Dear Friends and Colleagues

As you will see from the contents of this 2016 Annual Report, the School of Civil & Environmental Engineering had yet another stellar year in teaching, in research and in community and industry outreach.

Internationally ranked for the third year in a row as the premier School of its kind in Australia, and one of the world’s top twenty, we continue to forge ahead, with innovative research fields, new courses, and an ever-expanding network of industry connections.

Engineers have always been people of action – driven to create, to solve problems, to make things happen, and to make a difference. Our current students and staff are no exception.

In the 21st century, the School is moving towards a blended learning approach - utilising creative, efficient and educationally sound digital teaching & learning methods as well as continuing our high-quality embodied methods – lectures, laboratories, site visits and workshops. The School actively encourages and rewards good teaching - amazingly, almost one quarter of our academic staff have received UNSW Teaching Excellence awards. In 2016 Dr Ali Amin was the latest staff member to receive a well-deserved V-C Teaching Excellence award.

The School remains committed to advancing a more prosperous, safe and just society. Our Centres and discipline groups provide focal points for our researchers to contribute to global efforts in innovative civil, environmental and geospatial engineering research. Our strengths as engineering research leaders are evidenced by our ERA ranking of 5 out of 5, and grant funding success - with over $13 million awarded in 2016 to our research centres, including more than $3.6 million won in prestigious Australian Research Council grants. With strong internal and external collaborations - and with mentorship provided to our great young researchers – the School’s future excellence in research is ensured.

This Report provides only a small insight into our busy year and into the quality and resourcefulness of our staff; academic, research, professional and technical. A strong School does not happen without the efforts and collegiality of its staff; I thank them all for their amazing dedication and hard work.

PROFESSOR STEVEN FOSTER
HEAD OF SCHOOL

The UNSW School of Civil & Environmental Engineering is internationally ranked as Number 1 in Australia (QS & AWRU) and in the world’s top 20 (QS World University Rankings 2014-7).

We are the largest School in the UNSW Faculty of Engineering, itself the pre-eminent centre for engineering studies and research in Australia.

From our foundation in 1949, the School has pursued excellence and innovation in education and research, and our alumni are to be found as leaders and decision makers in industry, government and the community.

With over 2,900 current students, we play a leading role in the delivery of undergraduate and postgraduate degree programs – with a focus on sustainability as well as core engineering knowledge, preparing our students to confidently face the challenges of contemporary global society. We believe that civil and environmental engineers are uniquely placed to understand, meet and solve those challenges.

The School is at the forefront of fundamental and applied research across the breadth of civil and environmental engineering with three internationally acclaimed research centres – in infrastructure (CIES), water (WRC) and transport (rCITI) and with several other vibrant, cutting-edge research hubs. Our academic staff are recognised world leaders in their fields, supported by over 80 full-time researchers.

Each year we work with or on behalf of over 100 industry and government organisations on specific industry-related projects and have won millions of dollars in federal funds in order to pursue investigations into issues of national importance.

We continue to forge new links with industry and community partners to ensure a continuing real-world focus for both our teaching and our research.
The School is ranked first in Australia - by both the Quacquarelli Symonds (QS) World University Subject rankings (2015 - 2017) and the Shanghai Jiao Tong Global Rankings of Academic Subjects (2016) – also known as Academic Ranking of World Universities (ARWU).

Globally we are placed at 16th in the world by QS, an amazing achievement, and the only Australian Civil Engineering School to be included in the QS top 20 in 2017.

QS Rankings are based on the expert opinion of 76,798 academics and 44,426 employers, alongside the analysis of 28.5 million research papers and over 113 million citations sourced from the Scopus/Elsevier bibliometric database.

UNSW itself has a 5+ star ranking with QS, based on its achievements in eight categories: Research, teaching, facilities, access & inclusivity, employability, internationalisation, specialist excellence, and innovation.
SCHOOL MANAGEMENT COMMITTEE

The School Management Committee represents the peak decision-making body in the School with all key decisions relating to finances, staffing and overall direction debated and ratified by this group. The SMC is chaired by the Head of School and is made up of the Chairs of the School’s major committees, the Associate Head (Academic), the School Business Manager, the Student Centre Manager, the Directors of UNSW Centres based within the School, and other discipline group leaders.

Prof Stephen Foster Chair
A/Prof Mario Attard Associate Head
Prof S Travis Waller Chair RMC, Director rCITI
Dr Steven Davis Co-Chair, TLC
Dr Kurt Douglas Chair, ERC
Prof Chongmin Song Chair, CIT&ETC
A/Prof Vinayak Dixit Chair TSC
Prof Richard Stuetz Director WRC (Kens); Co-Chair TLC
Prof Ian Turner Director WRL
Prof Brian Uy Director CIES
Dr Martin Andersen Director CWI
A/Prof Ron Cox Director AACARNSI
Prof Nasser Khalili
Prof David Carmichael
Prof Chris Rizos
Anthony Dever Business Manager
Kristy Guia Student Centre Manager
Betty Lai EA to HoS

The School Executive Group (SEG) is an advisory group to the Head of School. It meets monthly with the Head of School to discuss key and current issues on matters of strategy, planning and policy directions for the School.

2016 School Executive Group Members
Professor Stephen Foster, HoS
Associate Professor Mario Attard
Professor David Carmichael
Mr Anthony Dever
Professor Nasser Khalili
Professor Richard Stuetz
Professor Ian Turner
Professor Brian Uy
Professor S Travis Waller

The School Board is chaired by the Head of School and comprises all academic and research staff in the School, together with student and professional and technical staff representatives. The Board meets twice a year; it provides advice to the Head of School about academic governance arrangements, on the quality of the School’s learning and teaching, and on research activities.

It also provides advice to the Head of the School about the School Committee structure.

Committee Chairs report to the Board on the outcomes of committee activities, on decisions, and on strategic direction.

The Head of School reports to the Board on the management of the School and related activities and issues and direction.

Seven Things You Should Know about UNSW Civil and Environmental Engineering

No 1!!

Ranked No 1 – in Australia and in the world’s top twenty

Over 65 years of innovative and in-depth teaching – a Foundation School of UNSW

EXPERIENCED

over 2000 undergraduates enrolled in 16 different degree programs, 660 Masters students in eight specialisations, & 200 PhDs

EXEMPLARY

Five out of Five ERA ranking winners of 135 Australia Research Council Grants

INVESTIGATIVE

Eight research hubs working across the full range of civil, environmental and geospatial engineering

INFLUENTIAL

consistently one of the highest contributors to Engineers Australia’s Top 100 Engineers lists

CONNECTED

each year we work with over 100 organisations on specific industry related projects

EXPANSIVE

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Australia’s Global University

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No 1!!
Our Vision: To facilitate the coordination of the Australian research community in the field of Climate Change Adaptation for Settlement and Infrastructure – supporting multi-disciplinary research, building research capacity, and promoting open exchange of information and resources.

As an internationally recognised centre, focused on high-level research in structural engineering, geotechnical engineering, engineering materials and computational mechanics, CIES provides outcomes that improve the design, construction and maintenance of economic, effective, safe and sustainable civil engineering infrastructure.

Construction is the world's largest industry and its efficiency and sustainability is of obvious importance. CIRI academics are actively engaged in industrial research on major construction projects in the region. We undertake basic and applied research in two broad areas - the design and management of large scale field processes and improved technology for construction activities.

An integrated understanding of groundwater is essential for the future of the Australian environment, our urban and rural communities, and for agricultural and mining activity. The Connected Waters Initiative Research Centre aims to help fill critical gaps in our knowledge through research, teaching and public education.

Our aim is to be a world leading organisation in integrated interdisciplinary transport research and development. Our five core research pillars are Planning, ITS, Communications, Infrastructure, Energy/Fuel and Computational Sustainability.

The Surveying and Geospatial Engineering (SAGE) Research group conducts world class research in the subdisciplines of geodesy, photogrammetry, positioning measurement and remote sensing. The group includes one of the world's top satellite and wireless positioning research groups, and one of Australia's premier Earth observation research teams.

The aim of the Sustainable Engineering Research Initiative is to explore, research, define, assess and resolve issues of sustainability in engineering problems, in particular the implications and implementation of sustainability concepts and practices for all areas of civil infrastructure - buildings, roads and transport, water supply, waste disposal -- in the areas of planning, design, construction, operation and maintenance.

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 civil and environmental hydraulics. We also undertake commercial activity in collaboration with industry.
Akbarzadeh, Ali
Lecturer
BE AUT, Tehran, PhD NUS
Research Interests: Sustainable Construction: Sustainability Assessment; Information Modeling; Construction Information Technology: Text-based Health Monitoring; Concrete technology: Design for Deconstruction

Amin, Ali
Lecturer
BE (Civil), 1st, PhD, UNSW
Research Interests: My research is centred upon the use of fine granular polysulphide or otherwise in concrete. By adding fillers to concrete, the primary objective is to bridge cracks once they form and prevent 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: Structural and physical and geotechnical processes at the surface water groundwater interface; Monitoring and characterisation of near surface materials, processes and processes at the near surface; reactive flow & transport modeling; developing methodologies for using heat as a tracer of groundwater flow; karst hydrology.

Attard, Mario
Associate Professor
Associate Head, Academy BE PhD MIEE UNSW, MIE Aust, CEng
Research Interests: Finite Strip Isotropic & Anisotropic Hyperelastic Modelling: Fracture in Concrete & Masonry; Crack Propagation due to Creep: Oscillation of High Strength Concrete Columns: Building of Sandwich Columns: Lateral Buckling of Thin-Walled Columns: Graphene: Air-water mass transfer across hydraulic air-water interfaces.

Barrington, Steve
Senior Lecturer
PhD UNSW, CPEng, BEng, MSc
Research Interests: Structures subjected to high volume fuel ash. Research includes: Fatigue, Creep, Shrinkage, Corrosion, Bond, drying shrinkage, self-compacting concrete, deicing salt, and alkali aggregate reactions.

Bettis, Kurt
PhD University of Sydney

Brown, Bruce
Senior Lecturer
BE MSc USyd, PhD UNSW

Carr, Craig
Associate Professor
BE, MSc UNSW, FE Aust
Research Interests: How geospatial technologies & applications; used for science, & by society in general; applied to waste management systems. I am a water engineer interested in geospatial technologies & applications; groundwater hydrogeology, hydrogeologic transport, hydrogeologic 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 field and in the office in order to quantify properties and processes from real-world field data.

Carmichael, D. O.
Professor
BSc BE PhD USyd, DSc, UNSW, CEng, CEng, MASC, FE Aus, MInstMC

Castel, Arraunt
Associate Professor
BE, MEng, PhD Toulouse

Cox, Ron
Associate Professor
Commonwealth ACARSMBE BE PhD UNSW, FE Aust
Research Interests: GeoSpace: Earth observation algorithms, scene analysis, change detection. Isometric 3D model generation from lidar (known as LIDAR) interpretation, & extract spatio-temporal information science & research that allow us to understand the way the view, understand, design, plan, manage, analyze, interpret, & extract spatio-temporal information such as patterns & trends of geospatial data. I investigate spatial analysis, change detection from lidar & UAV platforms.

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

Dixit, Vinayak
Associate Professor
Chair, Technical Services
MT Institute of Technology, Delhi, PhD University of Central Florida
Research Interests: Civil Engineering: Online Engineering: Electronic Governance.

Douglas, Kurt
Pelec Sullivan Mˇenyik
Senior Lecturer of Rock Mechanics
Chair, External Relations
BE (Hons) USyd, PhD UNSW
Research Interests: I am an expert in the field of rock mechanics. Predicting strengths of large scale rock masses (hundreds of meters) continues to be a major challenge. In attempting to improve our understanding using laboratory controlled methods, I am also currently involved in an ARC & Industry sponsored project researching erosion of rock spoilways & backward erosion of embankment materials.

Fielder, Stefan
Dipl Ing RWTH Aachen, PhD UQ
Research Interests: I research the behaviour of structural systems subjected to seismic loading with consideration of reinforced and prestressed concrete. I am particularly interested in bringing new and advanced materials to the engineering of concrete structures. My interests are in the use of high and ultra-high performance concrete, fibre-reinforced concrete and geopolymer concretes and in the development and exploitation of new materials and technologies for strengthening and repair of structures and structural systems. I develop physical models and the implementation of numerical and computational tools such as FEM and for their use in the study of behaviour of concrete structures that are subjected to extreme events.

Gao, Wei
Associate Professor BE HDU, ME PhD Xidian, MBA

Gardner, Laureen
Senior Lecturer
BS Arch, MSc, PhD U Texas & austin
Research Interests: I am a water engineer interested in geospatial technologies & applications; groundwater hydrogeology, hydrogeologic transport, hydrogeologic 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 field and in the office in order to quantify properties and processes from real-world field data.

Ge, Linlin
Associate Professor, BE, MSc, PhD UNW
Research Interests: I combine remote sensing with GIS & GPS to produce high quality & reliable maps. Integrating radar & optical remote sensing with GPS & GIS, we measure the subtle changes in the surface of the Earth with minimum latency using data collected from airborne & satellite platforms.

Geoff, Harry
Senior Lecturer
BSc, MSc, PhD, USyd
Research Interests: Least Squares analysis and 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 local, national & international standards & guidelines?

Hamed, Ehab
Senior Lecturer Blqy, MSc MSc PhD Technion

Harvey, Bruce
Senior Lecturer
BSc UNSW, PhD Higher Ed, USA
Research Interests: The role of uncertainty, the role of real-time information & change detection in multi-domain integrated systems (buildings and bridges) constructed & managed using advanced data processing tools.

Johnson, Fiona
Senior Lecturer
BE, PhD UNSW
Research Interests: Least Squares analysis and 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 local, national & international standards & guidelines?

Khalihi, Nasser
PhD, BSc, MSc, BMir, PhD UNSW

Khan, Stuart
Associate Professor
BSc, MSc USyd, PhD UNSW, MIE Aust

Khoshghalb, Arman
Senior Lecturer
BSc, MSc, PhD, UNSW
Research Interests: Large deformation of geotechnical structures, advanced numerical methods in geomechanics, advanced modeling of unsaturated soils & coupled analysis of porous media.

Lim, Siamsun
Associate Professor
PhD, MA (Mathematics)
Senior Lecturer
PhD, Berlin, Germany
Research Interests: How geospatial technologies & applications; used for science, & by society in general; Applied to waste management systems. I am a water engineer interested in geospatial technologies & applications; groundwater hydrogeology, hydrogeologic transport, hydrogeologic 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 field and in the office in order to quantify properties and processes from real-world field data.

Liu, City
Professor
BSc, MEng, PhD, UNSW

Lyon, Chris
Professor
BSc, MSc, PhD, UNSW
Research Interests: I conduct geospatial information science & research that allow us to improve the way we view, understand, design, plan, manage, analyze, interpret, & extract spatio-temporal information such as patterns & trends of geospatial data. I investigate spatial analysis, change detection from lidar & UAV platforms.

Moore, Stephen
Senior Lecturer
Director, Environmental Studies
BE UNSW, MSc, CPEng, MIE Aust
Research Interests: Environmental Assessments: Sustainability Assessment: Water Recycling & Seawater Desalination: Environmental Impact Assessment:

Rashidi, Taha
Senior Lecturer
BSc MSc Sharif UI Tehran, PhD UI Chicago

Rey, Daniel
Lecturer
BSc, MSc EE & IT Montpelier; MSc Maths UCL-Io, Brazil; PhD ISTIAR Lyon. Grenoble, France
Research Interests: Transportation networks, combinatorial algorithms, mathematical programming and operations research. I am interested in travel prediction models, sustainable urban travel behaviour in urban contexts.

Robertson, Craig
Senior Lecturer
BSc, MSc UNSW, University of South Australia, PhD Australia
Research Interests: I am a water engineer interested in geospatial technologies & applications; groundwater hydrogeology, hydrogeologic transport, hydrogeologic 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 field and in the office in order to quantify properties and processes from real-world field data.

Sarkar, Sourav
Senior Lecturer
BSc, MSc, PhD, UNSW
Research Interests: Study behaviour of structural systems subjected to seismic loading with consideration of reinforced and prestressed concrete. I am particularly interested in bringing new and advanced materials to the engineering of concrete structures. My interests are in the use of high and ultra-high performance concrete, fibre-reinforced concrete and geopolymer concretes and in the development and exploitation of new materials and technologies for strengthening and repair of structures and structural systems. I develop physical models and the implementation of numerical and computational tools such as FEM and for their use in the study of behaviour of concrete structures that are subjected to extreme events.
Russell, Adrian
Associate Professor
BE, PhD UNSW, PGCert Bristol
Research Interests: Unsaturated soils: Fibrereinforced soils; Particle-crushing in granular media; In situ testing of soils; Constitutive modelling of soils; Wind turbine foundations.

Senetakis, Konstantinos
Lecturer
Stud. Civil Engineering, MSc, PhD, Aristotle University, Thessaloniki
Research Interests: Rapid As-built Field Modelling in Construction; Sustainable Construction Operations; Construction Automation and Robotics; Structural Health Monitoring; Dynamic Data-Driven Project Management

Shen, Johnson
Xue Song
Lecturer
BEng, MS, Ning, PhD Hong Kong Polytechnic University
Research Interests: Risk Analysis; Project Management; Health Monitoring; Structural Health Monitoring; Dynamic Data-Driven Project Management

Splinter, Kristen
Lecturer
BSc (Eng), Queen’s University, Kingston, Canada, MSc, PhD Florida, Oregon State, USA
Research Interests: I study how our coastal (namely the beaches) erode and recover from changes in the size of waves, sediment supply, and water levels. I develop complex 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: Coastal Engineering & Coastal Management; Innovative coastal measurement & monitoring techniques; Sediment transport at the beachshore; Modeling of coastline variability & change spanning storm, seasonal, annual & decadal time-scales; Assessment of coastal adjustment to a changing climate

Uy, Brian
Professor & Director of CES
BE (Hons 1), PhD UNSW
Research Interests: Composite steel-concrete structures, critical infrastructure protection systems, design/construction techniques, rehabilitation & strengthening techniques, steel structures, structural health monitoring systems, sustainable construction materials.

Valiapour, Hamed
Harvard Associate Professor
BE, MEng, PhD UNSW
Research Interests: Structural Mechanics including reinforced concrete & steel, fibre-reinforced timber & timber-concrete composite materials; Behaviour of structures subjected to extreme loading scenarios such as fire loading, collapse simulation, emergency response, critical member loss, impact, blast and explosions; Computational mechanics and non-linear finite element modelling of structures; Constitutive modelling of wood.

Waite, T
David Scientia Professor
Research, UNSW Engineering
Research Interests: Separation processes involving colloids & particles in water & wastewater treatment; Desalination; Environmental chemistry; the solid-solution interface; photochemistry in aquatic systems; hydrogeochemistry for theoretical & experimental studies on the fate & effects of chemical pollutants; interactions between trace elements & microorganisms in aquatic systems.

Waller, St Trinian's Professor
Transport Innovation Chair, Research Management Centre
BSc Qatar State, MS, PhD Northwestern
Research Interests: Transportation network modelling, particularly systems characterized by dynamic, 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 modeling, networked dynamic equilibrium, system analysis of public-private partnerships, & bi-level optimization of transport networks.

Wallner, Jinhui
Associate Professor
BSc Wuhan, PhD Curtin

Waseda, Kenichiro
Associate Professor
MSc, PhD Ibaraki
Research Interests: 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.

Wiedmann, Tony
Associate Professor
MSC, PhD Ulm
Research Interests: Structural Mechanics including reinforced concrete & steel, fibre-reinforced timber & timber-concrete composite materials; Behaviour of structures subjected to extreme loading scenarios such as fire loading, collapse simulation, emergency response, critical member loss, impact, blast and explosions; Computational mechanics and non-linear finite element modelling of structures; Constitutive modelling of wood.

Westwood, Marshall
Senior Lecturer
ANU
Research Interests: I use computer models to simulate rainfall & runoff processes in catchments, working to improve hydrologic forecasts through improved catchment model structures & methods & examining how such models can assist regulators to develop appropriate legislation.

Wong, Jinling
Associate Professor
BSc, MSc, PhD Curtin

Woo, Alan
Professor
BE, PhD, UNSW
Research Interests: Constitutive and micromechanical models for soils and materials. My research focuses on simplification and generalization in hydrologic modeling, especially using nonlinear dynamic and scale-dependent models.
WELCOME NEW STAFF

WELCOMING DR TAEHWAN KIM

CVEN would like to welcome Dr Taehwan Kim to the 7th floor of structural engineering. Originally studying and working in fast-paced, urban city Seoul, South Korea, he comes to us via the USA: working at Oklahoma State University and completing his PhD at Purdue University in Indiana. Dr Kim brings with him many strengths and much experience, but perhaps his two greatest strengths are his drive toward interdisciplinary research and his ambition to be a world leading researcher in the relatively new area of chemistry of cementitious materials.

Only speaking English for eight years, he learned this difficult second language through email, discussions with his supervisor and by reading and writing technical materials, but he is also quickly becoming accustomed to the colloquial nuances of Australian English. He has felt very welcomed and accommodated by CVEN staff and students who, he says, “are familiar with communicating with international staff”. Morning tea breaks with 7th floor colleagues are proving instructive and heart-warming, as the arrival of Dr Kim further enriches the global character of the CVEN community.

His overarching career interest is improving the durability and sustainability of construction materials. Concrete has a long history, perhaps beginning three thousand years ago as the Egyptians built their pyramids. Two thousand years ago Romans understood a lot of the principles of how to make and harden concrete: “I hope in the future, by bringing chemical science to empirical data, we can predict the performance more accurately and improve the durability of concrete materials”, lowering costs, ensuring safety and contributing to a sustainable future.

DR DAVID REY

CVEN would like to congratulate Dr David Rey on becoming a Lecturer in transport engineering after being a research associate here for 3 years. It has been a smooth transition, as David has been teaching several classes since he arrived. Now, along with a new office come new opportunities. This office is not one of those well-worn rooms with years of collected artefact softening the corners. His is an office waiting to be filled with the stuff of his career.

Already, he has designed a new post graduate course for the Masters of Engineering Science Transport. Transport Logistics Engineering (CVEN9421) explores advanced methods applied to transport systems such as network algorithms, mathematical optimisation and integer programming. This new subject caters for the rapid development of transport infrastructure and transport systems such as network algorithms, mathematical optimisation and integer programming. This new subject caters for the rapid development of transport infrastructure and transport systems such as network algorithms, mathematical optimisation and integer programming.

Transport systems engage so many stakeholders and David Rey believes it is vital that transport engineering academics recognise and delineate their role within the matrix of stakeholders. “We have to be innovative, designing new ideas and new solutions: solutions that are real not just on paper, but on the road and in the sky”. Industry is a vital link in the implementation of innovative ideas, with their established infrastructures and teams of engineers at their disposal. Working at CVEN was so attractive to David partly because of its close knit ties to industry combined with its intellectual rigour and technological capacities.

Dr Rey’s connections to local and international industry are being constantly solidified by his research work. French – Australian joint venture Kools-Dowyer is currently working with the NSW government to design innovative transport services. David will be assisting them with innovations such as responsive, on-demand public transportation. This is the transport system of the future, re-thinking traditional methods, attempting to make moving around our cities easier, safer, saner and cleaner. David Rey will be part of this sweeping change.

DR KRISTEN SPLINTER

Kristen Splinter’s role at the Water Research Laboratory (WRL) has been evolving since she first arrived in 2011. Moving from a purely research role, she has recently joined the CVEN academic team, accepting a full time lecturing position, teaching undergraduate and postgraduate students a broad range of topics including sedimentology and coastal engineering.

Kristen Splinter’s world is full of movement. “I just purchased a new quadcopter to test out the concept of having moveable video imaging systems. Traditionally we mount cameras and drones on top of the Flight Deck building, is continuously scanning the ‘why’ of a problem. Much of her research these days focuses on moveable video imaging systems. Traditionally we mount cam-

It was during her PhD that she got her first taste of Australia: chasing a new quadcopter to test out the concept of having moveable video imaging systems. Traditionally we mount cameras and drones on top of the Flight Deck building, is continuously scanning the ‘why’ of a problem. Much of her research these days focuses on moveable video imaging systems. Traditionally we mount cameras and drones on top of the Flight Deck building, is continuously scanning the ‘why’ of a problem. Much of her research these days focuses on moveable video imaging systems. Traditionally we mount cameras and drones on top of the Flight Deck building, is continuously scanning the ‘why’ of a problem. Much of her research these days focuses on moveable video imaging systems. Traditionally we mount cameras and drones on top of the Flight Deck building, is continuously scanning the ‘why’ of a problem. Much of her research these days focuses on moveable video imaging systems. Traditionally we mount cameras and drones on top of the Flight Deck building, is continuously scanning the ‘why’ of a problem. Much of her research these days focuses on moveable video imaging systems. Traditionally we mount cameras and drones on top of the Flight Deck building, is continuously scanning the ‘why’ of a problem. Much of her research these days focuses on moveable video imaging systems. Traditionally we mount cameras and drones on top of the Flight Deck building, is continuously scanning the ‘why’ of a problem. Much of her research these days focuses on moveable video imaging systems.
FAREWELL TO AN OLD FRIEND: DR UPALI VANDEBONA

Transport engineer Dr Upali Vandebona has worked at the School of Civil and Environmental Engineering for nearly 30 years. In 2016 he transitioned from full time academic to an Honorary Senior Lecturer, a kind of semi retirement from the life he has known for so long. He has worked under six Vice-Chancellors and seven Heads of School. He has survived sweeping redundancies, re-structures, technological transformations and exploding student numbers and always with gentlemanly kindness, acceptance and fortitude. His colleagues will remember him as an intelligent, rigorous and patient academic, who developed trustworthy methods to find truth in the detail.

People are always happy to see Dr Vandebona and his relationship with the School has been one of mutual affection. He feels deeply supported by the School over his long career. “This School has always been a very nice place to work with very good support from the academic staff. They have always told me when a cyclone was coming and how to duck for cover. The administrative staff have always been cheerfully helpful and the technical staff have patiently assisted me with ever-changing procedures. There may have been many ripples, but the water has kept flowing.”

Born in Sri Lanka, Dr Vandebona completed his undergraduate studies in civil engineering in his homeland. A Masters degree in transport engineering was completed at Monash University.

“In 1987 transport engineering was an up and coming field. What attracted this young academic to transport was its modernity, its innovative thinking and its solution based approaches. “Engineers have always built roads, but transport engineering seeks to know how whole systems work. I found this approach much more fun. I liked maths and had a good feel for operations research.”

As just as his career was burgeoning so was computational technology. Hand written calculations were replaced with numerical modelling. An exciting time for someone with aptitude; so Dr Vandebona created one of the first simulated models using animation techniques in 1987. “I was really wrapt in it, immersed, time flew without me realising. I wasn’t homesick.” Looking back on his career it was these innovations in simulation that time flew without me realising. I wasn’t homesick.”

Looking at his career it was these innovations in simulation that time flew without me realising. I wasn’t homesick.”

Looking at his career it was these innovations in simulation that time flew without me realising. I wasn’t homesick.”

Dr Vandebona has always been very good and today so many of our students are successful in industry.” He has always had a quiet message of hope for all students: “This is a huge field with so many opportunities: “You can find the right match.”

Upali Vandebona is a man who likes to think and reflect. He likes walking through the stacks in the library just to see what can be discovered by wandering. He loves reading in other disciplines to cross fertilise his engineering knowledge and to create the open and free mind that all-too-busy human beings just don’t have time for anymore.

As he steps into retirement he knows he can have more time to ponder and witness and learn. Thirty years experience is not to be underestimated. He will continue to write papers, attend conferences and supervise student work. He knows that wisdom from the past is still relevant today: “There are gems from the 1980s that can still tell us something”. Projects which seem brand new actually have an intellectual lineage and “even though the language may have changed, historical projects are still relevant.”

So with more time he intends to travel with his wife, both in Australia and overseas. They love travel and both have large extended families living in many countries. Perhaps his one serious regret is not spending more time with this family. But as he came to work and succeed in a more affluent country, he helped support his family materially, remaining humble about his contribution to their wellbeing and thankful for their affection and community.

CVEN would like to thank Dr Upali Vandebona for his decades of exemplary teaching and academic research, but perhaps most of all for always being the gentleman and the poet.

SCHOOL ADMINISTRATION

The School’s Administration team had a successful year in meeting the high demand for advice and requests from all stakeholders associated with our School. Student numbers continue to grow at a high demand for all our courses. The School has continued to deliver students with the best possible experience while studying at the School of Civil and Environmental Engineering.

The Centre team ensured that all our students are supported andgiven the right guidance to assist them when they accept their offer, right through to graduation. As our student numbers grow, we are increasingly aware how imperative it is to ensure that all of our students are provided with a personalised service each time.

One of the Centre’s initiatives in 2016 focussed on our postgraduate coursework students. We understand that although they are here for a short period of time, they deserve to feel included in the whole University experience. As such the School office piloted English Conversational Classes for all our international students and Networking Sessions to ensure they were aware of the services that are available to them while studying at UNSW. The Centre team hopes to continue to provide these types of experiences in 2017.

The School ensured that our undergraduate students feel part of the School community by providing them with plenty of support. The School supported the student societies GEVSOC and SURVSOC through a number of events to ensure students have a well-rounded student experience. In addition to our undergraduate and postgraduate coursework student support, let’s not forget our wonderful PhD students who are excelling in research every day. We have a dedicated staff member who is always there to provide guidance and support on a daily basis.

Our IT team provided staff and students with the latest technology to ensure their teaching and research can be performed at the highest level. We also continued to improve our websites across the School and Centres.

Health and Safety was a major focus in 2016 ensuring a safe working environment across the School’s facilities and laboratories. The School completed a successful audit by Safework NSW.

The School Administration team met all UNSW deadlines and requirements in 2016 while continuing to provide a high level of support to staff and students. The team will continue to provide top quality financial, administration, office accommodation and other workplace support to staff and students.

I am proud to lead such a dedicated and highly motivated team in the School of Civil and Environmental Engineering.

Anthony Deyer, School Manager
FAREWELL LES BROWN

Les Brown has been a fixture at the School of Civil and Environmental Engineering for over two decades. But a fixture more akin to a chandelier than a light bulb. For over twenty years Les has been helping students at the front desk of the School office. He was the students’ first port of call. The one that helped solve their problems and ease their worries. A student can go through a whole degree without talking to their lecturers, but they would, inevitably, talk to Les, and with his wealth of information and unflappable character he has been the friendly face of the School to thousands.

He has a warm friendliness that made him a go-to guy for staff as well as students. Les knew the importance of a friendly chat. While his official title was admin officer, his true and unofficial title is “friend to all”. Les retired at the end of 2016. He will sorely be missed.

Fuller story here: https://www.engineering.unsw.edu.au/civil-engineering/news/ farewell-to-les-brown

LEVEL 3 WORKPLACE SAFETY COMMITTEE

The School of Civil and Environmental Engineering has a Workplace Safety Committee in accordance with the Work Health and Safety Act 2011. Committee representation covers all work groups within the School, including the Head of School, Academics, Laboratory Managers, IT, Administration, Postgraduates and Undergraduates. Membership also includes Centre Representatives, a First Aid Officer, and the Chief Warden (Emergency Control Organisation.)

CVEN OH&S COMMITTEE 2016

Paul Gwynne
Les Brown
Maria Lee
Paul Gwynne
Stephen Foster
Irene Calaizis
Gautam Chattopadhyay
Kelvin Ong
Larry Paice
Patricia Karwan
Ron Moncay
Ali Akbarnezhad
Catriona Tate
Xavier Vazquez Campos
Rohan Singh-Panwar

Chair
Deputy Chair
Secretary
Heavy Structures/Geotech
HoS
WRC - Kensington
WRL
HSL
Advisory

The provision of a safe work environment for all School staff and students remains the School’s highest priority.

The School is committed to protecting the health and safety of all staff, students, visitors and contractors. The School consults staff and students in implementing safety practices and systems within the workplace. Inspections and training, combined with a wide range of communication methods, ensure that all staff and students are informed of their responsibilities.

The School of Civil and Environmental Engineering has a Workplace Safety Committee in accordance with the Work Health and Safety Act 2011. Committee representation covers all work groups within the School, including the Head of School, Academics, Laboratory Managers, IT, Administration, Postgraduates and Undergraduates. Membership also includes Centre Representatives, a First Aid Officer, and the Chief Warden (Emergency Control Organisation.)
“He was a most memorable character, a wonderful teacher, an extraordinary problem solver and someone whose company was so stimulating and enjoyable. He was unique!”

Colleague Bruce Cathers agrees, “Ray’s door at UNSW was always open to help students. Every so often he would challenge the students with unusual and interesting problems. I know of one time he came up with a problem in Engineering Computations related to Richardson’s extrapolation method - and promised a slab to the first student to come up with the solution. And he also had high standards to which he firmly adhered in terms of exams and assignments.”

Ray was famously camera shy, and refused to let the School put his picture on the fledgling internet. To tease him a little, Mario Attard put a picture of the Australian polar explorer Douglas Mawson on Ray’s door. The image did look quite a bit like Ray, perhaps channeling some of Ray’s fierceness when faced with any hint of student plagiarism. Interestingly Ray didn’t take the picture off, and eventually the image found its way into a student yearbook as one Dr Ray Lawther.

Both Mario and Bruce had personal stories to tell of Ray’s brilliance. Mario remembered ‘I once went to his office with a mathematical puzzle which took me several days to solve. Ray looked at the problem, gave me the solution, and then went through the history of the problem - giving the solution a name...’ Bruce recalled, ‘I once asked Ray about a problem to do with geometry and integration. The algebra was horrendous - it was pages long - and I asked Ray about it. He replied straight away that it was trivial and proceeded to give me a wonderful, physically based explanation in terms of matchsticks!’

For Stephen Foster ‘Ray was not just a colleague but a personal friend and I know this is the sentiment of many in our School. He had the opportunity to work and study with him and had the pleasure of enjoying a game of golf or croquet, or five hundred, or sitting down and sipping a fine glass of wine with him. He was a great colleague and friend to many of us over many years.’

All who knew Ray would agree with Bruce Cathers, “He was a most memorable character, a wonderful teacher, an extraordinary problem solver and someone whose company was so stimulating and enjoyable. He was unique!”

Our sincere condolences to Ray’s wife Chris and his family.
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.

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 2016. Much of the heavy workload 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.

RESEARCH GRANTS

The RMC also administers the 2016 School Minor Equipment Grants Scheme (SMEG). This scheme is designed to provide and maintain School academic staff and researchers with a world-class research environment to attract and retain a critical mass of research excellence and investment in equipment (and critical software). It is a strategic investment to enable our researchers to work at the cutting edge of local, national and international research.

In 2016 $388,274 was awarded by the RMC to academic staff for a range of new equipment to support ongoing and new research projects in all our research hubs and centres. Some examples:

- As part of their 2016 SMEG Grant A/Prof William Glamore’s team at the School’s Water Research Laboratory were successful in obtaining an ISCO auto-sampler. Over the past 12 months they have used the kit to sample catchment runoff parameters over various runoff events as part of a large research hydrodynamic modelling study in collaboration with the Hunter Water Corporation. The fundamental research project will be critical in estimating pollutant loads in catchments. Additional research is underway to examine the role of emerging contaminants using the equipment obtained.

Using state of the art research sustainability software GaBi®/equipment purchased with their 2016 School Minor Equipment Grant, researchers in the School’s Sustainable Assessment Program (part of the Water Research Centre) are contributing to the development of more environmentally friendly photovoltaics cells using Life Cycle Assessment (LCA) in collaboration with colleagues from the School of Photovoltaics and Renewable Energy Engineering (SPRED). The study included global warming, human toxicity, freshwater eutrophication and ecotoxicity and aldicrin depletion as impact categories. Energy payback time was also included.

Dr Juan Pablo Alvarez Gaitan, Sustainability Assessment Program Research Associate, WRL.
In 2016 the School continued its amazing track record in winning ten highly sought after Australian Research Council Grants – 6 in Discovery, 1 Discovery Early Career; and 3 in Linkage – to the total value of $3.60M.

The objectives of the Discovery Projects scheme are to encourage high-quality research environments; to enhance national collaboration in research to expand Australia’s knowledge base and research capability; and to enhance the scale and focus of research in the national Science and Research Priorities. Under the Linkage scheme, industry partners make a significant cash or in-kind contribution to research projects. The collaboration is essential to transforming industries, building communities and strengthening the Australian economy.

The School’s success contributed to the strong performance of our Faculty and University. In 2016 UNSW received more Discovery Project grants than any other institution in the country – 88 grants worth $32 million. UNSW Engineering won 27 of those 88, to a value of $9.98M. In the ARC Linkage grants, UNSW outperformed every other university in the State and ranked third nationally, winning 25 grants for a total of $7.6M. The Faculty of Engineering won 13 of those 25, to a value of $4.06M.

School staff across the disciplines of water, structures and engineering won 13 of those 25, to a value of $4.06M. The Faculty of Engineering outperformed every other university in the State and ranked third nationally, winning 25 grants for a total of $7.6M. The Faculty of Engineering won 13 of those 25, to a value of $4.06M.

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Industry partners: ARRB Group Ltd; Transport For NSW; Robert Bosch (Australia) Proprietary Limited; Road Safety Commission; GetGo Carshare; Suncorp Group Limited; Vicroads Design; Transport Accident Commission; Liberty Mutual Research Institute For Safety.

Award: $458K

Dr Vinayak Dixit; Professor Travis Waller; Professor Michel Blommer; Dr Steven Most; Professor Andry Rakotonirainy; Professor Michael Regan; Mr Benjamin Barnes; Ms Victoria Pyia; Mr Carl Lienchi

LP160101021: This project aims to explore three human factor issues critical to the successful deployment of automated vehicles: factors influencing driver choice of automated vehicle control; interactions between automated and manually controlled vehicles; and driver detection, recognition, and reaction to automated vehicle system failures. Automated vehicles are predicted to be transformative, but their ultimate success and expected societal benefits will depend on drivers’ trust in them and on how people choose to use and interact with them. Insights from this research should prepare our society for more automated vehicles on the roadways.

Industry partners: Sydney Water Corporation; Water NSW

Award: $450,000

Western Sydney University: Associate Professor Avnurnuram Sathasivam; Professor Brajesh Singh; Associate Professor Stuart Khan; Professor Jens Coorsen; Professor Linda Blackall; Professor Bruce Rittmann; Dr Maneesha Ginige; Dr Peter Cox

LP160100959: This project aims to develop an adaptive, real-time control system for managing disinfectant residuals in chloraminated water supply systems. The project will develop and demonstrate a real-time control technology which delivers microbiologically safe, cost-efficient drinking water to people in warmer climates, despite warming climate and increasing population.

Industry partners: Commonwealth Scientific and Industrial Research Organisation; Sydney Water Corporation; Central Seq Distributor-Retailer Authority; South East Queensland Water; Logan City Council; Unitywater

Award: $710,000

University of Newcastle: Professor Robert Melchers; Professor Chongmin Song; Mr Damian McGuckin; Dr Stuart Cannon; Professor Martin Renison

LP160100931: This project will research the deterioration of structural integrity and remaining life of marine assets such as ships and offshore energy facilities, by integrating structural response analysis methods with aged-structure assessment techniques. Anticipated outcomes are superior safety, expected lifetime and economic benefits of maritime assets.

Industry partners: Defence Science And Technology Organisation; Pacific Engineering Services International P/L

Awarded: $550,000.00

Nationally, ARC Linkage applications had an overall success rate of 31% in 2016.

Other ARC Linkage projects CVEN staff are involved in:

**UNSW Chemical Engineering:** Professor Gregory Leslie; Dr Rita Henderson; Professor Ashish Sharma; Professor Kenneth Grattan; Professor Tong Sun; Dr Peter Jarvis; Dr Henberto BUSTAMANTE; Dr Peter Cox; Dr Bala Vigneswaran

LP160100620: This project aims to make the water industry capable of foreseeing and managing adverse raw water organisational matters from the treatment plant. This catchment to plant approach is expected to make existing treatment assets more productive and defer additional treatment costs.

Industry partners: Sydney Water Corporation; Water NSW

Award: $450,000

**University of North Carolina-Chapel Hill:** Professor Bruce Rittmann; Dr Maneesha Ginige; Dr Peter Cox; Dr Bala Vigneswaran

LP160100931: This project will research the deterioration of structural integrity and remaining life of marine assets such as ships and offshore energy facilities, by integrating structural response analysis methods with aged-structure assessment techniques. Anticipated outcomes are superior safety, expected lifetime and economic benefits of maritime assets.

Industry partners: Defence Science And Technology Organisation; Pacific Engineering Services International P/L

Awarded: $550,000.00

Nationally, ARC Linkage applications had an overall success rate of 31% in 2016.
**RESEARCH GRANTS**

**CIES Centre for infrastructure Engineering and Safety**

CIES is a leader in national and international research in infrastructure engineering, with an interdisciplinary research team supported by advanced analytical, computational and experimental techniques and facilities.

As Australia’s premier high level research group in structural engineering, geotechnical engineering, engineering materials and computational mechanics, CIES provides outcomes that improve the design, construction and maintenance of economic, effective, safe and sustainable civil engineering infrastructure. At CIES, we apply our skills to engineering and safety assessments of infrastructure. In particular we look at the risk management of infrastructure. In particular we look at the risk management of infrastructure.

In 2016, CIES continued to engage with and to promote the application of research outcomes and deliverables to industry and to provide an outstanding research and learning environment.

**Acting Director: Professor Changmin Song**

**Centre Manager:** Irena Calazis

**Website:** http://www.cies.unsw.edu.au/

**Email:** i.calazis@unsw.edu.au

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<table>
<thead>
<tr>
<th>Researcher(s)</th>
<th>Research Topic</th>
<th>Granting Organisation</th>
<th>Value at 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Gilbert, E Hamid</td>
<td>Time-dependent behaviour of precast concrete sandwich panels</td>
<td>ARC Discovery</td>
<td>DP160102027</td>
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<td>W Gao, Y Li, P Tangarangwong</td>
<td>Unified nondeterministic dynamic safety assessment of softening structures</td>
<td>ARC Discovery</td>
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<td>M Bradford, H Vaii Pour</td>
<td>Composite steel-timber structural system</td>
<td>ARC Discovery</td>
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<td>Chongmin Song</td>
<td>Scaled boundary framework for adaptive and multiscale structural analysis</td>
<td>ARC Discovery</td>
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<tr>
<td>A Castel, A Mukhorge (Curtin)</td>
<td>Modelling and testing corroding reinforced concrete structures</td>
<td>ARC Discovery</td>
<td>DP160104731</td>
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<tr>
<td>S Foster, T Tim-loi, S Tangarangwong</td>
<td>From CAD and digital imaging to fully automatic adaptive 3D analysis</td>
<td>ARC Discovery</td>
<td>DP190103747</td>
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<td>A Russell, D Muir Wood</td>
<td>Internal erosion of soils: microstructural modelling</td>
<td>ARC Discovery</td>
<td>DP150104123</td>
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<td>M Bradford</td>
<td>Buckling capacity of high-strength steel flexural members</td>
<td>ARC Discovery</td>
<td>DP150100446</td>
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<td>S Foster, H Vaii Pour</td>
<td>Rotation Capacity of Joints in SFRIC Moment Resisting Beams and Frames</td>
<td>ARC Discovery</td>
<td>DP150104107</td>
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<td>B Uy</td>
<td>The behaviour and design of innovative connections to promote the reduction and reuse of structural steel in steel-concrete composite buildings</td>
<td>ARC Discovery</td>
<td>DP140102134</td>
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<td>A Russell, N Khallil</td>
<td>Shallow foundations in unsaturated soils: mechanistic design through numerical modelling, analysis and experimental investigation</td>
<td>ARC Discovery</td>
<td>DP140103142</td>
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<tr>
<td>W Gao, Y Li, P, T Tim-loi</td>
<td>Steadastic post-tensioned slab: plastic buckling and behavior of curved grid-like structures</td>
<td>ARC Discovery</td>
<td>DP140101887</td>
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<td>G Ranisz (USYD), A Castel, P Gilbert, O Dasi-da-Costa</td>
<td>Softness degradation of concrete members induced by reinforcement corrosion.</td>
<td>ARC Discovery</td>
<td>DP140100029</td>
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<td>A Castel, S Foster, A Alzamarradi, R Lloyd</td>
<td>A mix design approach to reduce early-age thermal cracking of concrete</td>
<td>ARC Linkage</td>
<td>LP150100775</td>
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<td>S Foster, Hamid Valipour</td>
<td>High Strength Concrete Beam-Columns with High-Strength Steel Reinforcement</td>
<td>ARC Discovery</td>
<td>DP140103142</td>
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<td>M Bradford, B Uy, Yarhun Guo, Li Kuan Dai</td>
<td>Composite steel-timber structural system</td>
<td>ARC Discovery</td>
<td>LP150101196</td>
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<tr>
<td>A Mukhorge, B Li, V Karaginosov, A Stanco</td>
<td>Laser Ultrasonic Health Monitoring for Australia’s Infrastructure Assets</td>
<td>ARC Discovery</td>
<td>LP150100475</td>
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<td>N Khallil, A Khooshgab, J Rubtsov</td>
<td>Experimental investigation and constitutive modelling of weak rocks subject to mechanical and moisture degradation</td>
<td>ARC Discovery</td>
<td>LP140101578</td>
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<tr>
<td>C Zhang, B Uy, W-H Kang, W Huang, P Lv</td>
<td>Development of novel viscoelastic sprayed material for the effective blast resistance of critical and resource infrastructure</td>
<td>University of Western Sydney / ARC Linkage Project Shared Grant</td>
<td>LP140100030</td>
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<tr>
<td>S Foster, A Castel</td>
<td>Performance based Criteria for Concretes: Creating Pathways for Low Carbon Concrete Manufacture with Existing Standards</td>
<td>Cooperative Research Centre for Low Carbon Living Ltd</td>
<td>$187,905</td>
</tr>
</tbody>
</table>

**TOTAL** $3,274,266

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**Projects**

- **National Drop Weight Impact Testing Facility**
  - M Bradford
  - UNSW / Faculty Matching Funds - ARC IH190100006
  - Value: $26,500

- **250 kN Universal Testing Machine**
  - UNSW / Faculty Matching Funds - ARC IH190100006
  - Value: $151,706

- **Tech-voucher project with Propeller Aerobatics**
  - UNSW Major Research Equipment and Infrastructure Initiative (MREII)
  - Value: $30,000

- **Emissions Reduction Fund Cement and Concrete Industrial Processes Study**
  - Department of the Environment
  - Value: $58,185

- **Shrinkage and cracking of concrete**
  - Cement Concrete and aggregates Council (CCCA)
  - Value: $50,000

- **Peer Review Liquidation Assessment and Seismic Study – Mardi Dam**
  - Wyong Shire Council
  - Value: $10,850

- **Review of geotechnical design parameters**
  - Geotech Group
  - Value: $49,697

- **Erosion of embankment dams and dam spillways**
  - NSW Dams Safety Committee
  - Value: $6,500

- **Design for Adaptability in Modular Construction and Advantages of BMI Integration into the Design Process**
  - Modular Building Systems Pty Ltd
  - Value: $31,700

- **Review of geotechnical design parameters**
  - Geotech Group
  - Value: $54,172

**Industry funded research projects undertaken by Geotech Group**

- **Various**
  - Structures Group
  - Value: $54,172
The Centre bases its research activities around five core research pillars: Transport Planning – ITS Communications – Infrastructure – Energy/Fuel – Computational Sustainability. The Transport Engineering Research Group is recognised nationally and internationally for performing high quality theoretical and applied research in a diverse set of domains of transport engineering, and is the only one of its kind in Australia actively doing research on a comprehensive set of areas related to transport engineering including: network design; optimisation; pricing; safety; planning; risk assessment; demand modelling; public transport analysis; traffic management; land use modelling; simulation; operation research.

With eighteen academic and research staff, the Group has been rapidly expanding, with 28 PhD and 4 Masters students in 2016.

Centre Director: Advisor Professor of Transport Innovation Prof S Travis Waller
Centre Manager: Maria Lee
Website: http://www.rciti.unsw.edu.au
Email: rciti@unsw.edu.au

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**Water Research Centre**

Australia’s water management needs innovative and integrated solutions in terms of environmental, energy and social considerations. The Water Research Centre (WRC) is an internationally leading university centre that provides multidisciplinary research in water resources, engineering, management and the development of tools for environmental management and sustainability for improving aquatic and atmospheric environments. We also undertake commercial activity in collaboration with industry.

With its two research locations: WRC at the Kensington campus and the Water Research Laboratory (WRL) located at Manly Vale, we operate as an externally funded UNSW research centre within the School of Civil and Environmental Engineering.

Our history as a leading Australian water research organisation forms the base on which we have grown – we are now able to apply our experience and critical thinking across more than just water, to diverses yet related fields - Civil and environmental hydraulics: Water quality and treatment processes: Lifecycle assessment and sustainability: Waste management: Hydroclimatology: Carbon and water footprinting: Issues concerning atmospheric emissions and odour: Coastal engineering: Risk assessment.

WRC (Kensington) Centre Director: Professor Richard Stuetz
WRC (Kensington) Business Manager: Robert Steel
Website: http://www.wrc.unsw.edu.au/
Email: water@unsw.edu.au

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### RESEARCH CENTRES

**Research Area**

- **Transport Planning**
- **ITS Communications**
- **Infrastructure**
- **Energy/Fuel**
- **Computational Sustainability**

**Research Groups**

- **Transport Planning**
- **ITS Communications**
- **Infrastructure**
- **Energy/Fuel**
- **Computational Sustainability**

**Research Teams**

- **Transport Planning**
- **ITS Communications**
- **Infrastructure**
- **Energy/Fuel**
- **Computational Sustainability**

**Research Topics**

- **Transport Planning**
- **ITS Communications**
- **Infrastructure**
- **Energy/Fuel**
- **Computational Sustainability**

**Research Projects**

- **Transport Planning**
- **ITS Communications**
- **Infrastructure**
- **Energy/Fuel**
- **Computational Sustainability**

**Research Organisations**

- **Transport Planning**
- **ITS Communications**
- **Infrastructure**
- **Energy/Fuel**
- **Computational Sustainability**

**Research Funding**

- **Transport Planning**
- **ITS Communications**
- **Infrastructure**
- **Energy/Fuel**
- **Computational Sustainability**

**Research Impact**

- **Transport Planning**
- **ITS Communications**
- **Infrastructure**
- **Energy/Fuel**
- **Computational Sustainability**

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### RESEARCH GRANTS

**Granting Organisation(s) / Cash received 2016 (ex GST)**

- **ARC Linkage Project** 241,184
- **ARC Discovery Grant** 191,170
- **UNSW / ARC LIEF Central Contribution** 180,000
- **ARC Discovery Grant** 149,419
- **ARC Linkage Project** 144,151
- **ARC Linkage Project** 130,000
- **DPI-Water Linkage Project** 72,340
- **ARC LP130101107, LP160100066** 69,221
- **Research Topic**
- **Modelling of a coastal ecosystems model**
- **Enhancing inter-decadal streamflow prediction**
- **Minimising the carbon footprint of infrastructure projects**
- **Optimising CDI water treatment for ion removal and energy recovery**
- **Reducing flood loss - A data-assimilation framework for improving forecasting capability in sparsely gauged regions**
- **Enhanced modelling capacity for the industrial water system**
- **Assessing future drought risk for water resources system management**
- **Assessing future drought risk for water resources system management**
- **What will the future be? Projecting environmental change in a warming world for semi-arid landscapes**
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- **Assessing future drought risk for water resources system management**
- **Assessing future drought risk for water resources system management**
- **What will the future be? Projecting environmental change in a warming world for semi-arid landscapes**

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### Contribution

- **Transport Planning**
- **ITS Communications**
- **Infrastructure**
- **Energy/Fuel**
- **Computational Sustainability**

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### Contact

**Centre Director:** Prof S. Travis Waller
**Centre Manager:** Maria Lee
**Website:** http://www.rciti.unsw.edu.au
**Email:** rciti@unsw.edu.au
## RESEARCH GRANTS

### Kensington Campus Hub Investigators

<table>
<thead>
<tr>
<th>Research Topic</th>
<th>Granting Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A spatially explicit framework for predicting sub-daily rainfall intensity</td>
<td>University of Adelaide / ARC Discovery Project shared Grant DP150100411</td>
</tr>
<tr>
<td>Predictive modeling of anesthetic coagulation &amp; downstream process performance</td>
<td>University of Wollongong / ARC Linkage Project Shared Grant LP150100304</td>
</tr>
<tr>
<td>Improving the environmental performance of Australian construction projects</td>
<td>University of Melbourne / ARC Discovery Project Shared Grant LP150100982</td>
</tr>
<tr>
<td>Using mediated electrochemistry to correlate the reduction of trichlorophenol to the reduction potential of various Fe(II)-Fe oxide systems</td>
<td>Australian Synchrotron X-ray Absorption Spectroscopy Beamline Access</td>
</tr>
<tr>
<td>Transformation kinetics of ferritin-derived induced by the dissimilatory Fe reducing bacterium Shewanella oneidensis and comparison with abiotic transformation kinetics</td>
<td>Australian Synchrotron X-ray Absorption Spectroscopy Beamline Access</td>
</tr>
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</table>

### CRC GRANTS

<table>
<thead>
<tr>
<th>Research Topic</th>
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<tbody>
<tr>
<td>Beneficial reuse of solids from wastewater treatment operations</td>
<td>CRC for Low Carbon Living Ltd</td>
</tr>
<tr>
<td>Litter management strategies to reduce odour emissions from poultry litter</td>
<td>UNSW Strategic Support Grant</td>
</tr>
<tr>
<td>Integrated Carbon Metrics (ICM) – a multi-scale life cycle approach to assessing, mapping and tracking carbon outcomes for the Built Environment</td>
<td>CRC for Low Carbon Living Ltd</td>
</tr>
<tr>
<td>Energy Benchmarking for efficient, low carbon water recycling operations - Scholarship Ben Thwaites</td>
<td>CRC for Low Carbon Living Ltd</td>
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<td>CRC for Low Carbon Living Ltd</td>
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<tr>
<td>Integrated Carbon Metrics (ICM) – a multi-scale life cycle approach to assessing, mapping and tracking carbon outcomes for the Built Environment Scholarship - Soo Huey Teh</td>
<td>CRC for Low Carbon Living Ltd</td>
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<td>Energy Benchmarking for efficient, low carbon water recycling operations - Scholarship Ben Thwaites</td>
<td>CRC for Low Carbon Living Ltd</td>
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<td>CRC for Low Carbon Living Ltd</td>
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<tr>
<td>Integrated ETWW demand forecasting and scenario planning for precincts</td>
<td>CRC for Low Carbon Living Ltd</td>
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### OTHER GRANTS

<table>
<thead>
<tr>
<th>Research Topic</th>
<th>Granting Organisation</th>
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<tbody>
<tr>
<td>Development of robust low cost capacitive deionization technology</td>
<td>Sir Ratan Tata Trust / International Contract</td>
</tr>
<tr>
<td>Overview of options for wastewater treatment and resource recovery</td>
<td>Beijing Origin Water Technology Co Ltd / International Contract</td>
</tr>
<tr>
<td>Mbrana Anaerobic Chamber</td>
<td>UNSW MREII</td>
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### RESEARCH ORGANISATIONS

<table>
<thead>
<tr>
<th>Research Topic</th>
<th>Granting Organisation</th>
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<tbody>
<tr>
<td>Determination of factors causing strength increase in high-level sludge addition to Portland Cement</td>
<td>Boral Cement Limited</td>
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<tr>
<td>Critical control point assessment to quantify robustness and reliability of multiple treatment barriers of a DRP Scheme</td>
<td>Hazen and Sawyer</td>
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<tr>
<td>Methodology for a comprehensive analysis (TBL) of alternative water supply projects compared to direct potable reuse WRRF-14-03</td>
<td>Hazen and Sawyer / Water Research Australia / WaterReuse Research Foundation Subcontract</td>
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<tr>
<td>Faculty Silver Star</td>
<td>UNSW Faculty of Engineering</td>
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<tr>
<td>Faculty Silver Star</td>
<td>UNSW Faculty of Engineering</td>
</tr>
<tr>
<td>Human health implications of intentional and non-intentional nanoparticle ingestion, injection and inhalation</td>
<td>UNSW / PLUS Alliance Collaborative Research Seed Grants</td>
</tr>
<tr>
<td>Wet weather overflows health monitoring</td>
<td>Sydney Water Corporation / State Government Contract</td>
</tr>
<tr>
<td>Development of sustainable zero-discharge wastewater treatment systems</td>
<td>University Collaborative Research Fund - Seed Grants</td>
</tr>
<tr>
<td>City carbon footprint networks using the Global Industrial Ecology Virtual Lab</td>
<td>UNSW / Tonghu University Collaborative Research Fund - Seed Grants</td>
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<tr>
<td>Our ‘footprint’ matter – Australian diets and their environmental, economical and health impacts</td>
<td>European Commission / Marie Curie InternationalOutgoing Fellowships for Career Development (IFOP)</td>
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<tr>
<td>Strategic analysis of water quality in the Parramatta river catchment</td>
<td>Jacobs Group (Australia) Pty Ltd / Parramatta City Council Subcontract</td>
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<tr>
<td>Modelling contaminant removal during wastewater treatment</td>
<td>UNSW / Australia-Germany Joint Research Cooperation Scheme</td>
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<tr>
<td>Our ‘footprint’ matter – Australian diets and their environmental, economical and health impacts</td>
<td>Australian Academy of Science / WH Gladstones Population and Environment Fund</td>
</tr>
<tr>
<td>Multi-functional reactor systems for liquid and gas phase treatment of agriindustrial and municipal effluents: toward pollution and odour abatement with energy cogeneration</td>
<td>UNSW, VCE PostDoc Support</td>
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<tr>
<td>Emerging contaminant research prioritisation decision framework</td>
<td>Water Environment and Reuse Foundation (WEMRF) / International Contract</td>
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<tr>
<td>Flood inundation data assimilation - Scholarship for Sahni Pathiraja</td>
<td>CSIRO / Postgraduate Studentship</td>
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<tr>
<td>Optimisation of granular sludge for energy efficient wastewater treatment and reuse - Scholarship for Benjamin Thwaites</td>
<td>WQRA Postgraduate Scholarships</td>
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<tr>
<td>Paxton catchment improvement program: Peer Review</td>
<td>Hunter Water Corporation / State Government Contract</td>
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<tr>
<td>Wattlenet model independent expert review</td>
<td>Water Research Australia / WateReuse Research Foundation Subcontract</td>
</tr>
<tr>
<td>From collection system to tap: Resiliency of treatment processes for direct potable reuse</td>
<td>Sustainable Systems LLC /Consulting</td>
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### RESEARCH GRANTS

<table>
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<tr>
<th>Kensington Campus Hub Investigators</th>
<th>Research Topic</th>
<th>Granting Organisation</th>
<th>Cash received 2016 (ex GST)</th>
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### APPLIED RESEARCH

<table>
<thead>
<tr>
<th>N. Le Minh</th>
<th>Odour analysis</th>
<th>ABRIDGROUP Contractors &amp; CHIM Hill Aus Pty</th>
<th>72,405</th>
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<tbody>
<tr>
<td>N. Le Minh</td>
<td>Odour analysis</td>
<td>ExcelPias Pty Ltd</td>
<td>17,725</td>
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<tr>
<td>S. Khan, J. McDonald</td>
<td>Odour analysis</td>
<td>Trace Organics</td>
<td>13,500</td>
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<tr>
<td>N. Le Minh</td>
<td>Odour analysis</td>
<td>The Odour Unit</td>
<td>14,330</td>
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<tr>
<td>D. Rosler</td>
<td>Consulting</td>
<td>Office of the Environment</td>
<td>11,375</td>
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<tr>
<td>N. Le Minh</td>
<td>Odour analysis</td>
<td>Peter Stephenson &amp; Associates Pty Ltd</td>
<td>8,190</td>
</tr>
<tr>
<td>N. Le Minh</td>
<td>Odour analysis</td>
<td>Norton Rose Fribright</td>
<td>8,100</td>
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<tr>
<td>N. Le Minh</td>
<td>Odour analysis</td>
<td>REHAU Pty Ltd</td>
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<tr>
<td>R. Henderson</td>
<td>Odour analysis</td>
<td>University of Queensland</td>
<td>1,350</td>
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<td>N. Le Minh</td>
<td>Odour analysis</td>
<td>Sydney Water Corporation</td>
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<tr>
<td>R. Henderson</td>
<td>Odour analysis</td>
<td>Ecolab Pty Ltd</td>
<td>120</td>
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<td><strong>Total</strong></td>
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<td><strong>2,966,080</strong></td>
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### Water Research Centre

**WRL**

WaterResearch Laboratory (WRL) - a world-leading academic re-
search and consulting laboratory that endeavours to tackle the most challenging and pressing water-engineering problems faced by the world today relating to water and the environment.

As part of UNSW Civil & Environmental Engineering’s Water Research Centre, we aim to deliver world-leading water engineering research that results in real positive impact on a global scale. WRL is at the frontier of water engineering research. We pride ourselves on paving the way to discover and deliver new ideas, leading conversations and delivering solutions that have a global positive impact, be it new technologies to monitor and quantify changing coastlines, or restoring wetlands to preserve wildlife and ecological communities. Based on Sydney’s Northern Beaches, our globally-esteemed laboratory spans four hectares and is home to state-of-the-art facilities and equipment. Our personnel are comprised of the most experienced and creative problem solvers in their respective areas of research and industry.

Our expertise extends (but is not limited to): Estuarine, coastal and ocean hydrodynamics and sediment transport; Coastal zone monitoring, foreshore protection and management; River flow and floodplain management; Groundwater research and management; Civil engineering hydraulics; Catchment hydrology; Environmental studies and climate adaptation; Wetland restoration.

Our prestigious record built over more than 50 years has made us what we are today, a leading global think tank. We’re a band of pioneers and experts driven by a passion to finding grand breakthroughs for a better tomorrow.

**WRL Director:** Professor Ian Turner
**Centre Manager:** Grantley Smith
**Website:** http://www.wrl.unsw.edu.au/
**Email:** info@wrl.unsw.edu.au

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<table>
<thead>
<tr>
<th>Northern Beaches WRL Hub Researchers</th>
<th>Research or Project Topic</th>
<th>Granting Organisation(s)</th>
<th>Funds received in 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matt Blacka, James Carley, Ian Coglian, Kristen Spielter, Ron Cox, Dan Howie, Ian Turner, Ben Modra, Chris Drummond, Alix Harrison, Mat Deibler, Toby Tucker, Mitch Harley, Matt Phillips, Josh Simmons, Will Giammore, Duncan Rayner</td>
<td>Coastal Engineering</td>
<td>Asian Development Bank, Vita Torkin and Taylor, Aurecon, Beatty Legal Pty Ltd, Bega Valley Shire Council, Byron Shire Council, Central Coast Council, City of Gold Coast, Clarence City Council, CMS Surveys, Coasts and Harbours 2016, The Odour Unit, The Odour Unit, University of Queensland, UTS, Water NSW Corporation</td>
<td>$1,296,152</td>
</tr>
<tr>
<td>Brett Miller, Granitley Smith, Chris Drummond, Stefan Felder, Bruce Cathers, Matt Blacka, Toby Tucker, Alice Harrison, Mat Deibler, Dan Howie, Ian Coglian, James Carley, Priom Rahman</td>
<td>Civil Engineering Hydraulics</td>
<td>Drying Green Alliance, ACO Polycrete Pty Ltd, Golder Associates, NSW Fisheries, SPEL, Sydney Water Corporation, ACO Polycrete Pty Ltd, Australian Water Partnership, Jindal Pty Ltd, Golder Associates</td>
<td>$587,718</td>
</tr>
<tr>
<td>Granitley Smith, Brett Miller, Stefan Felder, Bruce Cathers, Ron Cox, Doug Anderson, Alice Harrison, Ben Modra, Priom Rahman</td>
<td>Hydrology, Flooding and Water Resources</td>
<td>NSW SES, NSW OEH, City of Newcastle, WMAWater</td>
<td>$142,520</td>
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<tr>
<td>Will Giammore, Duncan Mayrner, Brett Miller, Jamie Rusch, Alix Harrison, Toby Tucker, Doug Anderson, Ian Kung, Grantley Smith, Doug Anderson, Priom Rahman, Chris Drummond, Martin Anderson, Stefan Felder</td>
<td>Environmental Engineering</td>
<td>ARUP Pty Ltd, Clarence Valley Council, Department of Commerce (for Clarence Valley Council), Ferrier Hodgson, Griffith University, Hornsby Council, Hunter Water Corp, national Climate Change Adaptation Research Facility (NCCARF), National Parks and Wildlife (DPW), Newcastle City Council, Newcastle Coal Infrastructure Group, North Coast Local Land Services, NSW Department of Primary Industries (Fisheries), NSW Environmental Protection Authority, NSW Office of Environment &amp; Heritage, NSW Office of Water, DPI, globalsharahy City Council, Surfers Shire Council, NSW Office Of Environmental &amp; Heritage: Parks And Wildlife Divi, Sydney Water Corporation</td>
<td>$1,620,184</td>
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</tbody>
</table>
## Research Grants

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<tr>
<th>Northern Beaches WRL Hub Researchers</th>
<th>Research or Project Topic</th>
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<tbody>
<tr>
<td>Dr. Martin Andersen, Professor Andrew, and Dr. Richard</td>
<td>Groundwater</td>
<td>Australian Nuclear Science and Technology Organisation (ANSTO), Geoscience Australia</td>
<td>$197,885</td>
</tr>
</tbody>
</table>

### Prof Ian Turner

**Project Title:** Beach Erosion and Recovery: Quantifying the Hazard<br>
**Granting Organisation:** Australia Research Council – Discovery (DP150103399)<br>
**Funds Received:** $156,200

### Prof Ian Turner (in collaboration with UNSW, DITF, and University of Plymouth, University of Bath)

**Project Title:** Integration of an airborne hyperspectral imagery with an existing airborne LiDAR in a UNSW owned aeroplane<br>
**Granting Organisation:** MREII (UNSW Major Research Equipment and Infrastructure Initiative Schema)<br>
**Funds Received:** $82,500

### Prof Ian Turner, Dr. Kristian Splinter, Dr. Michelle Hayley (in collaboration with UNSW-CEN)

**Project Title:** Coastal Erosion – A STEM education initiative to promote school & community engagement<br>
**Granting Organisation:** Office on Environment and Heritage (OEH) – NSW Adaptation Research Hub: Coastal Processes Response Node<br>
**Funds Received:** $33,000

### Brett Miller, Alice Harrison, and Prof Ian Turner

**Project Title:** Publicly available datasets: online photogrammetry web portal<br>
**Granting Organisation:** Office on Environment and Heritage (OEH) – NSW Adaptation Research Hub: Coastal Processes Response Node<br>
**Funds Received:** $112,000

### Dr. Martin Andersen, Prof. Andrew Baker, and Brett Miller

**Project Title:** Groundwater organic matter: carbon source or sink?<br>
**Granting Organisation:** Australia Research Council – Discovery (DP160101379)<br>
**Funds Received:** $148,000

### Dr. Martyn Anderson (Bond, Eberhard, Friend, & Kennard)

**Project Title:** Research to inform the assessment of ecohydrological responses to coal seam gas extraction and coal mining<br>
**Funds Received:** $364,000

### Prof. Denis O’Carroll, Dr. Martin Andersen, and Prof A Baker

**Project Title:** Groundwater infrastructure project – Department of Education NCRIS scheme<br>
**Funds Received:** $433,500

### Dr. Martin Andersen

**Project Title:** The role of organic carbon for determining water quality in an artificially de-stratified dam, Chichester Dam<br>
**Funds Received:** $10,000

### Dr. Gislab Rau, Dr. Martin Andersen, and Prof. Andrew Baker, and Prof. Richard Stute (in collaboration with the Connected Waters Initiative)

**Project Title:** Groundwater infrastructure program NSW<br>
**Funds Received:** $50,000

### Dr. Denis O’Carroll

**Project Title:** Fate of engineered nanoparticles: Challenges in informing human and ecological health risk assessments<br>
**Funds Received:** $223,000

### Dr. Denis O’Carroll, Dr. Martin Andersen, and Prof. Andrew Baker, and Prof. Richard Stute (in collaboration with the Connected Waters Initiative)

**Project Title:** Emerging Contaminant and Water Quality Laboratory<br>
**Funds Received:** $111,307

### Dr. Stefan Felder

**Project Title:** 2016 UNSW Faculty of Engineering Silverstar Award for ARC DP16 application<br>
**Funds Received:** $30,000

### A/Prof Ron Cow (ACCRANSI)

**Project Title:** Australian Climate Change Adaptation Research Network for Settlements and Infrastructure - ACCRANSI – promote adaptation research and build capacity RG150174<br>
**Funds Received:** $166,625

### A/Prof Ron Cow (ACCRANSI)

**Project Title:** Review of finance mechanisms for climate change adaptation RG162235<br>
**Funds Received:** $4,500

### A/Prof Ron Cow (ACCRANSI)

**Project Title:** Optimisation of seawalls and beach nourishment for coastal adaptation<br>
**Funds Received:** $136,000

### Total

**Funds Received:** $5,890,091

## PhD Graduates

### Student / [Supervisors]

**Topic:** Modelling and quality control for 3D UAV mapping

**Students:** A/Prof Haimehneida, Seyed Komeili (Bradford, Mark)

**Funds:** Use of innovative anchors for composite action in rehabilitated steel structures

**Students:** Prof. Ian Turner, Dr. Kristen Glamore, and A/Prof Will Glamore (Turner, Ian L)

**Funds:** Antarctic Treasures: Investigating photovoltaic-powered light-emitting diode based disinfection of water for point-of-use application

**Students:** Dr. Mohammad Zaved Khan, and Prof. Martin Andersen (Khan, Stuart & Peters, Gregory)

**Funds:** Investments of Reactivity of Nanoscale Iron Particles for Degradation of Chlorinated Organic Contaminants in Seawater

**Students:** Dr. Mohammad Zaved Khan, and Prof. Martin Andersen (Khan, Stuart & Peters, Gregory)

**Funds:** Investigating photovoltaic-powered light-emitting diode based disinfection of water for point-of-use application

**Students:** Dr. Mohammad Zaved Khan, and Prof. Martin Andersen (Khan, Stuart & Peters, Gregory)

**Funds:** Experimental and computational investigation of the formation, transformation and reactivity of iron oxides in wastewater treatment

**Students:** Dr. Mohammad Zaved Khan, and Prof. Martin Andersen (Khan, Stuart & Peters, Gregory)

**Funds:** Experimental and computational investigation of the formation, transformation and reactivity of iron oxides in wastewater treatment
PHD GRADUATES

<table>
<thead>
<tr>
<th>STUDENT / [SUPERVISORS]</th>
<th>TOPIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rana, Mohammad Masud [Uy, Brian]</td>
<td>The effects of bond and anchorage on the behaviour and design of composite slabs</td>
</tr>
<tr>
<td>Rocheta, Eytan [Sharma, Ashish &amp; Evans, Jason P]</td>
<td>On Low-Frequency Rainfall Variability Bias in Climate Model Simulations</td>
</tr>
<tr>
<td>Saputra, Albert Artha [Song, Chongmin]</td>
<td>A scaled boundary polyhedral element for three-dimensional analyses</td>
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<tr>
<td>Sepasgozar, Samad [Davis, Steven]</td>
<td>Technology adoption in construction.</td>
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<tr>
<td>Tang, Yi [Russell, Adrian]</td>
<td>Numerical Modelling of Shallow Foundations in Unsaturated Soils</td>
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<tr>
<td>Yeó, Tiffany Li Lee [Khan, Stuart J &amp; Coleman, Heather]</td>
<td>Chemical contaminants in swimming pools: Occurrence and health risk assessment</td>
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<tr>
<td>Tsarev, Sergey [Collins, Richard N]</td>
<td>Uranium interactions with reduced iron species: electron transfer between uranium and Fe(0)-Fe(II)-Fe(III) in natural clays and nanoscale zerovalent iron</td>
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<tr>
<td>Wasko, Conrad [Sharma, Ashish]</td>
<td>Continuous rainfall simulation in a warmer climate</td>
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<tr>
<td>Wijayaratna, Kasun [Dixit, Vinayak &amp; Waller, S Travis]</td>
<td>Modelling disrupted transport network behaviour</td>
</tr>
<tr>
<td>Wijesiri Pathirana, Indika [Uy, Brian]</td>
<td>Use of innovative shear connectors in construction and rehabilitation of steel-concrete composite beams</td>
</tr>
<tr>
<td>Yang, Chengwei [Gao, Wei &amp; Tangaramvong, Sawelchak]</td>
<td>Interval elastoplastic analysis of structures</td>
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</tbody>
</table>

STUDENT / [SUPERVISORS] TOPIC

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ME or MSc

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<td>Wijayaratna, Kasun [Dixit, Vinayak &amp; Waller, S Travis]</td>
<td>Modelling disrupted transport network behaviour</td>
</tr>
<tr>
<td>Norzahari, Nur Fadhiliah [Lim, Samsung/Trinder, John &amp; Turner, Russell]</td>
<td>Stem Classification and Modelling from Lidar for a Semi-Automated Forest Inventory</td>
</tr>
<tr>
<td>Zafar, Kiran [Waller, S Travis &amp; Rashdi, Taha]</td>
<td>Modelling mode and route choice behaviour with adaptive data collection</td>
</tr>
</tbody>
</table>
The Teaching and Learning Committee (TLC) of the School is responsible for all academic matters relating to all undergraduate and postgraduate coursework programs; these involve:

- encouraging teaching quality,
- providing teaching aids to staff,
- monitoring courses through student focus group surveys,
- interaction with student representatives of CEVSOC and research student demonstrators through CERSA,
- setting policy regarding academic aspects of undergraduate and postgraduate examinations and enrolments,
- providing a focal point for student assistance in 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 2016 were:

CVEN Teaching and Learning Committee 2016

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Steven Davis</td>
<td>Co-Chair (Operations &amp; Scholarships)</td>
</tr>
<tr>
<td>Prof Richard Stuetz</td>
<td>Associate Head (Academic)</td>
</tr>
<tr>
<td>A/Prof Mario Attard</td>
<td>Civil Engineering Program Coordinator</td>
</tr>
<tr>
<td>Dr Fiona Johnson</td>
<td>Elite Student Coordinator</td>
</tr>
<tr>
<td>Dr Kostas Senetakis</td>
<td>Industrial Training Coordinator</td>
</tr>
<tr>
<td>Dr Fiona Johnson</td>
<td>Elite Student Coordinator</td>
</tr>
<tr>
<td>A/Prof Jinning Wang</td>
<td>Faculty IRC Rep</td>
</tr>
<tr>
<td>Dr Arman Khoshghalb</td>
<td>Water and Environmental Teaching Rep.</td>
</tr>
<tr>
<td>Dr Tommy Wiedmann</td>
<td>Postgraduate Coursework Coordinator</td>
</tr>
<tr>
<td>Dr Hamid Valipour</td>
<td>Year 1 Coordinator</td>
</tr>
<tr>
<td>Dr David Rey &amp; Dr Johnson</td>
<td>Year 2 Co - Coordinator</td>
</tr>
<tr>
<td>Dr Ehab Hamed</td>
<td>Year 3 Coordinator</td>
</tr>
<tr>
<td>Dr Taha Rashidi</td>
<td>Year 4 Coordinator</td>
</tr>
<tr>
<td>Dr Lila Gao</td>
<td>Postgraduate Coursework Coordinator</td>
</tr>
</tbody>
</table>

In 2016 the Committee continued with the innovative School Teaching Initiative Grant Scheme (STIGS) – the aim being to develop and implement innovations in School teaching and learning, and to support the improvement of the student experience through teaching related activities. The six successful 2016 projects – involving twelve teaching staff – included:

- Online teaching innovations and improvements within undergraduate and postgraduate courses, including:
  - the creation of Online Assessment Tools for Graphical Modelling Problems in construction courses (Dr Steven Davis)
  - the development and integration of visualization and online simulations tools (animations) for enhancing the education experience of second year transport design, planning, and modelling courses (Drs Taha Rashidi and Lauren Gardner);
  - an online, user-oriented design and evaluation framework for ENGG1400 workshops and assessments. ENGG1400 is a first year course in optimization and modelling for engineering students who desire a higher capability in the application of the modelling of engineering systems, and seek to acquire a set of optimization tools that can then be applied to various engineering applications. School teaching Staff involved – Dr David Rey, Dr Lauren Gardner & Prof S Travis Waller - aim to create a tool that can automatically assess, grade, and provide feedback for student computer models.

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EDUCATIONAL EXCELLENCE – A DISTINCTIVE CVEN MODEL

It was another busy, active and inspired year for the dedicated teachers at the School and the hardworking Committee. It began with the 2016 School Teaching Retreat, held on 18 Feb at Coogee Surf Lifesaving Club. The theme was “Educational excellence – a distinctive CVEN model.” The Retreat was oriented towards the UNSW 2025 Strategic Plan’s commitment that we will deliver: “Exemplary education for every student through integrating the most innovative developments in digital and face-to-face learning into novel solutions, to improve educational quality and the student experience.” [UNSW 2025 Strategy, Commitment 3, p7]


Sharing their expertise and experience with us, David Collen from Open Learning spoke on ‘Using technology for the development of a personalised learning experience’ and Lila Azouz – Education Developer Consultant UNSW Learning Centre, presented on ‘Education technology in the delivery of a blended learning experience and the development of on-line modules’. University and Faculty Perspectives were provided by Prof Geoffrey Crisp – PVC (Education) and Prof Maurice Pagnucco – Deputy Dean (Education).

Small Group Discussions were held throughout the day considering, amongst other things - what is the most effective method for improving teaching quality and learning outcomes and where and how should the School be investing in teaching? Staff from each discipline were then asked to select one discipline based course for implementation of a blended learning (or other) model, and asked to map the learning outcomes, dissect the curriculum and present a preliminary implementation on a week by week basis – mindful of the UNSW 2025 educational strategy. What resourcing would be needed to support course change champions.

DEVELOPMENT OF NEW FOURTH YEAR COURSES

In 2016 the School made a significant investment in the development of three new fourth year courses – integrating new learning methods and providing us with more flexibility in delivery. The three courses are: CVEN4060 – Student Led Project, CVEN4300 – Structures Practicum, and CVEN4106 – Construction Practicum. These courses will involve more practical subjects, where the students have the opportunity to work in teams, design a project, and implement the idea drawn upon. They have been designed so that students will have hands on learning experience that enables learning by doing. The student groups will be required to make or build something, and then follow up to assess how successful the whole process has been. Students will only be allowed to do one of these subjects.

ALI AMIN

VC AWARD FOR TEACHING EXCELLENCE

In 2016 Dr Ali Amin won a UNSW Vice-Chancellor’s Award for Teaching Excellence (Early Career). The awards recognise excellence in approaches to teaching and the support of learning that influence, motivate and inspire students to learn; development of curricula, resources or services that reflect a command of the field; evaluation practices that bring about improvements in teaching and learning.

“Excellence in teaching is an essential and fundamental mission of our University, and it is very pleasing to be able to formally recognise your contribution this way,” President and Vice-Chancellor Professor Ian Jacobs said on congratulating Dr Amin.

Dr Amin has been lecturing subjects in Construction and Structural Analysis and Design within the School since 2013. He has redeveloped courses and introduced a number of blended learning initiatives to the courses he teaches by utilizing videos, animations and construction site visits and field trips - all of which encourage student engagement, motivation and deep learning.

Ali is a firm advocate in empowering our students with the skills and competencies required to meet society’s demand for high quality and responsible engineers. He does so by providing demanding, high quality courses with a high level of interaction. Students value the real-world emphasis in the courses he teaches and consistently rate Ali’s enthusiastic and innovative teaching extremely highly.

Fifteen of the School’s academics have been awarded the prestigious UNSW Vice-Chancellor’s Award for Teaching Excellence since its introduction in 1989. With only fifteen Awards presented each year - and with UNSW academic staff members numbering over 2,600 - the School of Civil and Environmental Engineering has been very well represented.

2016 ADMISSION, ENROLMENT, GRADUATE STATISTICS

Undergraduate

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Commencing</th>
<th>Enrolled 2016</th>
<th>Graduated 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>3620 BE Civil Engineering</td>
<td>918</td>
<td>205</td>
<td></td>
</tr>
<tr>
<td>3624 BE Civil with Architecture</td>
<td>196</td>
<td>32</td>
<td></td>
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<tr>
<td>3625 &amp; 3707 BE Environmental</td>
<td>74</td>
<td>17</td>
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<tr>
<td>3146 BE Civil/BE Mining</td>
<td>99</td>
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<tr>
<td>3621, 3626, 3703, 3704, 3763, 3766 BE BA*</td>
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<tr>
<td>3631 &amp; 3773 BE Civil/BE Enviro</td>
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<td>3730, 3735, 3767, 3772, 3941, 3942, 3762 BE DSc</td>
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<tr>
<td>3472, 3476, 3707, 3717 BE Surveying &amp; Geomatic Systems</td>
<td>89</td>
<td>9</td>
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<tr>
<td>4776/4777/4778 BEngLBE (Engineering/Law)</td>
<td>19</td>
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Total Undergraduates: 693

Graduated 2016: 205

Postgraduate Coursework

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<tr>
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<tbody>
<tr>
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<tr>
<td>3858 &amp; 8338 MEngSc</td>
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<td>220</td>
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<tr>
<td>8359 MEngSc (Extension)</td>
<td>35</td>
<td>32</td>
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<tr>
<td>8621 ME (coursework) new</td>
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</table>

Total Coursework: 342

Graduated 2016: 206

HDR

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<tr>
<th>Course Code</th>
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<th>Graduated</th>
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<tbody>
<tr>
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</tr>
<tr>
<td>ME</td>
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</tr>
</tbody>
</table>

Total Higher Degree: 38

Graduated 2016: 206

ADVICE TO GRADUATES

Dr Robert Care, CVEN alumnus and Strategic Geographies Leader of global consulting group Arup gave an inspirational occasional address at the November 2016 graduation ceremony for UNSW civil and environmental engineering students.

In his urged graduates to understand that an engineering career is not, will not and cannot ever be a narrow focus on technical issues, but rather a facing of the planetary and societal issues – resource scarcity and security – water, food, energy – poverty, growing inequality, urbanisation and climate change. All are engineering challenges.

Dr Care shared honestly from his own personal journey as an engineering leader, and advised graduates to ensure they took care of themselves, sought help when needed, and selected wisely those elements which form a balanced life.

You have chosen a great calling,” he said, “designing and building our futures – in consulting or in contracting, in industry, in finance, in management consulting, or even in politics. You have all the skills to make a huge difference, a major contribution to the people on our tiny, cool, blue planet. There are wonderful opportunities out there for you. Take those opportunities. Embrace change. Embrace failure. Grow. Learn. Give and receive. And one final message – just go for it.

STUDENT LIASON

In 2016 the T&L Committee organised regular student focus groups, with a new position created in CEVSOC for TLC liaison – giving undergraduate students a voice in the structure and delivery of courses.

The Committee also supported the student organisation CEVSOC including:

CEVSOC International Night: The focus was on assisting international students finding jobs for IT and after graduation. There was also a focus on how they can get more involved with University and School life. There were around 40 students in attendance.

Thesis Information Night: Ron Cox and Ian Turner attended to discuss the two Thesis options in the new program. Students completing Thesis also spoke of their experiences. 130 students were in attendance.

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OUR TEACHING - CVEN ANNUAL REPORT 2017 - 45
STUDENT PRIZES

CVEN STUDENT PRIZES 2016

University Medal Winners

Congratulations to our two 2016 University Medalists for their outstanding academic performance - soaring above even the rigorous standards of an Honours Class 1.

- Camellia Wong: University Medalist in BE Civil Engineering
- Ahmed Nashwan Abdul Matheen: University Medalist in BE Environmental Engineering

Year 1 prize

- Nikoly Kumiashvili: Jacob N Frenkel prize: for the best achievement in Civil Engineering for a first year student

Year 3 prizes

- Griffen Mallows: Welding Technology Institute Of Australia Prize: for the best performance in CVEN3303 Steel Structures
- Zoe Gillespie: The Full Time Class Of 1962 Civil Engineering And Surveying Alumni Prize: for the female student with the highest WAM at the end of 3rd year
- David Morgan: The J.K Geotechnics Prize: for the best performance in CVEN3202 Soil Mechanics
- Karin Ching: The Crawford Munro Memorial Prize: for the best performance in CVEN3501 Water Resources Engineering
- Darren Pham: The ASI Undergraduate Steel Design Award: for the best performance in CVEN3501 (Mechanics of Solids) & CVEN3303 (Steel Structures)

Final Year prizes

- Camellia Wong: Alexander Wargon Prize: for best performance in the Structures Discipline in the BE Civil Engineering degree
- Ebony Catalano: The Engineers Australia Civil and Structural Engineering Prize: for the best performance in Structural design in the final year of the degree

SAGE prizes

- Luke Chidzey: EGM Memorial Prize: for outstanding performance in GIS courses
- Allen Qi: Associate Of Public Authority Surveyors: for the best performance in SAGE courses in first year

Year 4 Industry Sponsored prizes

- Belinda Serafin: Consulting Surveyors NSW - Land Development: Awarded to the graduating SAGE student with the best mark in Cadastral and Land Development courses
- Alec Xie: SSSI - For Photos & R & S: Awarded to the student with the best total mark in the Photogrammetry and Remote Sensing course
- Eloise Harch: R.S. Mather Memorial: Awarded to the student with the best total mark in Geodesy courses: GMAT2700 and GMAT3700.
- Belinda Serafin: The Bossi Medal: for the best performance in the final year of the Bachelor of Surveying & Spatial Information Science
- Eryan Chen: Maurice Maughan Prize: Awarded to the student with the best total mark in GMAT2500 and GMAT2569
- Belinda Serafin: Institution of Surveyors NSW Inc Prize: for the best performance by a graduating student in the BE in Surveying and Spatial Information Systems

Other prizes

- Mervin Mathew: senior prize: for the best performing student in SAGE courses
- Jacob Cottrell: Maurice Maughan Prize: Awarded to the student with the best total mark in GMAT2500 and GMAT2569
- Belinda Serafin: The Bossi Medal: for the best performance in the final year of the Bachelor of Surveying & Spatial Information Science
- Shubhajit Bhattacharya: Maurice Maughan Prize: Awarded to the student with the best total mark in GMAT2500 and GMAT2569

SAGE student with the best mark in Cadastral Development: Awarded to the graduating student with the best total mark in Cadastral Development: Awarded to the graduating student with the best total mark in Cadastral

CVEN Surveying Discipline Prize, sponsored by RPS

Winners of Dean’s Awards 2017 for studies completed in 2016

<table>
<thead>
<tr>
<th>Name</th>
<th>Program name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ming En Chin</td>
<td>Bachelor of Engineering/Bachelor of Arts</td>
</tr>
<tr>
<td>Josiah Blas Fajardo</td>
<td>Bachelor of Engineering/Bachelor of Laws</td>
</tr>
<tr>
<td>Ray Fu</td>
<td>Bachelor of Civil Engineering/Bachelor of Science</td>
</tr>
<tr>
<td>Jeffy Halim</td>
<td>Bachelor of Engineering (Honours)</td>
</tr>
<tr>
<td>Jianan Jiang</td>
<td>Bachelor of Civil Engineering</td>
</tr>
<tr>
<td>Jason Wahay Ko</td>
<td>Bachelor of Engineering/Bachelor of Commerce</td>
</tr>
<tr>
<td>Jason Lam</td>
<td>Bachelor of Civil Engineering</td>
</tr>
<tr>
<td>Monica Laut</td>
<td>Bachelor of Engineering/Bachelor of Environmental Engineering</td>
</tr>
<tr>
<td>Kevin Liu</td>
<td>Bachelor of Engineering (Hons)/Bachelor of Science (Computer Science)</td>
</tr>
<tr>
<td>David Michael Morgan</td>
<td>Bachelor of Engineering/Bachelor of Commerce</td>
</tr>
<tr>
<td>Daniel Christian Setioso</td>
<td>Bachelor of Engineering/Bachelor of Commerce</td>
</tr>
<tr>
<td>Dan Su</td>
<td>Bachelor of Engineering (Honours)</td>
</tr>
<tr>
<td>Clinton Ngo Tran</td>
<td>Bachelor of Engineering (Hons)/Bachelor of Commerce</td>
</tr>
<tr>
<td>Ateeththyah Vigneswaran</td>
<td>Bachelor of Engineering (Honours)</td>
</tr>
<tr>
<td>Charlie Zeng</td>
<td>Bachelor of Engineering (Hons)/Bachelor of Commerce</td>
</tr>
</tbody>
</table>

School of Civil and Environmental Engineering Display Prize: for the best student group to create a business proposal and display that defines and promotes the School
CEVSOC SPORTS & CHARITY
CEVSOC Sports & Charity Manager for 2016 CEVSOC Mary Hadjiangeli was busy during the year – coordinating amongst other things, the World’s Greatest Shave – which fundraises for the Leukaemia Foundation - and the annual Cardno Cup football match between staff and students. Old age and cunning won over youth and beauty again in the Cardno cup where CVEN staff and students played a scintillating game. Both sides displayed a high level of football skills, team work, discipline, commitment and style. Staff won 5-3. Condolences and thanks to the student team, the ref, and to our loyal industry supporters and annual sponsors Cardno.

E-REUSE
Environmental engineering student Charlotte Wang and Rohan Pala (civil engineering/commerce) were at the forefront of a new campus-wide scheme (eReuse Inc) to save UNSW computers from landfill – refurbishing and then recycling them for people who lack access to computers. The School of Civil and Environmental Engineering was the first UNSW group to sign up for e-Reuse. Moreover, valuable funding and support for the development process was provided throughout 2016 by the Head of School Professor Stephen Foster and the School’s Teaching and Learning Committee.

GROUNDWATER RESOURCE INVESTIGATION CVEN 4503
The fourth year course in groundwater involves a program of field work and data analysis undertaken at the UNSW Farm in Wellington, NSW.

COASTAL ENGINEERING STUDENTS VISIT BOTANY BAY AND CRONULLA
In May 2016, 60 budding coastal engineers from the CVEN9640 Coastal Engineering class were taken on a tour of Botany Bay and southern Sydney by Water Research Laboratory Director Professor Ian Turner and Senior Research Associate Dr Mitch Harley. Among the places visited were the Bankseameadow Revetment, where they observed the 20 tonne tri-bar and dolos units placed along the revetment to protect Port Botany from wave attack. This was followed by a visit to various groyne structures around Lady Robinsons Beach and Kurnell. To finish the day, the students had a close inspection of the “seabre” seawall in Cronulla and observed different beach processes in action.

SUSTAINABLE INFRASTRUCTURE
The VC, Professor Ian Jacobs, was impressed when he visited the showcase of the fourth year course Planning Sustainable Infrastructure. Reflection on and celebration of the Mer Island culture and the development of learning and engineering outcomes were the themes of this year’s showcase. The Mer Project was approached by final-year students in technical and consultative ways that recognised the importance of culturally responsive and integrated solutions.

SAGE TRIGS TRIP
So how does laser radiation propagate through the atmosphere? Students investigated exactly that during a surveying practical exercise with their lecturer Dr Craig Roberts at the North Bondi trigonometric station measuring to colleagues at Clovelly and Maroubra trig stations.
CEVSOC Office Bearers for 2016:

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>George Chard</td>
<td>President</td>
</tr>
<tr>
<td>Alex Warren</td>
<td>Vice-President</td>
</tr>
<tr>
<td>Claudia Burbidge</td>
<td>Treasurer</td>
</tr>
<tr>
<td>Jessica Vorreiter</td>
<td>Secretary</td>
</tr>
<tr>
<td>Guy Baumber</td>
<td>Arc Delegate</td>
</tr>
<tr>
<td>Shabab Jahan</td>
<td>Promotions Manager</td>
</tr>
<tr>
<td>Joe Zheng</td>
<td>ENGSOC Representative</td>
</tr>
<tr>
<td>Mary Hadziangeli</td>
<td>Sports &amp; Charity Manager</td>
</tr>
<tr>
<td>James Mallett</td>
<td>Major Social Events Manager</td>
</tr>
<tr>
<td>Zoe McLaughlin</td>
<td>Technical Events Manager</td>
</tr>
<tr>
<td>Simon Chan</td>
<td>Weekly Events Manager</td>
</tr>
<tr>
<td>Aurelia Israel</td>
<td>International Student Manager</td>
</tr>
</tbody>
</table>

2016 saw CEVSOC continue its transformation into a progressive, diverse and inclusive student community with one of the largest and most active member bases of any society at UNSW. Our member base almost doubled in 2016, increasing to over 1000 people compared to 600 in the previous year. We were able to introduce a number of brand-new events and initiatives to broaden our scope and cater to members with different interests. As a result of this expansion, the CEVSOC committee likewise expanded to almost twice its previous size, allowing us to take on more people than ever!

We also introduced a Teaching and Learning Committee position to give our students a voice in the structure and delivery of courses. This position saw huge interest and led to the running of a number of student focus groups to get our students’ voices heard.

CEVSOC collaborated with over 10 student societies in 2016, including PsychSoc, WIESOC, CSESOC and EWB. Collaboration with other societies allowed our members to meet new people and discover extra-curricular opportunities outside of their scope of study. Our collaborative events proved to be extremely successful and created a vibrant social atmosphere for those involved.

Networking is tough for undergraduate students. However, networking is simultaneously one of the most important skills to develop before entering the engineering industry. To try and remedy this issue, CEVSOC introduced our first-ever Third Year Camp in 2016. This event involved taking 120 students and a group of 10 industry representatives for a weekend away filled with networking, engineering challenges and team building activities. Networking over drinks and canapes can be tough, but networking over a scavenger hunt or an archery competition proved to be much easier! This event saw huge interest from students and even went on to win the coveted Arc Club Activity of the Year award for 2016!

Leading CEVSOC was an amazing experience and I can’t be any more grateful for the opportunity to give back to my student body. I would like to give my thanks to our dedicated member base for their enthusiasm and involvement, this year’s committee for their exceptional hard work and dedication, and finally our industry sponsors and School for their unwavering support of our unique student community. 2016 was a great year for CEVSOC and I can’t wait to see what the new committee achieves in 2017.

George Chard
CEVSOC President 2016

SURVSOC- THE SURVEYING SOCIETY

2016 Office-Bearers

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luke Chidzey</td>
<td>President</td>
</tr>
<tr>
<td>Luke Haavisto</td>
<td>Vice-President</td>
</tr>
<tr>
<td>Jacky Chan</td>
<td>Treasurer</td>
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<td>Hannah Pearce</td>
<td>Secretary</td>
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<td>Conor Molloy</td>
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<td>Tim Cook</td>
<td>AUSIM/Industry Representative</td>
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<td>Mitchell Bradac</td>
<td>4th Year Representative</td>
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<td>Angus Baxter</td>
<td>3rd Year Representative</td>
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<tr>
<td>Karats Eisenmenger</td>
<td>2nd Year Representative</td>
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Another good year for SurvSoc, which set up a Facebook page to better connect and communicate.
The School's industry-subsidised annual Year 4 dinner was held at the Shangri-La Hotel at Circular Quay, and a good time was had by all. Industry sponsored prizes were awarded at the dinner to outstanding students in several disciplines (see pp46-47 for full list). Our congratulations to them and to all our wonderful hard working students, and thanks to our generous industry sponsors for their continuing support.
In keeping with our commitment to raise the community profile and the enrolment levels of surveying and geospatial degrees – in the 2016 ERA / IAC meet with NSW Surveying task force in March to discuss current and future strategies. The year showed some improvement in undergraduate surveying fortunes, with student enrolments almost doubling in the three years since the School of Surveying and Geospatial Engineering re-merged with CVEN.

Members of the IAC also provided support and feedback for the School during its successful EA Accreditation process in May 2016.

In May the Dean, Professor Mark Hoffman, made a presentation at the IAC meeting, and we raised with him our ongoing concerns about the continuing decline in high school students studying extension mathematics. Along with numerous other professional and industry groups, the Committee regards this as a serious crisis and will continue to actively promote the study of extension mathematics in schools.

In August we were delighted when IAC member and CVEN alumnus Kourosh Kayvani was awarded the 2016 John Connell Gold Medal – presented annually by EA to an outstanding structural engineer, and Athenia Venios – also IAC member and CVEN alumnus - won the 2016 Judy Raper Award for Leadership in Engineering. In September IAC member and alumnus Narelle Underwood became Australia’s first woman Sir John Rich Fellowship holder. The IAC is committed to supporting UNSW and CVEN women in engineering programs and encouraging more diversity in the profession.

In August IAC members reviewed and provided feedback to the Head of School on proposals for three new fourth-year hands-on courses – which involve the opportunity for students to work in teams, design a practical project, and implement the idea drawn upon. In my own view, every course should reinforce the notion of the IAC’s charter: to give young people the chance to question more, and continually daring engineers to think outside the box.

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: 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 students, and sponsorship of attendance by school careers advisers at 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.

An energetic engagement with the School community will continue wherever industry input can be of assistance.

Ian McIntyre
Principal and Global Service Lead, Contractual Services, Advisian

Dr. James Glastonbury, Engineering Director, Lining Optima

James is a director with the Engineering Excellence Group at Lining Optima, a global team of technical specialists and innovators that seek smarter ways to do things, in the world of engineering and construction. He is an industry expert in the use of BIM, 3D printing and other technologies for construction. His work has been recognized with numerous industry awards.

Andrew Johnson
Principal, AIRUP

Andrew leads an integrated buildings design team in the Sydney Arup office delivering bespoke high level multi-disciplinary design to achieve better and more sustainable buildings. Andrew is a structural engineer with a passion for design philosophies combining innovation with efficiency in historic building and structural solutions, and his experience designing and delivering projects in Australia, the UK, and around the world for nearly 20 years. His specific structural expertise includes tall buildings, hybrid structures, long term serviceability of engineering structures, seismic analysis and design, and long-span lightweight roof structures.

Ross Jones
Vice President Buildings & Infrastructure Eastern Region – Jacobs

Ross Jones is Jacobs’ Vice President Eastern, responsible for leading the Jacobs business across Australia’s Eastern States. He oversees the company’s major trades of Water, Transportation, Mining, Environment & Spatial, Built Environment, Power Consulting, Infrastructure, and Project Management/Construction Management. Ross is a graduate of the University of Adelaide, having been awarded a Bachelor of Engineering in Civil Engineering with a minor in Environmental Engineering. He has been involved in collaborative university-industry research leading the ALT level on construction and planning projects. Ross has held the position of SMK’s Global General Manager – Environment prior to the merge with Jacobs. Before that, he held a range of operations, client management and team leadership roles in SMK consisting of several projects and a diverse collection of work projects and has prepared numerous construction environments and environmental impact statements.

Andrew Kaynazi
Global Director of Excellence & Expertise, Aurecon

Professor Kourosh Kayvani is Global Director of Excellence & Expertise at Aurecon. In his 20 years in the industry, he has played key roles in the engineering of many iconic, complex structures across the globe, including Wembley Stadium in the UK, West Kowloon Terminus in Hong Kong and in Australia the Sydney Opera House, Sydney Hockey Stadium, Brookfield Place, Civic Tower, 5 Martin Place, Telstra Place, Sydney Star Observation Wheel. He specializes in long-span structures, tall buildings, stadium structures, seismic, acoustic and forensic engineering. Kayvani is a Fellow of the Institution of Engineers Australia and a Laureate of the IABSE Prize awarded by the International Association for Bridge and Structural Engineering for his work on long-span structures worldwide. He has also been listed in Engineers Australia’s Top 100 most influential engineers in 2009. Kayvani is a Visiting Professorial Fellow at UNSW, a Director of the Australian Institute of Engineers and the President of the Light Weight Structures Association of Australia.
IAC SCHOOL MEMBERS

Left to Right: Professor Stephen J Foster (Professor, Head of School); A/Prof Ron Cox (Co-Director, IAC School); Associate Professor Paul Mostyn; and Harry Young (Director, Technical Services, AECOM)

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Left to Right: Professor Stephen J Foster (Professor, Head of School); A/Prof Ron Cox (Co-Director, IAC School); Associate Professor Paul Mostyn; and Harry Young (Director, Technical Services, AECOM)

David Kinniburgh

Australian Market Leader – Transportation

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 25 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.

Paul Harcombe

NSW Chief Surveyor – Land and Property Information

Paul Harcombe holds a Bachelor in Surveying from UNSW and a Master of Geomatics from the University of Melbourne. He is a Fellow of the Institution of Surveyors Australia (how the Surveying & Spatial Sciences Institute SSSI). In 2010 he was awarded the SSSI Peter Gatt Medal for services to the industry. Paul is also a Fellow of the Institution of Surveyors NSW Incorporated. The University of Melbourne awarded Paul in 2010 with the Thornton Smith Medal for his outstanding contribution to the engineering profession in the field of geomatics. In 2016 Paul was a member of the NSW Board of Surveying and Spatial Information which regulates land and mining surveying activities and advises Government on Spatial Information matters.

Garry Mostyn

Principal, PSM

Garry Mostyn graduated from UNSW in civil engineering in 1972. 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 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 committees as well as the highest levels of the Australian Geomechanics Society and the International Society for Rock Mechanics.

Iain Scofield

General Manager, Group Services, CIMIC

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 overarching objective of raising the standards of project delivery performance. Iain’s ‘hands-on’ project experience includes road and railway infrastructure construction, dams and water supply, large multi-function public entertainment complexes and the restoration of heritage-listed buildings. Iain has an Honours degree in Civil Engineering from UNSW, and is a Member of the Institution of Engineers Australia and 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 Honours 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 and Maritime Services for over 7 years and held a number of senior roles, including Southern Region Survey Manager and Principal Regional Surveyor. Throughout her career Narelle has been actively involved in the surveying and spatial professional organisations in NSW. Narelle has won a total of nine industry awards for her innovation and commitment to quality outputs, including the Asia-Pacific Spatial Excellence Awards Young Professional of the Year in 2011, which she won from amidst a highly capable international field. As Surveyor-General she is the President of the Board of Surveying and Spatial Information (BOSSI), Chair of the Geographical Names Board, NSW Surveying Taskforce and the Surveying and Mapping Industry Council.

Athena Venios

Technical Director – Transport Group, AECOM

Athena graduated from UNSW with a BE (Civil) Honours degree in 1997. She currently manages a team of 240 consulting professionals at AECOM servicing the transport market in NSW, including roads (including bridges and tunnels), aviation, rail, ports & marinas.

Harry Young

Regional Director, Construction, Development, Multiplex

Harry Young graduated from USyd in 1995 with a BE in civil engineering and structural engineering, and went straight to work for international contractors Multiplex, where he has a variety of roles for Multiplex and is now Regional Director, Construction & Development, for NSW and ACT.
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 working closely with the Women in Engineering camp – an annual week-long event coordinated by UNSW Engineering. Numbers had been boosted – from 30 young women in 2015, to 90 in 2016. During the week, CVEN alumnus Eva Hanly gave a presentation on the Trans Urban tunnels, while ERC Chair Dr Kurt Douglas gave a mega talk (pictured) on Sydney civil infrastructure, past, present and future.

2016 saw the continuation of promotion of the Surveying degrees following the integration of the School of Surveying and Geospatial Engineering (SAGE) into CVEN in 2013. The new dual award program civil engineering/surveying, which began in 2016, has greatly assisted a rise in undergraduate enrolments. A meeting between the ERC, IAC and the NSW Surveying Taskforce was held in March to acknowledge and to further progress. Since 2013, student enrolments have doubled within the SAGE degrees.

In 2016 the ER Manager Mary O’Connell produced a Social Engagement @ Civil & Environmental Engineering booklet – as hard copy and a series of online stories – which showcased just some of the ways in which the School is involved in advancing a prosperous, safer and more just society. From our participation in Engineers without Borders, to a social justice project at home – the inspirational student-led project eReuse – to academics who work with disadvantaged and marginalised communities in Australia and around the world, the School is very socially engaged. Moreover our top scholars positively influence global trends in areas such as safe building structures, GPS systems, international water quality guidelines, transport modelling, real measurement of national footprints, and effective transnational waste management. The booklet was mailed out to NSW careers advisers and secondary schools, as well as to alumni, industry partners and UNSW colleagues.

The annual 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 by Ms Tricia Tesoriero, who won a 2016 Faculty of Engineering Staff Excellence award for her amazing organisational skills – and patience.

In 2016 we accepted 60 students from 57 high schools in Sydney and regional NSW including Armidale, the Blue Mountains, Forbes, Jindabyne, Newcastle, Tamworth, Wagga Wagga, Wollongong and Woolgoolga. The students appreciated visiting a wide variety of civil engineering sites – in progress, accomplished and in creative incubation – including Laing O’Rourke’s ‘Innovation Space’, Lend Lease’s development at Darling Harbour, several UNSW Laboratories, Port Botany, Centennial Parklands, Seacliff Bridge, Sydney Harbour Bridge, the Opera House, and the NSW Transport Management Centre. Students also tried their hands at their own structural design – as pictured. Feedback remains overwhelmingly positive – One young participant wrote, ‘Everything we did was amazing, not only the places we went but the people I met and the things I learnt too. I really feel like I’ve found my place in the world which is such a huge relief. I’m almost certain that I will be attending UNSW based on this trip. Thank you so much for this. It really has changed my life.’

Our special thanks to Advisian, ARUP, Barangaroo Delivery Authority, Centennial Parklands Education Precinct, Darling Harbour Live, Laing O’Rourke, Lend Lease, Multiplex, Sydney City Council, NSW Transport Management Centre, and the UNSW Water Research Centre for making the time to welcome and inspire the interest of these potential engineers.

The ERC also coordinates the annual Elite Student/Industry Breakfast, the CVEN Primary School Maths prize, and IAC
EXTERNAL RELATIONS COMMITTEE REPORT CONT.

mysterious. We also continue to develop the School's relationship with our graduates through the Annual Report and the annual CVEN alumni newsletter - distributed to all engineering alumnus at the end of each year through the University's magazine UNSW World. The 8 page 2016 newsletter had some great stories – including Ian McIntyre sharing his thoughts on the HSC maths issue, profiles of Athena Venios, winner of the 2016 Judy Raper Award for Engineering leadership, and history making SAGE alumnus Narelle Underwood who became NSW's 25th Surveyor General – the first woman in the country.

The ERC also provides support for Alumni group reunions – in 2016 the School was delighted to be able to support the alumni reunion organised by the CEVSOC president of 1986 Pete Bailey, and his indefatigable aide Greg Stanmore, with prizes, commemorative histories and a few rounds at the thirsty bar. See fuller story and pics on last page.

For further information on external relations, alumni, the IAC and our Industry Partnership Program contact Dr Mary O'Connell at m.connell@unsw.edu.au

MATHS PRIZE

A total of 85 NSW primary schools participated in the seventh year of the CVEN and Faculty of Engineering Maths Primary Prizes, ably coordinated by Tricia Tesoriero. Members of the School's Industry Advisory Committee, School staff and alumni presented 300 students with their awards at end of year ceremonies, further raising the profile of the profession to hundreds of young people, their families and community.
ALUMNI CONGRATULATIONS

SAGE ALUMNI – DOING VERY WELL, THANKS!

Legendary surveying academic Dr Bruce Harvey caught up with quite a few of his ex-students at an RMS in-house surveying seminar in May 2016. The award winning lecturer who has taught students at UNSW for nearly thirty years said, ‘it was nice to see them all doing so well.’

LtoR, Back Row: Armen Derivsievic (BE ’07), Steve Robinson (BSurv ’91), David Burke (BSurv ’86).
Middle: Jason Pirpss (BE ’08), Kit Panya (BE ’07), Michael Waud (BE ’04), James Ward (BE ’11), Ryan Fileld 2009, Pat Shaw (BE ’95).
Front: Mick Dunn (BE ’95), Dr Bruce Harvey, Narelle Underwood (BE ’09), Helen Pollock (BE ’97), David Jenkins (BSurv ’87).
Also present but not in the photo: Peter Nestelkovski (BSurv ’94), and Alastair Linke (BE ’06).

ALUMNUS GRAHAM CAMPBELL MEMORIAL

“one is - you’ve got to listen, two is - you’ve got to be on time, three is - you have to work in groups.”

As a successful engineer and a talented jazz musician, Grahame says, “People always ask me, “What’s the thing about music?” and I say, “It’s three things: one is you’ve got to listen, two is you’ve got to be on time, three is you have to work in groups”. These are exactly the same things you need to be a success in business.”

In his memoir Clarinets, Pipelines and Unforeseen Places, alumnus Grahame Campbell (BE (Civil) 1965, MEngSc ’72) tells his extraordinary life story. From selling ice creams at the beach to planning a pipeline in a war zone, and from playing the clarinet in the Trinidad Symphony Orchestra to running a multi-billion-dollar business, Grahame’s stories tell not just the evolution of an engineer, but the evolution of an industry from 1965 to 1996.

“There is this undercurrent within the industry,” Grahame says, “that nobody talks to engineers and nobody is interested in engineering” and I think it’s largely because engineers are not great communicators. I feel strongly that as an industry we can do this better so I decided to tell my story.”

WINS IN 2016

Congratulations to our high achieving alumni including:

Mark Combe (BE Civil 87 UNSW, MIE, MIPENZ, RPEQ.)

In 2016 Mark Combe was acclaimed by Engineers Australia as one of Australia’s Top 50 most innovative engineers. In 2015 his company Fibercon won a prestigious Shell and Australian Department of Industry, Innovation & Science Innovation Challenge Award for their development of a recycled macro-plastic fibre reinforcing made entirely from industrial plastic wastes. Fibercon was the industry sponsor of a three-year PhD program at James Cook University to develop Emesh - whose fibres can reinforce concrete in footpaths, cycleways, shotcrete and small precast elements. The company also tested its Macro Poly and Steel fibres with researchers at UNSW.

“The construction industry is not nearly as innovative as it could be,” Mark says, “despite the fact that our future depends upon it. It tends to stick with what it knows, and what has worked in the past. Understandable, perhaps, but no longer defensible. We all need to play a role in reducing the carbon footprint of construction.”

In 2016 Mark Combe was awarded the John Raper Award for Leadership in Engineering, in recognition of his sustained and significant contribution through demonstrated leadership within the profession in Australia. The breadth of Athena’s experience is impressive, spanning projects in road, bridge construction and maintenance, rail, water, aviation and transport planning and community support facilities. Her work has taken her to south Asia and Greece and she has integrated her international experiences to bring focus and creativity to all of her work and to support her people. Athena is currently leading a diverse team to identify and preserve a new corridor for the future Outer Sydney Orbital, as part of NSW’s long term transport master plan.

In 2016 UNSW surveying alumnus Narelle Underwood (BE (Surveying & Spatial Information Systems) Hons 1, 09) was appointed NSW Surveyor General. She has the distinction of being the first female Surveyor General in Australia. Throughout her career Narelle has been actively involved in the surveying and spatial professional organisations in NSW.

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Narelle has won a total of nine industry awards for her innovation and commitment to quality outputs, including the Asia-Pacific Spatial Excellence Awards Young Professional of the Year in 2011, which she won from amidst a highly capable international field.

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

In 2016 Dr Voo Yen Lei (BE Hons 1 ‘01, PhD ’04) and his innovative Malaysian company Dura Technology won a prestigious design award in 2016 from the American Pre-stressed Precast Concrete Institute for Best International Transportation Structure. Dura had designed and constructed a single-span, 100 metre long, concrete box-girder bridge over the Perak River, giving the city of Geik Park road access across the river for the first time ever. “Using a precast prestressed segmental solution certainly helped to overcome the obstacles on this project,” Voo says. “It is a better quality bridge than conventional concrete designs that requires negligible maintenance, delivers better functionality and a better look at the lowest cost.”

Dr Voo completed his PhD at the School in 2004, under the supervision of Professor Stephen Foster. His research into the behaviour of prestressed reactive powder concrete bridges has laid the groundwork for his subsequent career.
ALUMNI REUNION

REUNION OF THE CLAN

Once a community leader, always a leader – so it proved when the CEVSOC president of 1986 Pete Bailey, and his indefatigable aide Greg Stanmore set out to reunite the brotherhood and sisterhood of the graduate class of '86 (and '87, and '88... yes, those were less frantic times!) to celebrate their thirtieth anniversary with a gathering down at Harts Hotel on the Rocks.

Sixty staunch alumni of the School of Civil & Environmental Engineering turned up to mix and mingle – network and share. Hard to believe it was thirty years since graduation – the crowd looked so young and handsome!

Out of a possible 89 graduates, Pete Bailey was very happy with the night’s turnout. As he said, the result was better than a PASS. Conceded, indeed well over CREDIT Level.

Another 80’s hero, Dr Alex Heaney turned up to hand out the lucky door prizes and to receive belated but very sincere thanks for his teaching. Timber engineering is on its way back! Also representing the School was retired staff member Dr David Robinson and external relations manager Dr Mary O’Connell.

The School was delighted to be able to support the gathering with prizes, complimentary histories and a few rounds at the thirsty bar.

Above: The School in 1986. Photo by Adrian Bull
Below: Alex Heaney calls out the lucky door prize – event organiser Peter Bailey behind. photo by Adrian Bull.