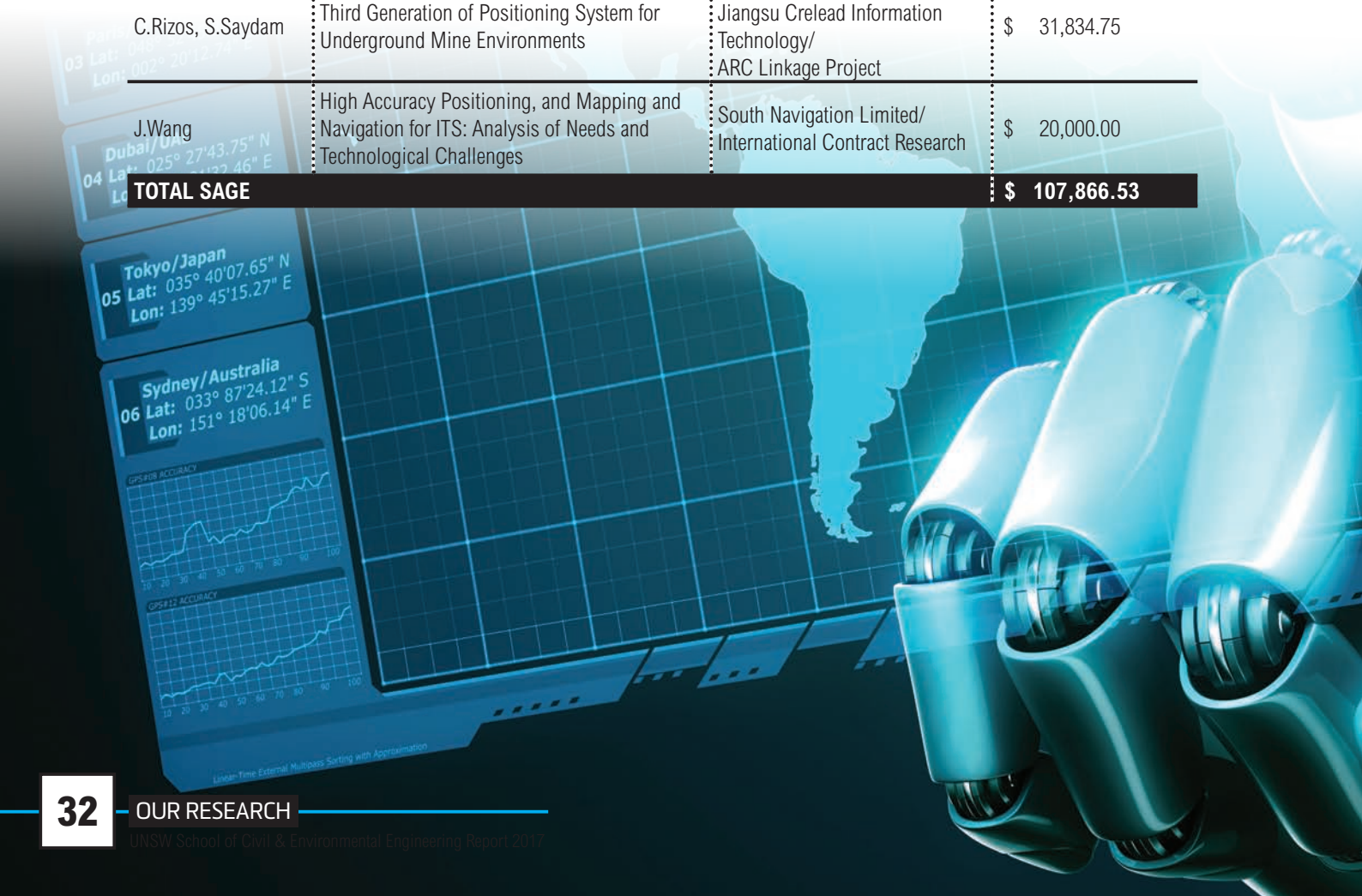
# rCITI Research Centre for Integrated Transport Innovation

| UNSW Personnel | Title | Sponsor & Scheme | Funding Amount |
|---|---|---|---|
| A.Ortmann, V.Dixit | TNP Behavioural change literature review | Infrastructure Victoria/ State Government Contract | $ 42,770.00 |
| D.Rey | rCITI UNSW & IFSTTAR dynamic bus routes | Keolis-Downer Pty Ltd/ Contract Research | $ 40,000.00 |
| L.Gardner | Real time models to inform prevention and control of emerging infectious diseases | National Health & Medical Research Council/ Project Grant | $ 83,927.67 |
| S.Waller | Adaptive Stochastic Dynamic Traffic Assignment | Australian Research Council/ Discovery Project | $ 100,871.32 |
| S.Waller | Independent Representative for SCATS Development Review/Governance | Roads and Maritime Services/ State Government Contract | $ 59,340.00 |
| S.Waller, V.Dixit | Investigating travel choice behaviour: a new approach | University of Sydney/ ARC Discovery Project Shared Grant | $ 103,376.00 |
| S.Waller, V.Dixit, E.Moylan, K.Wijayaratna | Travel time reliability model development | Transport for NSW/ State Government Contract | $ 159,360.00 |
| T.Hossein Rashidi | Integrating social media with conventional data sources to model land use | Australian Research Council/ Discovery Early Career Researcher Award (DECRA) | $ 127,999.60 |
| T.Hossein Rashidi, R.Krueger | 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 | $ 80,438.50 |
| T.Hossein Rashidi, V.Dixit, D.Masters | An evolutionary model for interactions of land use and travel behaviour | Australian Research Council ,NSW Department of Premier and Cabinet/ ARC Linkage Project | $ 123,893.19 |
| V.Dixit | Simulator Study (Project number: PRS16257) | ARRB Group/ Transport for NSW - State Government Contract | $ 35,650.00 |
| V.Dixit | North West Priority Growth Area Flood Evacuation - Technical modelling methodology | NSW Department of Planning and Environment/ State Government Contract | $ 27,272.73 |
| V.Dixit | iMOVE CRC | University of New South Wales/ iMOVE CRC Central Contribution | $ 30,000.00 |
| V.Dixit | Research Services in Traffic Engineering for Institute of Road Engineering (IRE) Indonesia | Institute of Road Engineering/ International Contract | $ 44,363.64 |
| V.Dixit | Knowledge Centre in mobility, connected and autonomous vehicles | Insurance Australia Limited/ Contract Research | $ 150,000.00 |
| V.Dixit, D.Rey, K.Wijayaratna | Specification Linear Programming for Traffic Signal Performance Reporting | Roads and Maritime Services/ State Government Contract | $ 95,475.45 |
| V.Dixit, H.Grzybowska | Impacts of Connected and Autonomous Vehicles on Capacity | Transurban Limited/ Contract Research | $ 19,471.99 |
| V.Dixit, S.Jian | Project Evaluation (Premier Innovation Initiative) | Roads and Maritime Services/ State Government Contract | $ 27,328.00 |

| UNSW Personnel | Title | Sponsor & Scheme | Funding Amount |
|---|---|---|---|
| V.Dixit, S.Waller, S.Most, C.Liersch | Understanding Impact of Autonomous Vehicles on Behaviour and Interactions | Australian Research Council ,Road Safety Commission WA ,ARRB Group ,Transport for NSW ,Robert Bosch (Australia) Pty Ltd ,Roads Corporation (VicRoads) ,Transport Accident Commission Victoria ,Liberty Mutual Research Institute for Safety/ ARC Linkage Project | $ 297,709.00 |
| V.Dixit, T.Hossein Rashidi, S.Waller | Planning and operational models for food rescue and delivery to the poor | Australian Research Council/ ARC Linkage Project | $ 53,390.36 |
| **TOTAL rCITI** | | | **$ 1,702,637.45** |

# SAGE Surveying and Geospatial Engineering Research

| UNSW Personnel | Title | Sponsor & Scheme | Funding Amount |
|---|---|---|---|
| C.Rizos, J.Wang | Trustworthy Positioning for Next Generation Intelligent Transport Systems | Australian Research Council/ Discovery Project | $ 56,031.78 |
| C.Rizos, S.Saydam | Third Generation of Positioning System for Underground Mine Environments | Australian Research Council, Jiangsu Crelead Information Technology/ ARC Linkage Project | $ 31,834.75 |
| J.Wang | High Accuracy Positioning, and Mapping and Navigation for ITS: Analysis of Needs and Technological Challenges | South Navigation Limited/ International Contract Research | $ 20,000.00 |
| **TOTAL SAGE** | | | **$ 107,866.53** |



# WRC Water Research Centre

| UNSW Personnel | Title | Sponsor & Scheme | Funding Amount |
|---|---|---|---|
| A.Deletic, K.Zhang, R.Ren, J.Hu, C.Chai, X.Li | Sino-Australian Centre on Sponge City | Jiangsu Easthigh Environmental Holdings Co Ltd/ International Contract | $ 190,812.38 |
| A.Sharma | Participation in a panel review of the eReefs Catchment Forecasting Project (2015-17) | Bureau of Meteorology/ Panel Review Contract | $ 4,262.55 |
| A.Sharma, S.Pathiraja | Flood inundation data assimilation - scholarship for Sahani Pathiraja | CSIRO - Commonwealth Scientific and Industrial Research Organisation/ Postgraduate Studentship | $ 1,000.00 |
| A.Zamyadi, R.Stuetz, R.Henderson | Release of Intracellular Cyanotoxins during Oxidation of Natural Bloom Samples and Laboratory Cultured Cells | Water Research Australia Limited/ Contract Research | $ 21,000.00 |
| D.Roser | Wet weather overflows health monitoring | Sydney Water Corporation/ State Government Contract | $ 6,687.45 |
| D.Roser | Application of Bayes Nets to Product Risk Assessment | Sydney Water Corporation/ State Government Contract | $ 48,000.00 |
| D.Roser | Provision of Support for Sydney Water Application of Bayes Nets to Product Risk Assessment | Sydney Water Corporation/ State Government Contract | $ 41,000.00 |
| F.Johnson | Determining the effectiveness of water, sanitation and hygiene interventions to reduce health vulnerability to climate change in Tanzania | Ifakara Health Institute (IHI)/ International Contract | $ 11,439.18 |
| F.Johnson, A.Sharma | Assessing future drought risk for water resources system management | Australian Research Council ,NSW Department of Primary Industries/ ARC Linkage Project | $ 175,328.02 |
| J.Hayes, R.Fisher, R.Stuetz | RP2008 Scholarship Funds - Beneficial Reuse of Solids from Wastewater Treatment Operations | CRC For Low Carbon Living Limited/ Research Grants | $ 10,500.00 |
| L.Marshall | Advancing uncertainty quantification in terrestrial hydrologic systems | Australian Research Council/ Discovery Project | $ 109,419.02 |
| R.Stuetz | Analytics to predict anaerobic codigestion & downstream process performance | University of Wollongong/ ARC Linkage Project Shared Grant | $ 65,609.00 |
| R.Stuetz, B.Thwaites | Optimisation of granular sludge for energy efficient wastewater treatment and reuse - Scholarship for Benjamin Thwaites | Water Research Australia Limited/ WQRA Postgraduate Scholarships | $ 10,000.00 |
| R.Stuetz, B.Thwaites | Energy Benchmarking for Efficient, Low Carbon Water Recycling Operations | CRC For Low Carbon Living Limited/ Research Grants | $ 35,000.00 |
| R.Stuetz, R.Henderson, B.Neilan, N.Schofield, W.Glamore, F.Johnson, A.Zamyadi | Nuisance & Harmful Algae Science-Practice Partnership | Melbourne Water Corporation/ State Government Contract | $ 200,000.00 |

| UNSW Personnel | Title | Sponsor & Scheme | Funding Amount |
|---|---|---|---|
| R.Stuetz, S.Khan, D.Roser, J.Alvarez Gaitan | Environmental Guidelines Use and Disposal of Biosolids Products Guidelines - Material Stability Review | NSW Environment Protection Authority/ State Government Contract | $ 55,000.00 |
| S.Khan | Better data-driven decision making under future climate uncertainty | Water Research Australia Limited/ Contract Research | $ 2,316.82 |
| S.Khan | Can wastewater treatment increase the ecotoxicity of chiral chemicals? | Australian Research Council/ Discovery Project | $ 222,406.12 |
| S.Khan | Smart Management of Disinfectant in Chloraminated Water-Supply Systems | Western Sydney University/ ARC Linkage Project Shared Grant | $ 13,000.00 |
| S.Khan | Emerging Contaminant Research Prioritisation Decision Framework | Water Environment and Reuse Foundation (WE&RF)/ International Contract | $ 34,544.80 |
| S.Khan | Integrating Management of Sensor Data for a Real Time Decision Making and Response System (WRRF-14-01) | Black & Veatch Corporation/ The WateReuse Research Foundation Subcontract | $ 20,001.33 |
| S.Khan, G.Carvajal Ortega, J.Drewes, P.Michel | Modelling contaminant removal during wastewater treatment | University of New South Wales/ Australia - Germany Joint Research Cooperation Scheme (DAAD) | $ 12,500.00 |
| T.Waite | Redox transformations of natural organic matter | Australian Research Council/ Discovery Project | $ 136,596.58 |
| T.Waite, G.Leslie, V.Chen, Y.Wang | Overview of options for wastewater treatment and resource recovery (Main Account & Project 1) | Beijing Origin Water Technology Co Ltd/ International Contract | $ 142,471.70 |
| T.Waite, J.Fletcher | Optimising CDI Water Treatment for Ion Removal and Energy Recovery | Australian Research Council ,Shenzhen Pangu Environmental Technologies Co Ltd/ ARC Linkage Project | $ 262,865.16 |
| T.Waite, R.Collins | Reactive Oxygen Species Production on Oxygenation of Subsurface Sediments | Australian Research Council/ Discovery Project | $ 120,773.84 |
| T.Waite, S.Foster, A.Castel, C.Arns, L.Keyte | Development of innovative cement binders with low carbon footprint | Australian Research Council ,Boral Cement Limited/ ARC Linkage Project | $ 188,386.77 |
| T.Wiedmann | Improving the Environmental Performance of Australian Construction Projects | University of Melbourne/ ARC Discovery Project Shared Grant | $ 25,406.00 |
| T.Wiedmann, S.Lundie, S.Moore, S.Teh, G.Chen | Integrated Carbon Metrics (ICM) – a multi-scale life cycle approach to assessing, mapping and tracking carbon outcomes for the Built Environment | CRC For Low Carbon Living Limited/ Research Grants | $ 154,324.00 |
| X.Li | Electron transfer at the microbe-mineral interface via cytochromes/exudates | Australian Research Council/ Discovery Early Career Researcher Award (DECRA) | $ 111,378.76 |
| **TOTAL WRC** | | | **$ 2,432,029.48** |

# WRL Water Research Laboratory

| UNSW Personnel | Title | Sponsor & Scheme | Funding Amount |
|---|---|---|---|
| A.Harrison, J.Carley, B.Miller | Overtopping Bray Park Weir and Contamination of Drinking Water Supply due to Climate Change | Tweed Shire Council/ Local Government Contract | $ 21,040.00 |
| B.Miller, J.Carley, M.Deiber, I.Coghlan, R.Jenkins, G.Smith, S.Felder | Breakwater Stability under Propeller Wash - Port Preston | Ausenco Management Pty Ltd/ Contract Research | $ 141,971.00 |
| B.Miller, M.Deiber | Dye Tracing - Merimbula | AECOM AUSTRALIA PTY LTD/ Bega Valley Shire Council Subcontract | $ 35,500.00 |
| B.Miller, W.Glamore | Estuarine Risk Assessment and Strategic Response – NSW Estuaries (Stage 2) | Sydney Institute of Marine Science/ NSW Adaptation Research Hub – Coastal Processors and Responses Node | $ 128,000.00 |
| B.Miller, W.Glamore | Investigation of Destratification Operations and Chichester Dam | Hunter Water Corporation/ State Government Contract | $ 28,000.00 |
| B.Miller, W.Glamore, G.Smith, D.Rayner, M.Deiber | Hydrodynamic Fate and Dispersion Modelling | Hunter Water Corporation/ State Government Contract | $ 40,240.00 |
| B.Modra | Port Botany Wave Climate | Port Botany Operations Pty Ltd as trustee for the Port Botany Unit Trust/ Contract Research | $ 10,800.00 |
| B.Modra | Seawall Survey of Port Botany | Port Botany Operations Pty Ltd as trustee for the Port Botany Unit Trust/ Contract Research | $ 9,925.00 |
| B.Modra, R.Matthews, M.Blacka, M.Harley, C.Drummond, L.Paice, T.Tucker | LS017 - Rock fishing safety monitoring camera | NSW Department of Primary Industries/ Recreational Fishing Trusts | $ 45,000.00 |
| C.Drummond | Amrun Project – Dam C - ACB Hydraulic Roughness Testing | Golder Associates Pty Ltd/ Contract Research | $ 64,356.00 |
| C.Drummond, B.Miller | Outfall Condition Monitoring using Unmanned Aerial Systems | Sydney Water Corporation/ State Government Contract | $ 20,833.00 |
| D.Anderson | Core and permeability Testing - Maules Creek Mine | Whitehaven Coal Limited/ Contract Research | $ 32,970.00 |
| D.Anderson | CoastAdapt Factsheet - Groundwater and Climate Change on the Coast | National Climate Change Adaptation Research Facility (NCCARF)/ Commonwealth Government Contract | $ 7,435.00 |
| D.Anderson, G.Smith, T.Tucker | Review of the Water Resource Assessment (WRA) report of Nestle Thailand Ayutthaya Factory | Water Stewardship Australia Limited/ Contract Research | $ 10,650.00 |
| D.Anderson, P.Rahman, R.Thompson, G.Smith | MT3DMS Model Calibration for Hawkes Bay Regional Council | GNS Science/ International Contract | $ 59,281.27 |
| D.Howe, J.Carley, I.Coghlan, A.Harrison | Clarke Beach Access, Byron Bay | Byron Shire Council/ Local Government Contract | $ 7,000.00 |

| UNSW Personnel | Title | Sponsor & Scheme | Funding Amount |
|---|---|---|---|
| D.O'Carroll | Fate of engineered nanoparticles: Challenges in informing human and ecological health risk assessments | Australian Research Council/ Future Fellowship | $ 225,048.50 |
| D.O'Carroll, M.Andersen, W.Glamore, I.Turner, R.Stuetz, W.Timms, H.Roshan, B.Kelly, A.Baker | Faculty Infrastructure Project: Emerging Contaminant and Water Quality Laboratory | University of New South Wales/ Research Infrastructure Scheme (RIS) | $ 83,480.00 |
| D.Rayner, W.Glamore, C.Drummond | Manly Lagoon Catchment Groundwater Boreholes | Northern Beaches Council/ Local Government Contract | $ 10,000.00 |
| G.Smith, B.Miller, B.Modra, S.Felder, C.Drummond, A.Harrison, M.Deiber, T.Tucker | Somerset Dam Supplemental Geotechnical Investigations, Physical Hydraulic Model, Concept Assessment and Selection. | AECOM Services/ Queensland Bulk Water Supply Authority Subcontract | $ 100,000.00 |
| G.Smith, B.Miller, M.Deiber | Stormwater Harvesting Analysis and Harvesting System Design | Manly Golf Club/ Contract Research | $ 7,500.00 |
| G.Smith, D.Anderson, T.Tucker, A.Harrison | Warren STP Augmentation - Groundwater Studies | NSW Public Works Advisory/ State Government Contract | $ 99,200.00 |
| I.Coghlan | Coastal Hazard Assessment for the Eurobodalla Council Management Program | Umwelt (Australia) Pty Ltd/ Contract Research | $ 138,320.00 |
| I.Coghlan, W.Glamore | Technical advice supporting Williams River erosion management plan | Hunter Water Corporation/ State Government Contract | $ 10,000.00 |
| I.Turner, B.Miller | Publically available datasets: online photogrammetry web portal | Sydney Institute of Marine Science/ NSW Adaptation Research Hub – Coastal Processors and Responses Node | $ 112,000.00 |
| I.Turner, J.Middleton, K.Splinter, C.Blenkinsopp | Beach Erosion and Recovery: Quantifying the Hazard | Australian Research Council/ Discovery Project | $ 109,581.72 |
| I.Turner, M.Harley | Coastal Erosion – a STEM education initiative to promote school & community engagement | Sydney Institute of Marine Science/ NSW Adaptation Research Hub – Coastal Processors and Responses Node | $ 33,000.00 |
| J.Carley, C.Drummond | Ettalong Extended Drone Monitoring and Analysis | Central Coast Council/ Local Government Contract | $ 2,625.00 |
| J.Carley, I.Coghlan | Options for Managing Large Rocks in North Curl Curl Ocean Pool | Northern Beaches Council/ Local Government Contract | $ 5,000.00 |
| J.Carley, I.Coghlan, G.Smith, C.Johnson | Peer Review of the 2016 Draft Portsea Front Beach Long Term Options Assessment Report | Department of Environment, Land, Water and Planning (VIC)/ State Government Contract | $ 7,495.45 |
| K.Splinter, I.Turner, M.Harley | Delivering a Beach Erosion Forecasting System | NSW Environmental Trust ,Northern Beaches Council/ Environmental Research Program ,NSW Environmental Trust Collaborative Partner Contribution | $ 67,149.02 |

| UNSW Personnel | Title | Sponsor & Scheme | Funding Amount |
|---|---|---|---|
| M.Blacka | Coastal Imaging Services | Gold Coast City Council/ Local Government Contract | $ 96,475.00 |
| M.Blacka, G.Smith | Tweed River Entrance Sand Bypassing Project: Coastal Imaging Surveillance System. | NSW Department of Primary Industries/ State Government Contract | $ 118,577.69 |
| M.Blacka, I.Coghlan, D.Howe | Palm Beach Shoreline Project: Large Basin Physical Model Testing | Haskoning Australia Pty Ltd/ Contract Research | $ 133,875.00 |
| M.Blacka, J.Carley | Physical modelling of Flowerpot Bay Wharf, Pitt Island | Downer HEB Joint Venture/ International Contract | $ 149,025.00 |
| M.Blacka, J.Carley, I.Coghlan, D.Howe, A.Blacka, C.Johnson, G.Smith | Proposal for the Bega Valley Shire Council Coastal Management Program – Coastal Hazards | Bega Valley Shire Council/ Local Government Contract | $ 77,760.00 |
| M.Blacka, W.Glamore, D.Rayner, J.Ruprecht, A.Blacka, A.Harrison, G.Smith | Review of the Merimbula & Back Lakes Estuary Management Study and Management Plan 1997, Lake Curalo Estuary Management Study and Plan 2002 and Wallaga Lake Estuary Management Plan 2000 | Bega Valley Shire Council/ Local Government Contract | $ 79,020.00 |
| M.Blacka, W.Glamore, I.Coghlan, C.Drummond, A.Blacka, C.Johnson, G.Smith | Assessment of Coastal Management Options: River Road, Shoalhaven Heads | Shoalhaven City Council/ Local Government Contract | $ 3,400.00 |
| R.Cox | National Adaptation Network for Settlements and Infrastructure (NCCARF Phase 2 Network) | Griffith University/ NCCARF Adaptation Research Network Shared Grant | $ 29,714.00 |
| W.Glamore | Williamtown Contamination from Perfluorocarbons (PFCs) - Extension | NSW Environment Protection Authority/ State Government Contract | $ 36,916.45 |
| W.Glamore, D.Rayner | Clybucca wetland biodiversity offset project | Roads and Maritime Services/ State Government Contract | $ 30,000.00 |
| W.Glamore, E.Johnston | Hunter River Estuary Water Quality Model | Hunter Water Corporation/ State Government Contract | $ 361,880.80 |
| W.Glamore, F.Johnson, M.Andersen, G.Rau, D.Anderson, W.Timms | 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 | $ 113,500.00 |
| W.Glamore, G.Smith, D.Rayner, J.Ruprecht, T.Tucker | Everlasting Swamp Hydrodynamic Modelling Study | Clarence Valley Council/ Local Government Contract | $ 55,385.00 |
| W.Glamore, G.Smith, D.Rayner, T.Tucker, M.Deiber | Provision of modified floodgate design for Fullerton Cove and Tilligerry Creek | NSW Office of Environment and Heritage (OEH)/ State Government Contract | $ 39,510.00 |
| **TOTAL WRL** | | | **$ 2,998,439.90** |

# CVEN ARC Grants 2017

(announced in 2017 for 2018 commencement)

In 2017 six staff at the School of Civil & Environmental Engineering won five major ARC grants totaling $2.624M. - two each ARC Discovery and Linkage, and one highly sought after Future Fellowship. Other CVEN staff were involved in multi-disciplinary cross-institutional projects which won ARC grants administered by other institutions.

Since 2001 the School of Civil & Environmental Engineering has won over 145 ARC grants and fellowships to a value of $52.8M. Our astonishing research success is based on the dedication and hard work of our entire staff; academic, professional, research and our HDR students.

In 2017 the following ARC grants were won by School staff:

## ARC Future Fellowship

■ **Professor Stuart Khan was awarded $1.023 million for an ARC Future Fellowship FT170100371 on "Validation and monitoring of advanced oxidation for potable water reuse".**

Khan's project aims to address an important limitation in the ability to monitor performance of advanced oxidation processes used to treat recycled water for drinking. The project will be conducted using a novel pilot system, designed to facilitate flexible operation and detailed monitoring. Through carefully designed experiments, observed operational parameters will be related to treatment performance for a range of contaminants. An expected outcome is the development of a framework to provide validation of process performance relationships and ongoing performance monitoring for use by water utilities and regulatory agencies that oversee their operations. This highly practical framework for validation and performance monitoring of an advanced water treatment process should result in improved viability of water recycling projects, increased urban water supply security and enhanced protection of public health.


## ARC Discovery

■ **Professor Ashish Sharma ($327k): 'A Fourier approach to address low-frequency variability bias in hydrology'. DP180102737**

*Project summary*: This project aims to develop a mathematical framework to better simulate the occurrence of sustained anomalies, such as droughts and long periods of flooding, into the future. These events increase water insecurity and result in loss of revenue, livelihoods and some-

times lives. Hydrological planning requires knowledge of how such sustained extremes will change in the future. Current alternatives for simulating such changes for future climates are inadequate for catchment-scale planning to proceed. The project proposes a strategy for post-processing hydrological simulations of the future using an elegant frequency-domain approach. It expects to provide the tools needed to develop hydrologic infrastructure, such as water supply reservoirs, that secure our water resources for the generations to come.

■ **Professor Chongmin Song and Emeritus Professor Francis Tin-Loi ($406k): 'Three-dimensional contact and fracture analysis for safety assessment of structures'. DP180101538**

*Project summary:* This project aims to address the safety assessment of engineering structures considering interfaces and cracks, which are nearly always the weakest parts of a structure system. Novel numerical approaches to model the contact of interfaces and crack faces and to simulate crack propagation under variable loads will be established based on the scaled boundary polytope elements and mathematical programming. It is anticipated that the developed numerical simulation tool will be robust and fully automatic. The intended outcome of this project is an innovative technology for numerical simulation and a rational predictive tool useful for cost-effective and timely planning, design and management of engineering structures.

# ARC Linkage

■ **Professor Chongmin Song; Dr Ean Tat Ooi : ($352K) 'Seismic analysis of cracking and deformations in concrete gravity dams.' LP160101229**

*Project Summary.* This project aims to establish a rational predictive capability for the responses of concrete gravity dams subject to extreme design earthquakes. This will include the development of innovative numerical methods for effective modelling of crack propagation and closure, large slips on crack faces and weak interfaces, dam-reservoir interaction, dam-foundation interaction and automatic mesh generation. The expected outcomes of the project will be a significantly improved prediction tool. It is also anticipated that the project will result in improvements in dam and public safety, and more efficient use of funds for dam safety upgrades and management.

*Total Fund*: $351, 731

*Linkage Partners*: Melbourne Water Corporation; Murray-Darling Basin Authority; Goulburn-Murray Rural Water Corporation; Sunwater Limited

■ **Professor Michael Manefield, A/Prof Denis O'Carroll, Professor Stuart Khan, Dr Nicholas Coleman, Dr Matthew Lee, Dr Qingguo Huang, Dr David Schleheck. ($516K) 'Biogeochemical remediation approaches for PFAS contaminated environments' LP170100116**

*Project summary:* This project aims to identify and harvest microorganisms capable of directly or indirectly affecting PFOS or PFOA degradation in the environment. Fluorinated compounds such as PFOS and PFOA in firefighting foams are contaminants of concern now routinely detected in contaminated groundwater and soil globally. Understanding the role of microorganisms, and the biogeochemical processes they perform in relation to fluorinated compounds, will inform handling of contaminated sites and lead to development of cost effective and sustainable remediation technologies.

*Industry Partner*: Ventia Utility Services P/L

# At other universities

■ **CVEN's AssociateProfessor Adrian Russell is co-CI on a UWA administered ARC Linkage Project LP160101561 on "Evaluating potential static liquefaction of tailings to prevent failures" ($630k ARC**).

Professor Andries Fourie; Dr Jayan Vinod; Dr Md. Mizanur Rahman; **Associate Professor Adrian Russell**; Mr Imran Gillani; Dr Michael Davies; Dr John Lupo; Mr Stephen Liddell; Mr Todd Martin; Ms Georgia Lysay; Ms Tamara Johndrow; Dr Caius Priscus

*Project Summary:* This project aims to reduce risk in the mining industry from failing mine tailings by producing a methodology for predicting the susceptibility of these tailings to static liquefaction. The impact of a mine tailing failure is catastrophic to the downstream community. The project brings together a number of industry partners committed to assisting with verification and adoption of characterisation and designed tools development in this project. This proposal will integrate results from laboratory element, centrifuge and calibration chamber tests with numerical modelling and in-situ tests to produce a methodology for predicting the susceptibility to static liquefaction. $630,000 UWA Administered

*Linkage Partners:* Newmont Mining Corporation; Rio Tinto Services Limited; Teck Corporation; Bhp Billiton Plc; Anglo American; Freeport-Mcmoran Inc.

# UNSW Goldstar and Silverstar Awards

In 2017 six CVEN research projects were awarded UNSW Goldstar and Silverstar awards.

**Goldstar Awards**: UNSW Goldstar research grants are awarded by the Vice Chancellor annually in recognition of UNSW researchers who achieve near misses in the ARC funding rounds. The Goldstar funds of $30K allow some initial research on the proposed research program to proceed, and to allow the investigators to further refine and improve their application for ARC re-submission.

Emeritus Professor Ian Gilbert and Dr Ali Amin, "Time-dependent behaviour of fibre reinforced concrete structures".

Professor Nasser Khalili and Dr Arman Khoshghalb, "Non-isothermal dynamic strain localisation in unsaturated porous media".

Professor Ashish Sharma, "A novel remodelling technique for reliable design flood estimation".

Associate Professor Thomas Wiedmann, "Modelling food system resilience and sustainability".

**Faculty Silverstar Awards**: UNSW Engineering Silverstar research grants are awarded by the Dean annually in recognition of Faculty researchers who achieve near misses in the ARC funding rounds.

Associate Professor Adrian Russell and Professor Nasser Khalili, "Impact of changing salt and water content on mechanical behaviour of soils".

Professor Travis Waller and Dr David Rey, "Incentivised Strategic Traffic Assignment: Bi-level Transport Optimization".

# PhD & ME Graduates

In 2017, the School celebrated the successful completion and graduation of over 50 HDR students, a record number and an amazing collective and individual achievement.

The work of our research students and that of their supervisors by now approaches scholarly critical mass. Certainly the School provides one of the largest consistent, in-depth and far ranging contributions towards global knowledge and expertise in civil, environmental and geospatial engineering.

2017 PhD grad Yating Tang and her supervisor Lucy Marshall

## PhD

**Ahmadian Fard Fini, Alireza**
Supervisor/s: ST Waller & A Akbar Nezhad
Optimizing Crew Performance through Integration of Human Resource Strategies into Planning of Construction Activities
http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis224906391

**Arbis, David**
Supervisor/s: V Dixit & TH Rashidi
Modelling the Strategic Interactions of Driver Manoeuvres
http://www.unsworks.unsw.edu.au/UNSWORKS:unsworks_search_scope:unsworks_45813

**Asefi, Hossein**
Supervisor/s: S Lim & M Maghrebi
Optimal site selection and location-routing for a sustainable integrated solid waste management system
http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis229488388

**Bertuzzi, Robert**
Supervisor/s: KD Douglas
Rock mass properties for tunnelling
http://www.unsworks.unsw.edu.au/UNSWORKS:unsworks_search_scope:unsworks_45631

**Chen, Guangwu**
Supervisor/s: T Wiedmann & M Hadjikakou
City-scale carbon footprint accounting and mitigation analysis
http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis228736430

**Choudhury, Dipayan**
Supervisor/s: A Sharma
CMIP5 Decadal Predictions: Implications for Australian Hydrology
http://www.unsworks.unsw.edu.au/UNSWORKS:unsworks_search_scope:unsworks_46304

**Dunlop, Mark**
Supervisor/s: R Stuetz & P Blackall
Quantifying poultry litter conditions and relationships with odour emissions
https://primoa.library.unsw.edu.au/primo-explore/fulldisplay?docid=TN_trove_thesis224657467&context=PC&vid=UNSWS&search_scope=SearchFirst&tab=default_tab&lang=en_US

**Eghdamirad, Sajjad**
Supervisor/s: A Sharma & F Johnson
Assessing the impact of uncertainty in hydrology through numerical climate modelling
http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis223257797

**Hammad, Ahmed**
Supervisor/s: A Akbarnezhad & D Rey
Reducing Urban Noise Pollution Through Multi-Objective Optimisation of Site Layout and Facility Locations
http://www.unsworks.unsw.edu.au/UNSWORKS:unsworks_search_scope:unsworks_45190

Hassan, M. Mahmudul
Supervisor/s: BL Peirson
Climate change adaptation
http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis228506517

Hassanieh, Amirhossein
Supervisor/s: H Valipour & SF Foster
Development of steel-timber composite system for large scale construction
http://www.unsworks.unsw.edu.au/UNSWORKS:unsworks_search_scope:unsworks_45489

Hayes, James Emerson
Supervisor/s: R Stuetz
The effect of arduous odours on the community
http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis228854657

He, Ke
Supervisor/s: C Song
Numerical Modelling of Cracking in Embankment Dams
https://trove.nla.gov.au/work/222787701?q&versionId=252605809

Jayakumar Nair, Divya
Supervisor/s: V Dixit & TH Rashidi
Logistics of Surplus Food Rescue and Distribution
http://www.unsworks.unsw.edu.au/UNSWORKS:unsworks_search_scope:unsworks_46357

Jian, Sisi
Supervisor/s: V Dixit & ST Waller
Understanding and Optimising Carsharing Systems
http://www.unsworks.unsw.edu.au/UNSWORKS:unsworks_search_scope:unsworks_46306

Jiang, Chao
Supervisor/s: N Khalili & GF Zhao
Hydraulic fracturing through 3D printing and lattice modelling
http://www.unsworks.unsw.edu.au/UNSWORKS:unsworks_search_scope:unsworks_46492

Kim, Seokhyeon
Supervisor/s: A Sharma & F Johnson
Improvements and Applications of Satellite-Derived Soil Moisture Data for Flood Forecasting
http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis228718037

Li, Donxu
Supervisor/s: C Song
The behaviour and design of demountable connections to promote the reduction and reuse of structural steel in steel and composite buildings
http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis228884602

Li, Jingwan
Supervisor/s: A Sharma & J Evans
Correcting model bias to allow assessment of climate change impact on design rainfalls
http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis223687932

Li, Xiang
Supervisor/s: SJ Khan & R Henderson
Advanced characterisation of dissolved organic nitrogen in drinking water sources impacted by algae and the potential formation of nitrogenous disinfection by-products
ttp://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis223366756

Li, Zeyu
Supervisor/s: J Wang & C Rizos
Vision based mapping and navigation: modelling, geometric analysis and quality control
http://www.unsworks.unsw.edu.au/UNSWORKS:unsworks_search_scope:unsworks_45744

Liu, Qingxiang
Supervisor/s: I Turner & J Trinder
Coastal change monitoring with multispectral satellite images
http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis229488378

Liu, Xuefen
Supervisor/s: S Lim & D Rey
City-scale evacuation management in flood scenarios, implementation and comparison of a multi-agent based approach and a traffic assignment approach
https://www.unsworks.unsw.edu.au/primo-explore/fulldisplay?vid=UNSWORKS&docid=unsworks_51113&context=L

Mao, Tuo
Supervisor/s: V Dixit & C Chen
Intelligent Transport System Based Freeway Management and Control
http://www.unsworks.unsw.edu.au/UNSWORKS:unsworks_search_scope:unsworks_46484

Masoumi, Saeed
Supervisor/s: H Valipour
Towards engineering the epoxy and cementitious materials at the nanoscale
http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis229488387

Nahar, Jannatun
Supervisor/s: FM Johnson
Characterising climate model bias: An insight into bias nonstationarity and spatial dependence in hydroclimatic simulations
https://primoa.library.unsw.edu.au/primo-explore/fulldisplay?docid=TN_trove_thesis230273298&context=PC&vid=UNSWS&search_scope=SearchFirst&tab=default_tab&lang=en_US

Naseem, Bushra
Supervisor/s: A Sharma
Ecohydrological modeling for streamflow prediction
http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis221360992

Payan, Meghdad
Supervisor/s: A Khoshghalb, N Khalili & K Senetekis
Study of small strain dynamic properties of sands and silty sands
http://www.unsworks.unsw.edu.au/UNSWORKS:unsworks_search_scope:unsworks_45429

**Peterson, Mark**

Supervisor/s: D Cendon, M Andersen & RI Acworth

The radioactive-stable tracer diffusion method to quantify diffusive losses in fractured rocks and heterogeneous aquifers

http://www.unsworks.unsw.edu.au/UNSWORKS:unsworks_search_scope:unsworks_46550

**Pflugrath, Brett**

Supervisor/s: WL Pierson

Quantifying stressors and predicting injury and mortality in fish passing downstream through weirs and turbines

https://primoa.library.unsw.edu.au/primo-explore/fulldisplay?docid=TN_trove_thesis228927942&context=PC&vid=UNSWS&search_scope=SearchFirst&tab=default_tab&lang=en_US

**Saket, Arvin**

Supervisor/s: WL Pierson

Breaking for 2D and 3D gravity wave groups in deep and transitional water

https://primoa.library.unsw.edu.au/primo-explore/fulldisplay?docid=TN_trove_thesis226266164&context=PC&vid=UNSWS&search_scope=SearchFirst&tab=default_tab&lang=en_US

**Shammay, Ariel Tal**

Supervisor/s: R Stuetz & E Sivret

Foul Air Contaminant Removal in Sewer Odour Control Systems

http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis229110827

**Sufian, Adnan**

Supervisor/s: A Russell

Multi-Scale Characterisation of Heterogeneity in Granular Materials

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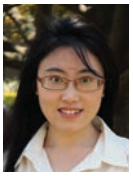


**Sun, Yingying**

Supervisor/s: TD Waite & A Pham

Iron-mediated oxidant production under conditions relevant to both natural aquatic and neurological environments

https://www.unsworks.unsw.edu.au/primo-explore/fulldisplay?docid=unsworks_49569&context=L&vid=UNSWORKS&search_scope=unsworks_search_scope&tab=default_tab&lang=en_US

**Tang, Wangwang**

Supervisor/s: TD Waite

Water Treatment by Capacitive Deionization (CDI): Non-Faradaic and Faradaic Reactions

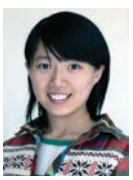
http://www.unsworks.unsw.edu.au/UNSWORKS:unsworks_search_scope:unsworks_45069

**Tang, Yating**

Supervisor/s: LA Marshall

Prior information and multi-objective analysis in Bayesian ecohydrological modeling

https://www.unsworks.unsw.edu.au/primo-explore/fulldisplay?docid=unsworks_51327&context=L&vid=UNSWORKS&search_scope=unsworks_search_scope&tab=default_tab&lang=en_US



**Wang, Kai**

Supervisor/s: TD Waite

Extracellular electron transfer by marine and freshwater phytoplankton: implications to iron transformations and oxidant production

http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis223141145

**Wen, Tao**

Supervisor/s: ST Waller & L Gardner

Methodologies for Origin-Destination travel demand estimation within a strategic traffic assignment model

http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis222186079

**Xiang, Tingsong**

Supervisor/s: C Song

The Scaled Boundary Finite Element Method for Plate Structures

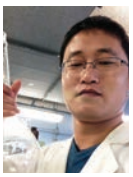
http://www.unsworks.unsw.edu.au/UNSWORKS:unsworks_search_scope:unsworks_45888

**Xiao, Wei**

Supervisor/s: TD Waite & M Bligh

Fe(II)-catalyzed Transformation of Iron (Oxyhydr) oxides in Abiotic and Biotic Systems

https://primoa.library.unsw.edu.au/primo-explore/fulldisplay?docid=TN_trove_thesis229898165&context=PC&vid=UNSWS&search_scope=SearchFirst&tab=default_tab&lang=en_US



**Xing, Guowei**

Supervisor/s: TD Waite

Effect of pH and chloride on the kinetics and mechanism of copper transformation and associated production of oxidative products in aquatic systems

http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis229110808

**Yeung, Anna Chi Ying**

Supervisor/s: TD Waite & B Neilan

The role of iron in regulation of the freshwater cyanobacteria Microcystis aeruginosa and Cylindrospermopsis raciborskii

http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis223045245

**Yu, Huijie**

Supervisor/s: TD Waite

The Role of Graphene in Improving Photocatalytic Properties of Immobilized AgCl Photocatalysts and Biomimetic High Valent Iron-oxo Catalysts: Preparation, Characterisation and Evaluation towards Contaminants Degradation

http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis220128083

**Yuan, Fang**

Supervisor/s: RJ Cox

Cross-shore beach morphological model for beach erosion and recovery

http://www.unsworks.unsw.edu.au/UNSWORKS:unsworks_search_scope:unsworks_46469

**Zhang, Xiang**

Supervisor/s: ST Waller & D Rey

Multi-objective network design: Road capacity expansion and multi-modal recharge facility location

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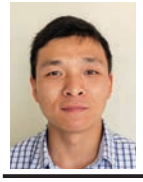


**Zhou, Peiyuan**

Supervisor/s: J Wang

Enhancing Precise Point Positioning with global and regional ionospheric models

http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis224404314

# ME

Dang, Jin Jerry

Supervisor/s: JX Shen

Investigation on Serviceability and Durability of Geopolymer Concrete Using Embedded Sensors

http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis219377992

Hartanto, David

Supervisor/s: E Hamed

Durability of FRP-Steel Lap Joints

http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis229029975

Karki, Alex

Supervisor/s: V Dixit & T Rashidi

Impact of parking types & time restrictions on urban parking choice behaviour

http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis228954289

Wei, Wang

Supervisor/s: M Andersen

The effect of an artificial destratification system on the water quality of Chichester Reservoir - the role of organic carbon

http://primoa.library.unsw.edu.au/UNSWS:SearchFirst:TN_trove_thesis228683353

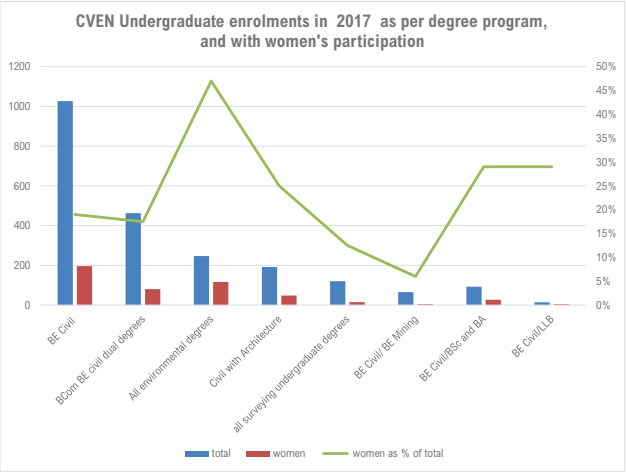

# 4 OUR TEACHING

# Our Teaching

The School is one of the largest of its kind in the world, with 2,220 undergraduate students enrolled in 2017.

The School offers single (4 year) Bachelor of Engineering Honours programs in Civil Engineering, Environmental Engineering, Civil Engineering with Architecture and, Surveying and Geospatial Engineering. In addition, the School offers a wide range of increasingly popular combined/dual degree programs (5-6 years) in which students can combine their engineering studies with degrees in Arts, Science, Computer Science, Law and Commerce.

There are also postgraduate coursework degrees such as the MEngSc which offers many specialisations. There is also a very popular two-year coursework ME streams in Civil and Environmental Engineering, first introduced in 2015. In 2017, 1144 postgraduate coursework students were enrolled.




The School has a tradition of educational innovation. It was the first School in Australia to offer a postgraduate coursework program with the Master of Technology degree in 1958, the first BE in Environmental Engineering in 1991 and the first BE in Civil Engineering with Architecture in 2007. The School's programs continue to act as engineering education models, with a quarter of our academic staff having won UNSW and outside Teaching Excellence awards. In the 21st century the School is moving towards a blended learning approach – utilising creative, efficient and educationally sound digital teaching and learning methods, as well as continuing our high quality embodied teaching – lectures, laboratories, site visits and workshops.

From strong foundations in mathematics and core engineering sciences, our courses – both undergraduate and graduate – are designed to be at the cutting edge of the profession and to produce leaders and thinkers; courses such as CVEN 4701 Planning Sustainable Infrastructure that won the Australasian Association for Engineering Education Award for Excellence in Engineering Education Engagement in 2015, and new multi-disciplinary courses in humanitarian engineering such as ENGG3001 Fundamentals of Humanitarian Engineering.

In 2017 there continued to be strong demand for our courses and while, on one hand, the high entry levels ensured strong student cohort groups into our programs, on the other hand gender balance, while improving, remained a challenge. As indeed it does for the profession – the School and Faculty are highly committed to assisting the profession to addressing this important issue.

The School believes that to holistically prepare students for a working life in engineering there must be a balance between theory and practice. We want students to graduate with the vital technical fundamentals of mechanics and mathematics, but also with the overarching, value adding, skills of problem solving. Our degrees are not just about the 'what' but about the 'how' of learning. Our aim – and the focus of our teaching and learning – is to prepare our students to meet the challenges of contemporary society, and to be part of its useful, innovative and informed leadership.

## The Teaching and Learning Committee 2017

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 and research student demonstrators
- setting policy regarding academic aspects of undergraduate and postgraduate examinations and enrolments,
- providing a focal point for student assistance in undergraduate and postgraduate coursework matters.

The major drive behind the Committee's agenda is to improve the learning experience of students.

The members of the committee in 2017 were:

| CVEN Teaching and Learning Committee 2017 | |
|---|---|
| Dr Steven Davis | Co- Chair (Operations & Scholarships) |
| Prof Richard Stuetz | Co- Chair (Technology & Innovation) |
| A/Prof Mario Attard | Associate Head (Academic)<br>Civil Engineering Program Coordinator<br>Structures Teaching Representative |
| Kristy Guia/Lekana Toubia | Student Services Manager |
| Stephen Moore | Environmental Eng Program Coordinator Sem 1 |
| Dr Lauren Gardner | Civil with Architecture Program Coordinator<br>Transport Teaching Representative |
| Dr Bruce Harvey | Surveying Teaching Representative |
| A/Prof Stuart Khan | Water and Environmental Teaching Representative & Environmental Eng Program Coordinator Sem2 |
| Dr Arman Khoshghalb | CIT & ET (Computing & Ed Tech Services) Liaison<br>Geotechnical Representative |
| A/Prof Tommy Wiedmann | Postgraduate Coursework Coordinator |
| Dr Ulrike Dackermann | Year 1 Coordinator |
| Dr David Rey & A/Prof Hamid Valipour | Year 2 Co - Coordinators |
| Dr Ehab Hamed | Year 3 Coordinator |
| Dr Ali Akbar Nezhad | Year 4 Coordinator |
| Dr Johnson Shen | Industrial Training Coordinator |
| Dr Fiona Johnson | Elite Student Coordinator |
| A/Prof Jinling Wang | Faculty IRC Rep |
| Charlotte Wang | CEVSOC Student Representative |

Since 2016 the Committee has organised regular student focus groups, with a new position created in the undergraduate student organisation CEVSOC for TLC liaison – giving undergraduate students a voice in the structure and delivery of courses. In 2017 the School supported CEVSOC in its First Year camp held in March and the Year 3 & Year 4 Professional Development Camp, held at Webbs Creek, August 2017.

In 2017 UNSW introduced education focused academic positions and four passionate School academics took up this new career path - Dr Steven Davis, Robert Holdom (pictured), Dr Bruce Harvey and Dr Craig Roberts. They were joined by research associates Dr Juan Pablo Alvarez Gaitan (WRC) and Dr Kasun Wijayaratne (rCITI).

In order to further lift the educational quality of the school and student satisfaction, the education focused academics convened fortnightly lunch time staff teaching discussions to share teaching expertise and challenges. As Steven Davis, co-Chair of the School's Teaching and Learning Committee, explained, "Instead of running seminars where people are talked at, we wanted a discussion format where everyone can learn from everyone else's expertise and experience."

Discussion topics put forward by the education focused academics ranged from 'What to do in Week 1' to 'How to write effective exam papers'.

The School's postdoc teaching assistants were also invited and were particularly interested in the topics 'best practice for supervising theses students', and 'how to mark a literature review'.

# School Teaching Initiative Grants Scheme (STIGS)


In 2107 the School's Teaching and Learning Committee continued with the innovative School Teaching Initiative Grants Scheme. STIGS has provided innovative academics with resources that enhance their teaching and the student experience. Resourcing teaching has meant our academics have more time to generate ideas, delivering refined, well prepared and interesting courses. Teaching facilities, equipment and technology resourced by these grants are state of the art, creating a vibrant learning environment.

It was a record year with 21 staff awarded a total of nine grants to the value of $250,000. Congratulations to all our dedicated teachers.

| Staff awarded Teaching Innovation Grants 2017 | Title |
|---|---|
| Ali Amin | Prediction contest for strength and response of reinforced concrete beams |
| Ali Akbarnezhad and Taha Rashidi | Uni-latis Software: making it available to all and development of automated feedback features |
| Juan Pablo Alvarez Gaitan, Fiona Johnson, Stephen Moore, Emily Moylan and Richard Stuetz | Developing critical reflective practice in engineering education: A Professional Attributes self-assessment tool |
| Steven Davis | Graphical Feedback for Online Assessment Tools for Graphical Modelling Problems |
| Ulrike Dackerman, Vinayak Dixit, Fiona Johnson and Ashish Sharma | Linking education to industry – online video resources to support student learning |
| Arman Khoshgalb | Integration of numerical simulation and software training into soil mechanics (CVEN3202) to encourage deeper learning and to improve workplace readiness of our graduates |
| Minh Nhat Le, An Ninh Pham, and Richard Stuetz | Learning support tool with interactive 360o/virtual reality (VR) video demonstrations and interactive assessment activities |
| Tommy Wiedman and Daniel Micevski | Enabling student assignments and projects on the Industrial Ecology Virtual Laboratory |
| Vinayak Dixit, Emily Moylan, Travis Waller and Kasun Wijayaratne | Transport - Authentic Learning - Big Data |

# Student Profile

Ankhtuya "Anka" Bold is from Mongolia and in 2017 was enrolled in a Master of Engineering Science (Project Management) at the School.


## Why did you choose to undertake a postgraduate coursework degree?

My ultimate goal is to help to improve the quality of life for people in my home country of Mongolia. I also want to be part of broadening the country's engineering sector too. Mongolia is small and still developing – it has many natural resources and there is a great need to implement small and large-scale engineering projects.

In my previous role I was involved in some large-scale water projects – a dam project, a pipeline realignment project and a project focused on reducing the cost of electricity consumption. I became aware that I lacked skills in general management and communication and realised I could only gain them through postgraduate study.

I chose a Master of Project Management because it combines engineering and science courses with management, and in doing so crosses lots of professional areas. I didn't want to just focus on the theory of engineering I wanted a cross section of skills and knowledge across business, marketing and management too.

## What have you done in your career to date?

I completed my Bachelor of Engineering in Water Supply and Sewerage Engineering at the Technical University of Mongolia in 2006 and began working for the Ulaanbaatar Water Supply and Sewerage Authority. I started work as a Water Meter Reader, which required walking long distances collecting data for companies. This position was physically and mentally challenging and showed me the reality of engineering – theory demonstrated first-hand for water supply systems.

After a year, I worked my way up to District Engineer for Water Supply and Sewerage Systems. Here I investigated illegal pipe connections. Then I was promoted to the Assistant Director Specialist Foreign Corporations. I received a lot of support from my colleagues at this company and this motivated me to apply for an international study scholarship. My parents are not wealthy so I needed a scholarship and was thrilled when I won an Australian Government Scholarship called the Australia Award.

## Why did you choose UNSW?

I chose UNSW because it is a high-ranking university and the School of Civil and Environmental Engineering is highly regarded across Australia and internationally. The location was also appealing in terms of being close to the ocean and a having a great lifestyle.

## What has been a highlight so far?

I found the first semester at UNSW quite challenging but my lecturer, Stephen Moore, supported and mentored me and I found his lectures stimulating and inspiring. Many of his lectures involved fun quizzes which I found very motivating. I am not very confident with my English, but he was very patient and always took the time to explain things in detail, particularly to the international students.

Overall, studying in Australia has broadened my professional outlook, and the variety of subjects has been ideal for my educational development.

## What do you want to do in the future?

I have a pipeline realignment project awaiting me in Mongolia straight after I finish, but my longer term aim is to study in China and learn Mandarin. I also want to do a PhD with a focus on water scarcity and waste issues within a cold climate environment, but not for another five or so years. Eventually I think I'd like to be a university lecturer in Mongolia. I want to build capacity in our own country and give back to younger generations.

# Is it a bird? Is it a plane?

Neither. It's School surveying lecturer Dr Bruce Harvey taking measurements with a mobile laser scanner mounted on his bicycle in the UNSW quadrangle.

The photo was taken during one of Dr Harvey's special Survey classes where students and colleague Dr Johnson Shen used and tested the latest equipment.

Usually the equipment is mounted on a car but the bicycle can survey places where a car cannot get access. The equipment includes the laser scanner, IMU unit, RTK GNSS, data connection via WiFi and battery all mounted on the rack on the bicycle! Bruce reported some excellent results from the survey.


Left to right: Dr Kurt Douglas (PSM Senior Lecturer of Rock Mechanics), Professor Stephen Foster (Head of School) and Mr Tim Sullivan (Chairman of Pells Sullivan Meynink

## Geotechnical Engineering – CVEN leads the field

In 2017 UNSW Engineering and leading geotechnical engineering firm Pells Sullivan Meynink joined forces for a further five years, with the continued support of an academic position at the School – the PSM Senior Lecturer of Rock Mechanics.

In 2007, Dr Kurt Douglas was first appointed to the role and ever since he has regularly visited PSM's offices to be their expert on tap. Dr Douglas's research covers rock mass strength and deformation prediction, spillway erosion assessment and piping within embankment dams.

"UNSW are leaders in Geotechnical Engineering education and research and have made major contributions to the profession over many years," says Mr Sullivan, Chairman of Pells Sullivan Meynink.. "By supporting this academic role we are giving something back."

As well as his industry work, conducting research, and chairing the School's external relations committee, Dr Douglas teaches, third and fourth year students, as well as postgraduates. As he says, 'most of what a Geotechnical Engineer does is not well understood. Our best work is hidden underground! My own research looks at how to better predict the properties of rock so that we can more efficiently design foundations, tunnels, slopes and dams.'

Under his guidance third year undergraduates learn the fundamentals of engineering geology (the 'geo' part of geotechnical) so that they will be able to predict the possible ground conditions they might encounter when assessing sites for future engineering projects.

Students doing his fourth year elective learn about Geotechnical Engineering design. This includes the design of tunnels, slopes and foundations and the investigation and remediation of landslides. They also join Kurt on his annual action packed fieldtrip visiting mines, slopes, landslides, dams and other engineered structures.

2017 Students on annual geotechnical field trip at Bombo NSW

# Field Trip to Manly Hydraulics Lab, WRL

It was a rainy day in May when Drs. Stefan Felder, Kristen Splinter and Kaveh Zamani introduced close to 550 2nd year water engineering students to the labs at the Water Research Laboratory. Mark Kulmar and staff at the Manly Hydraulics Lab (MHL) also hosted the students for a tour of their facilities.

This annual field trip, which is part of the 2nd year water engineering course (CVEN 2501), is a vital part in the education and learning experience of these students at UNSW as they get to see theory turned into practice. They also get to learn about a career in water engineering and how they can become involved.

WRL is one of the largest physical water laboratories in the southern hemisphere and is known as the birth place of Coastal Engineering in Australia. The lab is also known for its pioneering fundamental and applied research in the areas of Applied Hydraulics, Groundwater, and Environmental Engineering.

During the tour at WRL, students were introduced to a variety of models currently in use. Our first stop was a model car simulation where we looked at the velocity forces and water depths needed to cause instability in a car in moving water. Students learned about how we can scale down real objects (such a car) to be able to do these tests in a controlled setting. This model was done at a 1:18 scale. We discussed the types of scaling we'd use (Froude vs Reynolds) and how we would measure these forces.

As Engineers, we are trying to design in order to minimise risk (to humans) and failure (of a structure). In controlled physical modelling tests, we can test the limits of design and provide guidance back to society in this case on people safety in floods.

We then moved on to look at how water below us flows around in an intricate web of pipes and culverts that keeps our Sydney running. Dr. Felder and his students are looking at how changes in inflow - including the direction and magnitude - can impact both the upstream and downstream flows in a culvert system. Our research culvert is designed out of plexiglass so that we can easily see what is happening on the inside.

The students could see just how complex the water movement is in the system and we could discuss the theory we'd learned in class about continuity and momentum while watching it right before our eyes. It was also an opportunity to show them how we do these measurements using manometers, piezometers and pitot tubes.

Our next stop was to the 1.2 m wave flume to look at a coastal engineering project and how we might retrofit existing breakwaters to account for sea level rise and increasing storm wave heights. Doing detailed and specific tests in the lab lets us run design criteria (for example the 1:100 year storm wave and sea level rise) now so we can see if a structure is likely to withstand this event in 50 years time or not.

We next popped up to our fishway model where students got to see how we take into consideration environmental flows and fish passage when designing and constructing new dams. While dams may be vital pieces of infrastructure that provide flood mitigation, recreation and hydropower, they come with an environmental effect. Fish need to return to their birth place to spawn, and if we block that off, we run the risk of damaging fisheries.

To mimic a natural river system, dams are now constructed with fish ladders and passageways where we can design with nature to simulate boulders that allow fish lots of spots to rest as they travel up stream and around a dam. This was one experiment we encouraged students to stick their hands in and see how much the flow can change around structures. We also used dye to show them flow pathways and flow velocity differences across the structure.

We had discussed many of these topics in class but the 'aha' moment always comes when students can see and touch these instruments and forces in real time.

- Dr Kristen Splinter

# Engineers need 'hardware and heart-ware'.

## Inspiring industry speech at CVEN Graduation ceremony 2017.

"Today's problems are disruptive, messy and increasingly complex. Whether it's shaping the smart cities of the future, creating resilient rural communities, addressing poverty and social injustice or mitigating the impacts of climate change, 21st century engineers need to effectively connect innovative thinking, software, hardware and 'heart-ware' in order to face up to and solve some of the most complex challenges we face in Australia and around the world.'"

So instructed UNSW CVEN alumnus Dr Kourosh Kayvani, in his inspiring speech at the final CVEN graduation ceremony for 2017, held on 7 November. For Kourosh, an award winning civil engineer, and Global Director of Excellence & Expertise at Aurecon, building a smart nation "needs smart engineers, and not just 'smart' in the technical sense, but those who embrace more unconventional smarts. These engineers must be more engaging, persuasive, collaborative or co-creative – traits not normally associated with stereotypical, introverted engineers."

"Understanding what makes a city, town or region resilient, sustainable and future-ready requires serious collaboration between government, urban planners, scientists, economists, ecologists, sociologists, architects and, critically , engineers.

Whether working in civil, structural, mechanical, electrical or in IT, engineers must be the true masters of their craft, thus enabling each one of us to speak from a position of authority and gravitas. Mastery is about seeing the bigger picture, having the insight to connect the dots, and being able to make the complex simple.

As individuals, engineers must develop powerful soft skills in such areas as communications, collaboration, design and transdisciplinary thinking. They must also bring to the fore their passion for their craft, and connect that passion and craft to human needs and emotions.

Developing powerful soft skills is often more challenging for engineers because of the traditional way we have been educated. The science of engineering teaches people to apply the immutable laws of physics and maths in order to develop solutions to problems. The solution is either right or wrong; it will work or it won't. But having a solution purely rooted in being technically correct is no longer enough. We must be able to incorporate the human element in our solutions. And that is never black and white; more often it is a spectrum of greys."

**About Dr Kayvani:** In his 28 years in the industry, Kourosh Kayvani has played key roles in engineering for many award-winning projects across the globe. In 2006, at the age of 39, he won the prestigious IABSE Prize from the International Association for Bridge and Structural Engineering for his work on long span structures worldwide. He was listed in Engineers Australia's (EA) Top 100 most influential engineers in 2009 and won the prestigious John Connell Gold Medal from EA's Structural College in 2016.

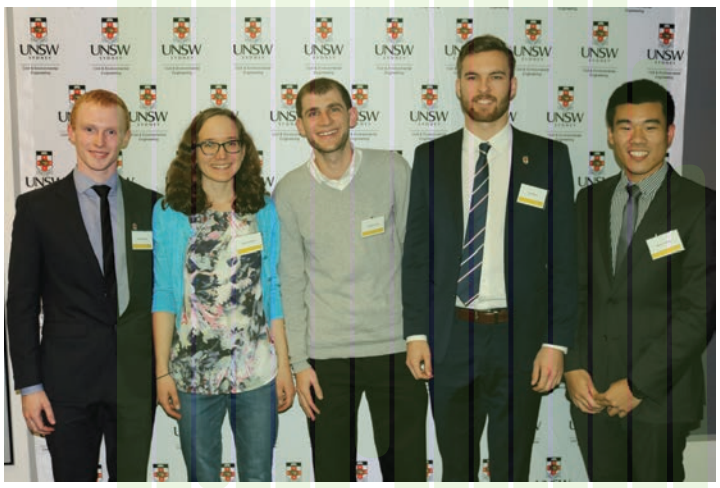
Kourosh has held Professorial appointments at the University of Sydney and UNSW for the last 10 years. Dr Kayvani obtained his B.Sc. (Civil Engineering) at Tehran University in 1988, after which he moved to and made Australia his permanent home. In 1992, Kourosh completed a MEngSc. (Structural Engineering) at UNSW, Sydney and later his PhD in civil engineering at UNSW in 1996. He is a long serving member of the School of Civil & Environmental Engineering's Industry Advisory Committee.

# Student Prizes

Anthony Ferraro

David Michael Morgan

Monica Laut



The future is bright: L-R David Morgan - University Medal (Civil Engineering) and Aurecon Prize for structural engineering, Hannah Pearce - RPS Prize for surveying, and Institution of Surveyors NSW Prize, Joshua Tooch - Cardno Prize for Civil & Environmental Engineering Practice, Tim Munro – ARUP prize for civil with Architecture, and Ming En Chin – Royal HaskoningDHV prize for environmental engineering.

## University Medal Winners

The University Medal is one of the most distinguished awards to be bestowed on an undergraduate. We congratulate all medallists and prize winners on their excellent performance!

| | |
|---|---|
| Anthony Ignatius Ferraro | University Medal in Civil Engineering |
| David Michael Morgan | University Medal in Civil Engineering |
| Monica Laut | University Medal in Environmental Engineering |

## Year 1 Prize

| | |
|---|---|
| Cameron Jenkins | **Jacob N Frenkel Prize**: for the best achievement in Civil Engineering for a first year student |

## Year 3 Prizes

| | |
|---|---|
| Clarence Li | **Welding Technology Institute Of Australia Prize:** for the best performance in CVEN3303 |
| Rachel Evans | The Full Time **Class Of 1962 Civil Engineering And Surveying Alumni Prize**: for the highest accumulative WAM at the end of 3rd Year in the School of Civil and Environmental Engineering |
| Liangyu Ding | **The JK Geotechnics Prize**: for the best performance in CVEN3202 Soil Mechanics in the Bachelor of Engineering in Civil Engineering or the Bachelor of Environmental Engineering program |
| Jianan Jiang | The **Crawford Munro Memorial Prize**: for the best performance in CVEN3202 Soil Mechanics in the Bachelor of Engineering in Civil Engineering or the Bachelor of Environmental Engineering program |
| Bryan Wai Yan Tam | The **ASI Undergraduate Steel Design Award**: for the best performance in CVEN2301 & CVEN3303 |

## Final Year Prizes

| | |
|---|---|
| Athethhan Vigneswaran | **Alexander Wargon Prize**: Best performance in the Structures Discipline in the Bachelor of Engineering in Civil Engineering degree program |
| Rachael Joukhdar | The **Engineers Australia Civil and Structural Engineering Prize**: for the best performance in Structural design in the final year of the degree |

## SAGE Prizes

| | |
|---|---|
| Eryan Chen | **EGM Memorial Prize**: For outstanding performance in GIS courses |
| Haolin Zheng | **Assoc Of Public Authority Surveyors:** for the best performance in GMAT courses, Year 1 |
| AhmedEl-Kiki | **Consulting Surveyors NSW - Land Development Prize**: Awarded to the graduating SAGE student with the best total mark in Cadastral and Land Development courses |
| David Phan | **SSSI - For Photogrammetry & RS Prize**: Awarded to the graduating SAGE student with the best total mark in Cadastral and Land Development courses |
| Kevin Song | **R.S. Mather Memorial Prize**: for outstanding performance in Geodesy courses in the Bachelor of Engineering in Surveying and Spatial Information Systems program |
| Ahmed El-Kiki | The **Bossi Medal:** for the best performance in the final year of the Bachelor of Surveying & Spatial Information Science |
| Eloise Harch | **The Maurice Maughan Prize:** Awarded to the student with the best total mark in GMAT2500 and GMAT2550 from the Bachelor of Engineering in Surveying or Geospatial Engineering |
| Hannah Pearce | **Institution of Surveyors New South Wales Incorporated Prize**: for the best performance by a graduating student in the Bachelor of Engineering in Surveying and Spatial Information Systems program |

## Year 4 Industry Sponsored Prizes

| | |
|---|---|
| Monica Laut | The Civil & Environmental Engineering **Water** Discipline Prize, sponsored by **GHD** |
| Joshua Tooch | The Civil and Environmental Engineering **Practice** Prize sponsored by **Cardno** |
| George Chard | The Civil and Environmental Engineering **Construction Management** Discipline Prize sponsored by **Multiplex** |
| Tim Munro | The Civil and Environmental Engineering **Civil with Architecture** Discipline Prize sponsored by **ARUP** |
| Ming En Chin | The Civil and Environmental Engineering **Environmental Engineering** Discipline Prize sponsored by **Royal Haskoning DHV** |
| Emma Ross | The Civil & Environmental Engineering **Geotechnical** Discipline Prize sponsored by **PSM** |
| Hannah Pearce | The Civil and Environmental Engineering **Surveying** Discipline Prize sponsored by **RPS** |
| David Morgan | The Civil and Environmental Engineering **Structural Engineering** Discipline Prize sponsored by **Aurecon** |
| Sophie Zachulski | The Civil & Environmental Engineering **Transport** Discipline Prize sponsored by **Turnbull Engineering** |

## Winners of Dean's Award (2018) for studies completed in 2017

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).

Students who maintain this high level of academic excellence can look forward to graduating with First Class Honours. Dean's Awards are just one way we offer our students recognition for their hard work.

| Name of Student | Program Name |
|---|---|
| Jessica Grace Athayde | Bachelor of Engineering (Honours)/ Bachelor of Commerce |
| Matias Nicolas Braga San Martin | Bachelor of Civil Engineering/ Bachelor of Environmental Engineering |
| James Frank Dunn | Bachelor of Civil Engineering/ Bachelor of Environmental Engineering |
| Rachel Eliza Evans | Bachelor of Civil Engineering / Bachelor of Commerce |
| Roy Fu | Bachelor of Civil Engineering/ Bachelor of Science |
| Prashanth Gunasekaran | Bachelor of Engineering (Honours) |
| Jefry Halim | Bachelor of Engineering (Honours) |
| Cameron Blake Jenkins | Bachelor of Engineering (Honours)/ Bachelor of Advanced Science(Honours) |
| Jianan Jiang | Bachelor of Civil Engineering |
| Akhlaaq Ahamed Jiffry | Bachelor of Engineering (Honours) |
| Aaron Siang-Chek Lee | Bachelor of Engineering (Honours)/ Bachelor of Commerce |
| Xianxing Liu | Bachelor of Engineering (Civil w Arch Honours) |
| Neil Conrad Sansome | Bachelor of Engineering (Honours)/ Bachelor of Commerce |
| Dan Su | Bachelor of Engineering (Honours) |
| Lachlan Jacob Sue | Bachelor of Engineering (Honours)/ Bachelor of Commerce |
| Bryan Wai Yan Tam | Bachelor of Engineering (Honours)/ Bachelor of Commerce |
| Clinton Ngo Tran | Bachelor of Engineering (Honours)/ Bachelor of Commerce |
| Sum Ching Allison Wong | Bachelor of Civil Engineering/ Bachelor of Environmental Engineering |

# CEVSOC

| |
|---|
| **President:** James Mallett |
| Vice President: Jarita Zeng |
| Treasurer: Guy Baumber |
| Secretary and Public Relations Manager: Leila Bowe |
| Arc Delegate: Angelica Kamperos |
| International Students Manager: Aurelia Israel |
| Promotions Manager: Brian Au |
| Social (External) Events Manager: Courtney Bell |
| Social (Internal) Events Manager: Brady Rengger |
| Sports and Charity Events Manager: James Peters |
| Teaching and Learning Representative: Christopher Samuels |
| Technical Events Manager: Amy Nguyen/Francis Moll |

CEVSOC is the constituent student society for students studying Civil and Environmental Engineering.

We are one of the largest constituent societies at UNSW with over 1400 active members.

After 50+ CEVevents, 13 CEVPublications, 7 CEVMerchandise, we have reached the end of 2017.

At the start of this year, the committee had two main goals, to improve and optimise the events and services that we offer, and develop new initiatives to further strive for our goal of providing something that benefits every single member of CEVSOC.

We successfully remade our inaugural third year camp into our professional development camp, which delivers a targeted platform for all students above first year to develop both personally and professionally. We ran UNSW's largest ever harbour cruise, with 801 attendees. We have coordinated all the UNSW Engineering school societies to put together the largest social society event at UNSW. We broke our technical event record, with over 170 attendees at our thesis night. Had our best industry engagement ever, with the most amount of networking events with some of Australia's leading employers. At our international students night, we acted on the feedback from 2016 and added new elements to ensure our events are relevant and of high quality. CEVSOC also continued to assist student feedback by facilitating working groups for courses and providing more feedback through our Meet Your Year Coordinator BBQs.

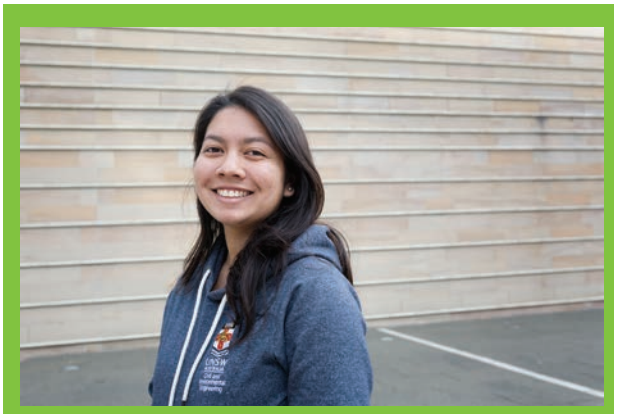
President: James Mallett

Vice-President: Jarita Zeng

We also created many new initiatives over the year. This includes:

- We renewed our commitment to diversity and inclusion, by implementing our new CEVBuddy Mentoring Program, which was where incoming international students were paired up with an older student with the aim to aid the integration into Australian student life
- Following on from our commitment to diversity and inclusion, we held UNSW Engineering's first networking event, we called Diversity Night, focused on the obstacles faced by international students as well as the challenges that women face in industry. We also held our first cultural awareness night which was centred around celebrating the diverse cultures of the CEVSOC student body
- We created CEVSports, 7 social sports teams that played soccer, touch rugby and netball throughout the year
- Continued to strengthen our relationships with industry by, after industry request, holding our first interview workshop seminar and created our CEVSOC LinkedIn profile page, to show off our members to our industry partners.
- Boomed our merchandise offerings, adding bucket hats, sports shirts crewnecks and multi-coloured hoodies
- Created our first ever newsletter, CEVNews to keep students up to date with the events we offer as well as important information such as company application deadlines

I'd like to thank the member base for electing my team and myself last year. It has been a fantastic experience and it has been an honour to represent you all. Many thanks goes to the committee, subcommittee and of course, the School and industry sponsors for the ongoing moral and financial support – we are incredibly lucky to have you all. Best of luck to the 2018 committee, I can't wait to see where you take the society.



"Through the different social and technical events held by CEVSOC, I have had the opportunity to become more involved in the student and professional community within civil engineering. In particular, CEVSOC Third year camp was an amazing opportunity to connect and reconnect with other civil and environmental students, whilst having the opportunity to meet experienced industry professionals. The camp provided a relaxed, social networking environment, a stark contrast to the traditional networking events held at university."

**International Students Rep: Aurelia Israel**
**BE Civil/BE Environmental**

# Year 4 Dinner 2017

The School's 2017 Annual 4th Year Dinner was held at the Four Seasons Hotel Sydney on Saturday 25 November. It was a great opportunity to celebrate the enormous achievements of our students. Engineering degrees are challenging but also rewarding and we congratulate all our students who have completed their studies with us.

As Head of School, Prof Stephen Foster noted in his toast, our futures and reputations will always be entwined and we wish our students success in the future and promise that we will always strive to continue to be a world leading School so they can be proud of their status as UNSW Graduates.

Many thanks to our sponsors who not only provided $1,000 each for a student prize (see page 54) but also subsidised the ticket prices of all the students attending.

Our Outreach: Year 10 work experience tour 2017

# 5 OUR COMMUNITY & INDUSTRY

# CVEN Industry Advisory Committee

The UNSW Civil and Environmental Engineering School's Industry Advisory Committee (IAC) comprises up to 18 members. Membership represents a broad cross section of relevant industry sectors at a senior and influential level. The composition of the committee is reviewed from time to time and meets four times each year.

The IAC's role is to advise the Head of School on industry views of the teaching programs and research directions for the School. Particular briefs may also be provided to the IAC at various times to address specific issues that arise in the School. The IAC may also raise issues that they would like to see investigated and provide some advice on these to the Head of School.

The Committee is an important means by which links between the School and industry are maintained. Its main function is that of a "sounding board" for the School in regard to undergraduate and graduate programs, research directions and community outreach.

The IAC and the School have taken a long term approach to raising the profile and maintaining the excellent reputation of the School with possible future students, their parents, teachers and careers advisers. As a consequence, the School now reaches out to these groups in several practical ways, all initiated by the IAC. Presentation of maths prizes in primary schools; Year 10 visits to engineering projects and activities as an alternative form of "industry work experience" for high school student; and sponsorship of school careers advisers to attend industry awards dinners for engineering excellence.

Each of these means of outreach is supported individually and collectively by IAC members, and each continues to receive very favourable feedback from participants.

The Committee has ongoing concerns about the continuing decline in high school students studying extension mathematics. Along with numerous other professional and industry groups, the IAC regards this as a serious crisis and will continue to actively promote the study of extension mathematics in schools.

The IAC is also committed to supporting UNSW and CVEN women in engineering programs and encouraging more diversity in the profession.

Chair Ian McIntyre looks forward to a continuing energetic engagement by the IAC with the School community, wherever industry input and expertise can be of assistance.

**Ian McIntyre**, Chair IAC
Principal and Global Service Lead, Contractual Services, Advisian/
Director at Ian McIntyre & Associates Pty Ltd

Ian has provided consulting services on a wide range of infrastructure, building and systems integration projects throughout Australia and Asia. His experience prior to joining Evans & Peck in 1987 was in project management and engineering in construction contracting. This involved major civil engineering and multidisciplinary resources, transportation, power and industrial infrastructure projects throughout Australia and in Hong Kong.

Ian 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 outcomes. Professional practice is divided between expert witness roles and advisory roles at the formative stages of projects.

Ian is graded as an Arbitrator and is an experienced expert witness, presenter and facilitator. He is a member of two Dispute Boards on major projects and is a member of the Board in Region 3 (Australasia) 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**
Advisor and consultant at Atkins Projects and Infrastructure

Christine has 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.

**Laurie Foy**
Construction 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 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 Brookfield 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 operational responsibilities for technical strategy and delivery assurance. Member of the Australia Hub executive team. Leading teams charged with design management, digital engineering, quality and specialist engineering responsibilities. Previously Engineering Director within Laing O'Rourke's Engineering Excellence Group - working with project delivery teams to drive positive industry change through innovation.

Innovation Lead with the Pacific Complete Delivery Partner team on the $4.5B Pacific Highway Upgrade (Woolgoolga to Ballina).

**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.

**Ross Jones**
Vice President - Jacobs

Ross Jones is the Vice President and Executive Director - Strategic Growth - APAC and Middle East of Jacobs, and was Vice President of Operations - Infrastructure & Environment for four years before his current position. Having been with the organisation (incl. SKM) for 20 years, his experience covers a variety of technical disciplines, including environmental impact assessment and management, community consultation, air quality management, traffic noise and ecologically sustainable development. Ross has project managed integrated concept design and EISs, predominantly for transport projects and has prepared numerous construction environmental management plans. He has also been project manager on several community consultation projects. Previously, Ross held the position of SKM's Global General Manager – Water & Environment prior to the merger with Jacobs.

**Dr Kourosh Kayvani**
Global Managing Director – Design, Innovation & Eminence at 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 nearly 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 such projects in Australia 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. A Fellow of Institution of Engineers, Australia, Kourosh is the winner of the 2016 John Connell Gold Medal from the Structural College. He is a Fellow of the Australian Academy of Technology and Engineering (ATSE), a Director of Australian Steel Institute (ASI) and the President of Lightweight Structures Association of Australasia.

**David Kinniburgh**
Australian Market Leader – Transportation GHD

David Kinniburgh is GHD's Australian Market Leader – Transportation - responsible for overseeing the development and delivery of GHD's regional transportation strategy. David has worked with GHD for more than 22 years and has strong experience ranging from concept development to detailed design and construction management, predominantly in the transportation sector. Previously, he was the Operating Centre Manager for GHD's Sydney operations, responsible for business in Sydney, Parramatta, Wollongong, Dubbo and Orange. Other roles within GHD have included Operating Centre Manager for GHD's Tasmanian business and Victorian Manager for Transportation and Municipal Engineering. David is the director of ISCA (The Infrastructure Sustainability Council of Australia).

**Garry Mostyn**
Principal, PSM

Garry Mostyn graduated from UNSW in civil engineering in 1973. He subsequently completed a Master's degree in geotechnical engineering at UNSW and a Bachelor's degree in geology and statistics at Macquarie University. He worked with the NSW Department of Public Works and with consulting geotechnical engineers from 1970 until 1986. He then joined the Civil Engineering school at UNSW where he lectured in civil and environmental engineering practice and geotechnical engineering.

He joined PSM in 1997 as a Principal Consultant while retaining a part time appointment at UNSW. Garry's fields of specialist expertise include slope engineering; foundation engineering; rock mechanics; geotechnical risk analysis; and forensic engineering. He has authored or co-authored over 80 journal and conference papers. He has worked on major projects throughout Australia and in Thailand and PNG. He has been an active member of several national and international code and practice committees as well as the highest levels of the Australian Geomechanics Society and the International Society for Rock Mechanics.

**Paul Plowman**
Acting General Manager - Customer Delivery, Sydney Water

Paul Plowman is the Acting General Manager- Customer Delivery at Sydney Water. Prior to this he was General Manager, Liveable City Solutions. 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 18 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. Before joining Sydney Water, Paul held the position of General Manager Program and Portfolio Management at Northern Territory's Power and Water Corporation. From 2011 to 2013, he held several senior management and major project roles with Melbourne Water. Paul has a Bachelor of Engineering (Civil) from Victoria University of Technology, a Master of Business Administration from AGSM and has completed executive education at INSEAD (France) with a focus on strategic partnering.

**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. He is used to operating within the framework of disciplined corporate governance and compliance required for a public company, and dealing regularly with the Board and the Executive leadership team to inform, report on progress and recommend actions on critical issues. 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 the University of NSW, is a Member of the Institution of Engineers Australia and is a Chartered Professional Engineer.

**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. She 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 Road's and Maritime Services for over 7 years and held a number of senior roles, including Southern Region Survey Manager and Principal Surveyor. 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. In 2017 UNSW Engineering presented Narelle with the Maria Skyllas-Kazacos Young Professional Award for Outstanding Achievement.

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

Athena leads a multidisciplinary team within the Technical and Project Services Division of Roads and Maritime to develop and deliver projects across Greater Sydney. Prior to this, Athena was Technical Director – Transport Group at AECOM , responsible for the delivery of complex transport projects including motorways, railways and multi-modal infrastructure, working closely with government and key stakeholders. As 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. Athena was awarded the 2016 Judy Raper Award for Leadership in Engineering, in recognition of her sustained and significant contribution within the profession in Australia.

# External Relations Committee

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 industry and our alumni community.

ERC members represent and promote the School at many presentations and functions on and off campus. These include UNSW and Engineering Information Days, UNSW Open Day, High School visits on and off campus, the Indigenous Australian Engineering Summer School, UNSW Nura Gili Winter School, and the Women in Engineering camp – an annual week-long event coordinated by UNSW Engineering.

The ERC also coordinates the annual Elite Student/ Industry Breakfast, Year 10 work experience program, the CVEN Primary School Maths prize, the industry Partner program and IAC meetings.

| | |
|---|---|
| Dr Kurt Douglas | Chair |
| Dr Craig Roberts | Deputy Chair |
| Dr Mary O'Connell | External Relations Manager |
| Ms Tricia Tesoriero | Special Projects Administrator |
| Dr Ali Amin & Dr Taehwan Kim | Scholarships Officer/s |
| Dr Lauren Gardner | |
| A/Prof Ron Cox | |
| A/Prof Lucy Marshall | |
| Dr Gabriel Rau | |
| Dr Kristen Splinter | |

Kurt Douglas

The 2017 Year 10 work experience week was held in June. Designed and organised by the School's external relations and industry advisory committees, and approved by the NSW Department of Education and Communities, this fantastic outreach project has been running since 2010. It is coordinated every year by Ms Tricia Tesoriero. Feedback from students, parents and careers advisers remains overwhelmingly positive. See accompanying story.

ERC Manager Dr Mary O'Connell continued to develop the School's relationship with our graduates through the Annual Report and bi-annual CVEN e-newsletter, sharing our achievements and activities with several thousand alumni, industry and research colleagues. And in 2017 the School was delighted to be able to support the alumni reunion organised by the class of '77. See fuller story and pics on following pages.

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

# "This week I loved everything about engineering"

## The Year 10 work experience 2017 - CVEN Outreach

CVEN's work experience week for Year 10 high school students has been operating and evolving for eight successful years. In 2017 sixty students from around NSW joined CVEN academics and industry partners on sites around Sydney to experience the world of Civil and Environmental Engineering. Students came from Coffs Harbour, Deniliquin, Goulburn, Griffith, Illawarra, Kooringal, Mullumbimby, Newcastle, Wagga Wagga, and all areas in and around Sydney.

The NSW Department of Education also sent their Business Relationships Advisor to join us on one of our site visits around Sydney. Rosemary Seberry commented that "the students gave me positive feedback about what they had been doing… industry partners were very willing to share their knowledge and experience… we look forward to continuing this relationship."

The students enjoyed exploring the world of construction and infrastructure at Richard Crookes Construction site at UTS, Multiplex-managed sites at Sussex Street and Block 11 Central Park, as well as Laing O'Rourke's exciting 'Innovation Space'. They also visited the UNSW Water Research Laboratory, Centennial Parklands, Seacliff Bridge, North Head and Cronulla Waste Treatment Plants, Barangaroo Delivery Authority HQ, the NSW Transport Management Centre, the UNSW Driving Simulator Lab and UNSW iCinema. Students returned back to the university each afternoon to write their daily reports in the School's computer laboratory. The week ended with an exciting structural engineering competition in our Design studio.

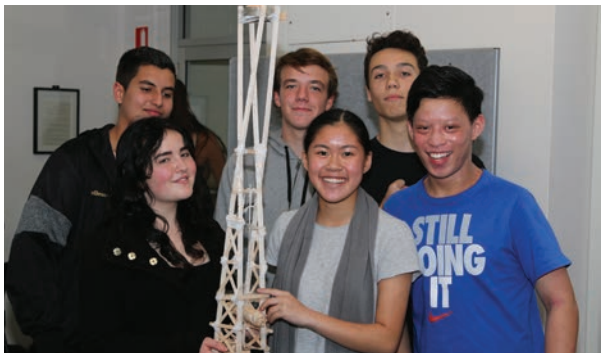
Feedback from students about the program include the following comments:

"today solidified my long-standing passion for construction and architecture…. ".

"These inspiring experiences surely swayed us aspiring engineers into pursuing a career in construction. A big thank you must be given to those working behind the scenes making these experiences possible."

"I will cherish this experience forever and ultimately this week has positively influenced my love for engineering."

"All in all, this week was probably one of the most educational weeks I have had; we learned lots of stuff from clearly specialist individuals, professors,




doctors and engineers themselves, so a massive thank you."

"I have come to know over this week the true importance of engineering in the world and its impact on people's lives. And I now know that I wish to make this impact possible on others' lives."

"This week I loved everything about engineering"

Our grateful thanks for the generous support received from so many of our industry colleagues including Advisian, ARUP, Barangaroo Delivery Authority, Centennial Parklands, NSW Department of Education, Laing O'Rourke, Multiplex, PSM, Richard Crookes Construction, Sydney Water, Transport Management Centre, and the UNSW Water Research Laboratory, for making the time to welcome and inspire the interest of these potential engineers.

Tricia Tesoriero – Year 10 Work experience manager

# Industry Partners

Partners Careers Market


Partners Careers Market


Elite Students Breakfast

The School has substantial and active links with industry to ensure a continuing real-world focus for our teaching and our research. The School is very committed to maintaining and developing these strong ties and we encourage companies and organisations to join our Industry Partners Program to do so.

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

It is important to us that high school students can see a direct path from university to the exciting and challenging world of engineering. 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.

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

Thank you to all our current Industry Partners & Supporters:

Advisian, ANSTO, ARUP, Aurecon, Bouygues Construction, Cardno, CPB Contractors, GHD, JK Geotechnics, Laing O'Rourke, Macquarie Geotech, Multiplex Ltd, Pells Sullivan Meynink Pty Ltd, Royal HaskoningDHV, RPS Group, SMEC Australia, Taylor Thomson Whitting (TTW), Turnbull Engineering, WSP

# Congratulations to all the 2017 primary school maths prize winners


Tara Indigo from Blackheath Public School is one of the 254 NSW primary school students from 87 schools who received a maths prize from the UNSW School of Civil & Environmental Engineering this year.

Tara says she's proud of herself for getting the award. She says her maths skills have improved a lot this year and that she really enjoys maths.

Our congratulations go to Tara and to all the young winners.

The UNSW Civil and Environmental Engineering Prize in Mathematics is an initiative of the School's Industry Advisory Committee, to help address the problem of falling numbers in students undertaking higher level maths and science in high school years. Maths is one of the key requirements for a rewarding, fulfilling and socially useful engineering career.

We wanted to find a way of communicating the practical value of maths and science to students prior to their high school years.

The key objective of the prize - to the value of $100 - is to encourage a lifelong interest in mathematics, as one of the key requirements for a rewarding, fulfilling and socially useful engineering career. Selection criteria emphasize applications and creativity as well as class projects and test results.

For a full list of 2017 winners and participating schools see the following table.

For more information on the primary school prize please contact cvenschools@unsw.edu.au

| SCHOOL | FIRST NAME | LAST NAME |
|---|---|---|
| Alexandria Park Community School | Shafin | Ahmed |
| | Alexander | Ho |
| | Theodore | Sanuri |
| | Leo | Yuan |
| Annandale North Public School | Jake | Donaldson |
| | Liam | Howe |
| | Toby | Skott |
| Arncliffe Public School | Luke | Ghazel |
| | Tarek | Mokdad |
| Australian International Academy | Samah | Abdullah |
| | Noor | El-kadomi |
| | Lina | Hawli |
| | Ameer | Rahimullah |
| Avondale School | Ethan | Kent |
| Balgowlah Heights Public School | Chien Chien | Chang |
| | Luke | Larson |
| Balgowlah North Public School | Joshua | Tucker |
| Balmain Public School | Finn | Cooper |
| | Jingcheng | Zhu |
| Bankstown West Public School | Lian | Alaslani |
| | Zeba | Shaikh |
| | Ismail | Doureihi |
| Beaumont Hills Public School | Akshaj | Shetty |
| | Nelson | Wong |
| Beauty Point Public School | Chloe | Badger |
| | Cairistiona | Clarke |
| | Kaia | Hole |
| | Nicholas | Thomson |
| | Charlie | Voyce |
| Beecroft Public School | Jerry | Li |
| | Kyle | Zhang |
| Bellevue Hill Public School | Ella | Gottheiner |
| | Joshua | Ottaviano |
| | Ben | Suskin |
| | Anastasia | Tarasova |
| Belrose Public School | Toby | Clear |
| | Timothy | Fortescue |
| | Benjamin | Jewell |
| | Sam | Tillotson |

| SCHOOL | FIRST NAME | LAST NAME |
|---|---|---|
| Berowra Public School | Joshua | Beard |
| | Alex | Jones |
| | Charles | Mann |
| | Max | Mohi |
| Blackheath Public School | Oliver | Gray |
| | Tara | Indigo |
| | Charles | Monks |
| Bondi Beach Public School | Jamie | Khov |
| Bondi Public School | Ethan | Donazzan |
| | Ari | Wilson |
| Bronte Public School | Harley | Everingham |
| | Oliver | Sullivan |
| Cammeray Public School | Hugo | Baird |
| | Ella | Cooper |
| | Charlie | Longmore |
| | Aidan | McNamara |
| | Max | Rigby |
| Canturbury South Public School | Darrel | Lai |
| | Clara | Salim |
| Carlingford Public School | Eric | Scholten |
| Carlton Public School | Trisha | Chittajallu |
| | Jason | Gao |
| | Angus | Tao |
| | Eric | Yang |
| Casula Public School | Manuga | Egodage |
| | Muhammad | Kathia |
| | Farees | Mushed |
| | Sava | Prokic |
| | Yasin | Rana |
| Chifley Public School | Alana | Brennan |
| | Luca | Whitaker |
| Claremont College | Jaiden | Chee |
| | Jackson | Macri |
| | Jaden | Tan |
| | Valerie | Wu |
| Clovelly Public School | Nolan | Breton |
| | Luca | Holmes |

| SCHOOL | FIRST NAME | LAST NAME |
|---|---|---|
| Condobolin Public School | Sam | Cunningham |
| | Indyanna | Graham |
| | Oska | Haworth |
| | Cooper | Miles |
| Coolah Central School | Thomas | Burgess |
| | Ardie | Curtis |
| | Fiora | Whitbourne-Martin |
| | Benjamin | Young |
| Cowra Public School | Jacqueline | Long |
| | Liam | Saunders |
| Crescent Head Public School | Isaac | Gorline-Singleman |
| | Lawson | Moffitt |
| Crown Street Public School | Nicolas | Chen |
| | Bonnie | Douglas |
| | Stella | Trevaskis |
| | Victoria | Vu |
| Croydon Public School | Larissa | Vongsuvanh |
| | Syrus | Wong |
| | Grace | Xu |
| | Emma | Zhao |
| Daceyville Public School | Kadir | Erduran |
| | Alicia | Ong |
| Double Bay Public School | Harry | Blain |
| | Hirav | Gandhi |
| Eastlakes Public School | Amira | Mollah |
| | Subhan | Mustafa |
| Eastwood Public School | Christie | Chung |
| | Ian | Lam |
| | Fred | Lin |
| | Daniel | Xu |
| Epping North Public School | Ishaan | Akolker |
| | Eleanor | Ticehurst |
| Ermington Public School | Yu Tong | Duan |
| | Dowon | Kim |
| | Emily | Wang |
| Ermington West Public School | Damian | Carritt |
| | Mitchell | Evans |
| | Gabriel | O'Keeffe |
| | Hannah | Sistrom |
| Ferncourt Public School | Henry | Kershaw Macdonald |
| | Tom | Nguyen |
| | Vu | Nguyen |
| | Arun | Peiris |
| Glenhaven Public School | Jamieson | Hedges |
| Harbord Public School | Donald | Danilo |
| | Cameron | Farrugia |
| | Thomas | Harte |
| | Thomas | McCann |
| Illawong Public School | Yingrui | Deng |
| | Alexandra | Melicher |
| | Hamish | Zacka |
| Jasper Road Public School | Alice | Barrett |
| | Annabel | Hall |
| | Samuel | Luo |
| | Andrew | Wang |
| Kambora Public School | Zoe | Fenn |
| | Emily | Gessner |
| | Penelope | Law |

| SCHOOL | FIRST NAME | LAST NAME |
|---|---|---|
| Kensington Public School | Audrey | Guo |
| | Zaydan | Hassan |
| | Lauren | Teoh |
| | Linton | Zeng |
| Lugarno Public School | Eirena | Chang |
| | Dali | Griffiths |
| | Anthony | Kariotis |
| | Brooklyn | Su |
| Manly West Public School | Erin | Butcher |
| | Hayden | Macfarlane |
| Maroubra Junction Public School | Marissa | Chu |
| | David | Lin |
| | Dylan | Setiawan |
| | Jade | Zhao |
| Masada College | Alwyn | Zhou |
| Matraville Public School | Tasfiq | Chowdhury |
| | George | Zayya |
| Middle Harbour Public School | Sam | Carroll |
| | Tadhg | Nolan |
| Mosman Public School | Tom | Bradley |
| | Simon | Thakur |
| Mount Colah Public School | Joshua | Sayo |
| | Kiana | Sayo |
| Mount Druitt Public School | Mahd | Ahmad |
| | Arin | Sagin |
| | Mishall | Temory |
| | Alice | Ton |
| Narrabeen North Public School | Patrick | Familton |
| | Jye | Wormleaton |
| Niagara Park Public School | Kira | Alarcon |
| | Rhys | Hungerford |
| North Haven Public School | Deklan | Pate |
| | Saxon | Ritter |
| Northmead Public School | Julian | Byun |
| | Vihaa | Raval |
| | Theodore | Robinson |
| | Imandi | Rupasinghe Arachchige |
| Oatley Public School | Luke | Males |
| | Liam | Sellers |
| Our Lady of the Rosary | Nicholas | Harris |
| | Sophie | Loekman |
| | Liam | Leadbetter |
| | Hannah | Mourad |
| Pagewood Public School | Ayuth | Gunasekara |
| | Caitlin | Matthews |
| | Disha | Patel |
| | Ross | Zhou |
| Pennant Hills Public School | Leo | Tu |
| | Leo | Yu |
| Picnic Point Public School | Frederick | Ding |
| | Jamie | Jin |
| | Violet | Loane |
| | Daniel | Nguyen |
| Rainbow Street Public School | Zara | McNally |
| Randwick Public School | Daniel | Barry |
| | Alexander | Loukine |
| Rose Bay Public School | Zephyr | Damari |
| Roselea Public School | Jessica | Wen |
| | Eddy | Zhai |

| SCHOOL | FIRST NAME | LAST NAME |
|---|---|---|
| South Coogee Public School | Sasha | Danko |
| | Sophia | Fang |
| | Curtis | Johnson |
| | Tyler | Klinger |
| St Aloysius Catholic Primary | Levi | Christofordis |
| | Sinead | Laney |
| | Lachlan | Maher |
| | Sascha | Stewart |
| St Declan's Catholic School | Joshua | Bertoia |
| | Jade | Mercer |
| St Francis of Assisi Catholic School | Alexandra | Bulman |
| | Louis | Hewitt |
| St Francis Xavier's Catholic Primary | Sarah | Dewberry |
| | Jane | Le |
| | Zoe | Nguyen |
| | Madeline | Price |
| St Joseph's Catholic Primary | Saul | Spyrides |
| | Melanie | Tinker |
| St Philip's Christian College | Doeun | Lee |
| | Cooper | Wilson |
| St Spyridon College | Nektarios | Kollias |
| Sylvania Heights Public School | Gregory | Kotsalidis |
| | Mike | Lin |
| | Lucy | Symmans |
| Tacking Point Public School | Cory | Thiele |
| | Ethan | Unasa |
| Toongabbie Public School | Sobanen | Dhileban |
| | Chelsey | Torrens |
| Toongabbie West Public School | Dhruvin | Patel |
| | Arjin | Rebel |
| Turramurra Public School | Alannah | Hickson |
| | William | Jo |
| | Jasmyn | Pearson |
| | Ben | Woollard |
| Warrawee Public School | Alexander | Adams |
| | Brendon | Chien |
| | Derek | Li |
| | Armaan | Samra |
| West Pennant Hills Public School | Annabelle | Edwards |
| | Aiden | Gillett |
| | Sebastien | Lui |
| | Joshua | Raj |
| Wheeler Heights Public School | Niklas | Kappelmann |
| | Jayden | Kirby |
| | Alexandra | Popovic |
| | Adam | Picknell |
| Wollondilly Anglican College | Jacob | Croft |
| | Emmett | Shafer |
| Woollahra Public School | Tri | Nguyen |
| | Alexander | Pham |
| | Ted | Powers |
| | Benjamin | Tay |

# Putting our Learning in a Global Context

Dr Fiona Johnson – a global engineer

Agriculture is vital to the livelihoods of many in Nepal, with 68% of the population estimated to be employed in the agriculture and forestry sector. However, a number of factors including decreased financial investment and extreme weather events have threatened agricultural production in the already water-troubled country, bringing about food insecurity, poverty, and serious public health issues.

The World Bank has listed four main restrictions to increasing agricultural production in Nepal: a lack of irrigation, unavailability of inputs such as quality seeds and fertilizers, pests, and lack of access to advisory services and marketing.

A new project by UNSW and Arizona State University (ASU), partners in the collaborative PLuS Alliance, is tackling some of these issues. **Dr Fiona Johnson**, Senior Lecturer with the UNSW School of Civil and Environmental Engineering, is excited about the results that can be achieved from this type of international collaboration.

"This project is exciting because it uses the combined skills of ASU and UNSW academics and students to address an important issue for communities in Nepal," says Dr Johnson.

In 2017 students and academics from UNSW and ASU investigated methods for turning an invasive weed species into a useful resource. The weed, Mikania micrantha, is smothering vital food sources with impacts felt throughout the whole ecosystem, including on endangered animals such as the One Horned Rhinoceros and the Royal Bengal Tiger in Nepal's Chitwan National Park.

Research has identified that this weed can be converted into biochar, and used to improve the availability of nutrients in soil, increasing agricultural productivity. While UNSW students investigate the sustainability of different biochar production techniques, ASU students are designing devices that can easily harvest the weed from the forest.

"The project will provide technical expertise on optimising biochar production," said Dr Johnson. "This will include considering whether it is better to use the biochar as a soil additive or if it is more economical to sell it for charcoal production. This has the dual benefits of reducing the pressures on the forest ecosystem by reducing the weed and providing new income streams for local residents".

The second element of the project is focused on irrigation – a multifaceted issue in Nepal with old or inefficient infrastructure widely used and numerous water access and supply issues in play.

The PLuS Alliance is working with local NGO LI-BIRD who are implementing solar-powered community irrigation schemes as part of their work on the Climate-Smart Villages program, where solar-powered irrigation allows communities to grow vegetable crops during the dry season, providing additional food and income.

ASU students visited Nepal in May to help with the installation of a new irrigation scheme which is working well, and UNSW students will investigate the long term water balance questions—particularly in regard to climate change—and provide a framework to incorporate such assessments into future project designs.

This project requires a range of different skills, and UNSW academics have been integral in providing this support and expertise. Dr Rita Henderson, Senior Lecturer with the School of Chemical Engineering, is providing advice to the project on the biochar characterisation aspect while Dr Johnson is considering the sustainability aspects of the project—both in terms of the biochar and also the irrigation system design.

Professor Stephen Foster, Head of UNSW's School of Civil and Environmental Engineering, has been instrumental in enabling students to contribute to exciting and innovative projects such as this — and by combining the project with ASU and students in Kathmandu, UNSW students are putting their education into a global context.

Hand pump for a household in Amaltari Village. Credit: Mark Henderson

# WiE Award 2017

Congratulations to CVEN IAC member **Narelle Underwood** on winning The Maria Skyllas-Kazacos Young Professional Award for Outstanding Achievement in 2017.

"To say it is an honour is an understatement," said Narelle Underwood, Surveyor-General of NSW and Director of Survey Operations, on being presented with the award at the UNSW Women in Engineers Awards ceremony, held at The Mint in Sydney on the 17 August 2017.

"There are many incredible young female engineers from UNSW who have made outstanding achievements in their careers. I love my job and the pathway that my career has taken, so while it's taken a lot of hard work and sacrifice to get where I am today, to have my accomplishments acknowledged in this forum is a true honour," Underwood continued.

Narelle Underwood graduated from UNSW in 2009 with a Bachelor of Engineering First Class Honours in Surveying and Spatial Information Systems and the University Medal. She is also the first woman to ever be appointed to the role of Surveyor-General in any Australian state.

"Narelle Underwood has blazed an outstanding trail for the female engineers that follow in her footsteps, and we are proud to present her with this award for her commitment and passion for her profession," says Professor Mark Hoffman, Dean of UNSW Engineering.

The two other awards presented at the ceremony were The Judy Raper Award for Leadership, won by Professor Selomulya, leader of the Biotechnology and Food Engineering Group ; and The Ada Lovelace Medal for an Outstanding Woman Engineer, won by Kathryn Fagg, an experienced Non-Executive Director and current President of Chief Executive Women.

# EA Awards

Congratulations to our high achieving alumni

**Mark Babister**
(BE Hons '88, MEngSc '93, UNSW, GradDipMgt, Deakin, RPEQ)

**John Holland Civil Engineer of the Year 2017**

Warmest congratulations to alumnus Mark Babister, FIEAust CPEng NER, for his prestigious Engineers Australia award. The Sir John Holland award is presented annually to an eminent civil engineer who has made a major contribution to the profession.

Mark is a national leader in water engineering, specialising in flood estimation and floodplain management. He has over thirty years' experience in water engineering studies, and has successfully led an extensive number of significant hydrologic, hydraulic, floodplain management, infrastructure and dam studies for a wide range of water managers and infrastructure owners.

Mark has been instrumental in the update of Australian Rainfall and Runoff (ARR) which is the national guide for design flood estimation. Mark chaired the technical committee, and was a member of the steering committee overseeing the project and is a co-editor of Australian Rainfall and Runoff. He has played a key role in development of a number of other guidelines for water engineering in Australia and undertaken a number of expert advice roles.

**Sam Johnson**
BE Civil Hons 1 2017

**EA Rod McGee Medal**

Our very recent graduate Sam Johnson was awarded the EA 2017 Rod McGee Medal -which recognises and encourages engineering students to engage in career opportunities in public works engineering.

Sam has always been interested in the role of infrastructure to ensure basic human rights and the possibilities of market-based solutions to poverty issues. He believes that the most important infrastructure challenge of the 21st century is not to build the largest skyscraper, but rather to ensure infrastructure is provided so that people worldwide can enjoy a reasonable quality of life.

His fourth year thesis was written as a general overview document for other engineers who are designing new products for development or humanitarian aid, so that they have a basic theoretical overview of common business models – successes and mistakes.

Sam has conducted research on behalf of Engineers Without Borders Australia with the primary objective to provide insights into how the business model of EWB's Cambodia-based social enterprise ATEC* Biodigestors can be improved. A biodigestor is a vessel that transforms organic waste into biogas for cooking and organic fertiliser.

Our warmest congratulations go also to Sam.

# Alumni win Australia Day Honours

Congratulations to Robert (Bob) Harrison, OAM and John Yeaman, AM

In the 2017 Australia Day Honours, School alumni Robert (Bob) Harrison (BSurv '73) and Prof John Yeaman, FTSE (ME '76, PhD '81) were recognised for their services to Australian society.

Bob Harrison received the Medal of the Order of Australia (OAM) for his outstanding service to surveying and to professional organisations. Professor Yeaman was awarded Membership of the Order of Australia for his significant service to civil engineering and road asset maintenance management, to professional organisations, and to the community.

Bob Harrison, who is Principal at Harrison, Friedman & Associates – has been a member of the Institution of Surveyors since 1969, later serving as President and in several other leadership roles.

As a professional with over forty years' experience, Bob has done it all: worked abroad and interstate; run his own practice out of Jannali, Harrison Friedmann & Associates; chaired numerous industry committees and boards; served as president of the Institution of Surveyors NSW and regularly attended and facilitated international symposiums. In 2014 he was awarded the Professional of the Year at the NSW Excellence in Surveying & Spatial Information Awards. In receiving that award, Bob stated that for him surveying has always been and still is "an enjoyment."

Bob is also respected in the community for his generous assistance to the Apex Foundation for children with special needs, where he has been an Apex member since 1976, a life member since 1996 and is now the President of the Apex Children's Chalet. Former Principal Surveyor of RMS, Mark Gordon, emphasised Bob's worthiness of the award by saying: "This recognition is well overdue. Bob is a Saint."

Bob has loved his work as a surveyor and always encourages young people to consider surveying as a career. "BIS Shrapnel has done a study" he says, "which found there will be a shortage of 15,000 surveyors in Australia by 2021."

Professor John Yeaman AM, FTSE, completed his PhD at the School in 1981 under the supervision of Professor Ian K Lee – his topic was on the development of pavement management systems for local government. Since then John has assisted road organisations and governments across the world in the management of their road networks. His main fields of expertise include design, implementation and operation of road management information systems, assistance of road authorities in planning and programming road maintenance and improvement programs under constrained budget situations. John has occupied the position of director, deputy team leader or team leader on several internationally recognised projects as well as occupying key expert positions in multi-disciplinary teams.

John has recently been appointed to an endowed Chair – The Department of Transport and Main Roads (DTMR) Professor of Pavement Engineering at the University of the Sunshine Coast.

Our warm congratulations to Bob and John for their well-deserved awards.

# Alumni Reunion 1977 – 40th year reunion

Graduating class 1977 civil engineering UNSW

Aaah the seventies!

A time of great cultural change, wonderfully flared trousers and long luscious hair for men, yes even at the School of Civil Engineering!

The Class of '77 held a forty year reunion on Saturday 4 November 2017 in the Lord Nelson Brewery in Sydney's CBD. It was organised by Joe Cato, legendary toga wearer and leader of the student organisation CIVSOC, along with loyal stalwarts Joseph P Canceri and Alan Taylor.

Alas, the group weren't able to round up all their old classmates pictured above on the old front steps of the School...

but as Joe said, "It was more intimate with the smaller crowd and a bit easier to get around to everyone."

Legendary ex-staff member Alex Heaney went along to represent the School. He reported: "I was amazed at some of the things they remembered. They particularly referenced the odd lecturing features of Ken Faulkes, Bob Frisch-Fay, Ray Lawther, Peter Kneen, and Myself! "

Stuart Wood and his wife Michele were at the enjoyable catch-up. Stuart had brought along a picture of his graduation, where he had sat beside Rod Wong, who was also at the reunion. Of course no-one had aged a bit!

"The butchers vs the greasers"; traditional flour fight between Medicine and Engineering

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