UNSW AUSTRALIA

School of Civil and Environmental Engineering

Annual Report 2012

Never Stand Still | Engineering | School of Civil and Environmental Engineering

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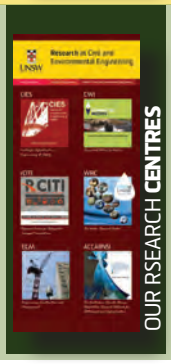

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THE BIG PICTURE

UNSW AUSTRALIA

School of Civil and Environmental Engineering

Never Stand Still | Faculty of Engineering | School of Civil and Environmental Engineering

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Our mission is to develop well educated graduates with the essential skills, attributes and knowledge that will enable them to practise as exceptional professional civil and environmental engineers; and to conduct research and development of international distinction to meet the needs of the discipline, industry and society.

About Us

The School of Civil & Environmental Engineering is the largest and most successful School of its kind in Australasia and is ranked 17th best in the world (QS World University Rankings 2012) .

We are the largest School in the UNSW Faculty of Engineering, itself the pre-eminent centre for engineering studies and research in Australia, and the first University of choice for NSW's top students.

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

We are 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). Our academic staff are recognised world leaders in their fields, supported by 70 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.

School Statistics 2012

Academic Staff	36
Professional & Technical Staff (School)	24
Research Centre Academic Staff	60
Postgraduate Research Students	124
Postgraduate Coursework Students	510
Undergraduates	1509
Equivalent Full-time Students (EFTSU)	1410
Doctoral Graduates	14
Postgraduate Coursework Graduates	309
BE Graduates	382
Grant Funding	15.56 mil
Research Publications Refereed	368
Recurrent Income	13 mil

Foreword from the Head of School

The School has never been in such a strong position across all aspects of teaching, research, profile and finances and, under Scientia Professor David Waite's leadership, the year 2012 was again a year of significant growth. As we move to the future, it is important that we acknowledge the work and tireless contribution of David to the School during his six year tenure as our Head of School.

The School's focus remains firmly directed to its core business of excellence in teaching and excellence in research. By any measurement, whether it be teaching accolades, testimonials or rankings, or research grants, papers and higher degree student completions, 2012 will be marked as a year of great success. As you read through this report you may note that in the QS World University Rankings, we rank 17th in the world … an accomplishment of which we are duly proud but also one that recognises the hard work, efforts and expertise of our staff. Our challenges for the coming years are to raise the School profile even further, to further develop our collaborations locally, nationally and internationally and to look for opportunities wherever they exist.

Some statistics of note that you will find in this 2012 annual report are: (i) the School managed a recurrent income of $13 million and $15 million of research income; (ii) our researchers published 3 books, 9 book chapters, 241 refereed journal papers and 115 refereed conference papers; (iii) we had 124 higher degree research (HDR) students and graduated 14 . Our successes as a team in attracting competitive monies, in publishing our works and in HDR student supervision are self-evident. Less visible, however, are the many and major contributions and impacts of our research on the profession – from our work on national and international Standards to representation on national and international industry advisory bodies. In many ways it is this work that has the most lasting impact on our profession.

While all our achievements over the year are too many to list in this brief introduction, they derive from significant efforts by a great many dedicated staff and students. This report contains just a few of our activities and outputs for the year; I thank all of the staff for their tremendous and on-going support. Without their efforts and their dedication, the School would not be the success that it is.

PROFESSOR STEPHEN FOSTER
1 May 2013

The School Management Group

School Management Group
Back Row: L-R, Chongmin Song, Bill Peirson, Richard Stuetz, Ron Cox, Travis Waller, Stephen Moore
Front row: L-R, Karenne Irvine, Betty Wong, David Waite, Stephen Foster, Mario Attard.
Absent: Nasser Khalili, David Carmichael

The School Management Group 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 SMG is chaired by the Head of School and is made up of the Chairs of the School's major committees, the Directors of UNSW Centres based within the School, the Associate Head (Academic) and the School's Senior Administrative Officer.

The School Management Group provides a forum for discussion of all aspects of School life and, with the Head of School, charts the future direction of the School.

School Structure

The School is managed by the Head of School, assisted by the School Management Group and by various other management committees as listed. Each committee has a Director who reports to the Head of School.

School Management Group	
Head of School Professor T David Waite	
Associate Head - Academic Associate Professor Mario Attard	**Chair, Computing Services** Professor Chongmin Song
Senior Administrative Officer Ms Karenne Irvine	**Co-Chair External Relationships** Associate Professor Ronald J Cox
Chair, Research Management Professor Stephen Foster	**Chair, Teaching and Learning** Stephen Moore
Director WRL Dr William Peirson	**Chair, Technical Services** Professor Richard Stuetz
Executive Assistant Ms Betty Wong	Professor David Carmichael Professor Nasser Khalili Professor Travis Waller

Highlights 2012

l- r Mark Bradford, Ian Gilbert, Vinayak Dixit, Adrian Russell, Nasser Khalili, Travis Waller, Stephen Foster (HoS), Jean Xiaojing Li, Chongmin Song, GaoFeng Zhao (Absent: Wei Gao, Yong-Lin Pi)

Discovery Grants

Australian Research Council (ARC) Discovery Project and ARC Linkage Infrastructure, Equipment and Facilities (LIEF) grants were announced in November 2012. The School was successful in obtaining 3 Discovery Project grants to the value of $1M and 1 LIEF (Linkage Infrastructure, Equipment and Facilities) grant for $390K. This is good news for the School especially considering how competitive these grants are, with a success rate of just 21% across the country in the Discovery category.

The ARC Discovery Projects were won by Prof Ian Gilbert: Prof Nasser Khalili and Dr GaoFeng Zhao: and Prof Chongmin Song, Dr Wei Gao and Prof Yong-Lin Pi. The LIEF Grant was won by Prof Travis Waller and Dr Vinayak Dixit, working with Prof Michiel Bliemer (USyd) and Prof Dennis Del Favero (iCinema).

In addition School researchers Prof Mark Bradford, Prof Nasser Khalili, Dr Xiaojing (Jean) Li and A/Prof Mathew McCabe are partners in four other successful grants working with other Schools and/or universities, while Dr Adrian Russell, Prof Nasser Khalili and Dr Hossein Taiebat were UNSW Goldstar Award winners.

Full details are in Our Research p 31.

Visit of the NSW Minister for Transport, The Hon. Gladys Berejiklian

The NSW Minister for Transport, The Hon. Gladys Berejiklian visited the School of Civil and Environmental Engineering in March for a presentation about the Research Centre for Integrated Transport Innovation (rCITI). Professor Travis Waller's overview of rCITI was followed by discussion with the Minister. Attendees at the Minister's visit included delegates from UNSW such as Professor Graham Davies (Dean, Faculty of Engineering), Professor Les Field (Deputy Vice-Chancellor, Research), Professor T. David Waite (HoS, Civil and Environmental Engineering), and Professor Nasser Khalili (Associate Dean, Research), as well as representatives from Evans & Peck (Mr Ian McIntyre and Mr Paul Forward, Principals) and NICTA (Mr Rob Fitzpatrick, Director, Infrastructure, Transport & Logistics).

Ms Berejiklian was pleased with the university's efforts and the creation of a Transportation Research Centre and is looking forward to opportunities for cooperation. During her visit, Ms Berejiklian appointed Professor Waller an invited member to the Transport Specialist Advisory Group for Transport for NSW.

Sustainability in Construction

In November 2012 a joint forum on sustainability in construction was organised by UNSW and the Hong Kong Polytechnic University and held in Hong Kong. Prof Li-Yin Shen, Faculty of Construction Management and Real Estate, Chongqing University, China and Prof David G Carmichael of the UNSW School of Civil & Environmental Engineering were the main organisers, assisted by Ms Vivien Kao, the Senior Executive Officer of the Department of Building and Real Estate of the Hong Kong Polytechnic University.

The forum featured a group of prominent speakers including UNSW staff A/Prof Leonhard Bernold and Dr Ali Akbar Nezhad, Dr Maria C. A. Balatbat, from Australian School of Business, Prof Albert P C Chan, Associate Dean of Faculty of Construction and Environment, The Hong Kong Polytechnic University, and industry practitioners including Julian Bott, Sustainable Design Consultant and Practice Director, Cundall Hong Kong, Jeremy Newton, Director, Project Advisory, Evans & Peck (HK) Co Ltd, and Ms Lighting (Lai Ting) Chan, Environmental Manager, Leighton - Gammon Joint Venture, West Kowloon Terminus Station North.

The forum covered the following key topics:

- Sustainability in Construction
- Towards a Sustainable Construction Industry by Managing the Muda-Waste
- Risks and Opportunities in Sustainability Reporting
- Sustainable Design and Construction
- How Sustainable is Your Office Upgrade?
- Environmental Effects on Construction Workers
- Implementing Sustainable Urbanization using Experience Mining System (ExMS)

Keynote speaker Professor David Carmichael noted that companies are increasingly acknowledging the importance of sustainability, both from a global viewpoint and more narrowly in terms of company existence and growth. More companies are promoting their sustainable activities to stakeholders, and industry leaders can be distinguished from the laggards. 'Still, there is a very long way to go' he said, 'and a lot to be done in developing sustainable practices fully and embodying sustainability as standard company ethos. Some legislation may be necessary to speed up the conversion, but sustainability, corporate social responsibility, and triple bottom line reporting will continue to rise in prominence within the construction industry within the coming years.

CIES – Leading research in innovative and advanced building systems

CIES Director of Research and Founding Director Scientia Professor Mark Bradford is leading research in the areas of innovative and advanced building systems. A research project entitled "An innovative and advanced systems approach for full life-cycle, low-emissions composite and hybrid building infrastructure" is funded by the Australian Research Council through a prestigious Laureate Fellowship awarded to Professor Bradford.

The topic is of high relevance in contemporary engineering practice and provides a very timely solution to a major contemporary engineering challenge facing Australia.

This project is developing a 'green' sustainable composite steel-concrete building frame system that reduces greenhouse gas emissions throughout the life-cycle of building construction, usage, maintenance and deconstruction. It will reduce the use of ordinary Portland cement, which is a major carbon dioxide producer, by using geopolymer concrete made from fly-ash, and will use economic thin-walled, high-strength steel sections.

High-strength steel and reduced slab sizes not only result in less material usage for the building itself, but they reduce the size of the footings needed to support the structure.

Deconstructability also forms part of the research, which will also consider bolted beam to column joints which can be deconstructed, and using steel hollow section columns as a strength-enhancing repository for concrete made from recycled aggregates.

The Laureate Fellowship team consists of two post-doctoral research fellows – Professor Yong Lin Pi and Dr Xinpei Liu, two PhD students, as well as final-year honours students from the School.

A typical push test set up to obtain the strength and stiffness characteristics of pretension bolted shear connectors.

CIES - Sustainability Symposium

In October 2012 the School's Centre for Infrastructure, Engineering and Safety (CIES) held a Symposium on "Sustainability in Civil Infrastructure: Design, Construction and Resilience" with an impressive line up of international and national leaders in the field of Sustainable Infrastructure research and practice.

Speakers included: Em Prof David Nethercot (Imperial College, London), Prof Jin-Guang Teng (Hong Kong Polytechnic University), A/Prof Daksh Baweja (UTS), Scientia Professor Mark Bradford (CIES-UNSW), Prof Stephen Foster, Prof Rob Melchers (Newcastle), Prof Michael Neuman (FBE, UNSW), Prof Brian Uy (UWS), Prof S. Travis Waller (rCITI-UNSW), Prof John Wilson (Swinburne).

Em Prof R Ian Gilbert (pictured) facilitated a vibrant discussion on the sustainability of Australian infrastructure.

Topics explored at the symposium included design safety, sustaining ageing infrastructure, sustainable design and construction, new materials and technologies for concrete, timber, and steel; recyclable and demountable structures, innovative methodologies of large scale transport systems, and discussions on the concept and measurement of sustainability itself.

On offer to industry participants as well as academic colleagues was the opportunity to review trends in infrastructure sustainability - to keep abreast of current and future developments; as

well as to network with leading researchers and professionals with opportunities for collaboration on future research projects. More details on page 86.

Some of the CVEN Hydrology group: Dr Hoori Ajami, Fitsum Woldemeskel, Zaved Khan, Dr. Bellie Sivakumar, Amin Asadi, Bushra Naseem, Conrad Wasko, Dr. Raj Mehrotra, Shakera Khan, Prof Ashish Sharma, Dr Gregoire Mariethoz, A/Prof Mathew McCabe, Dr Lixin Wang, Dr Jason Evans, Dr Yi Liu, Urooj Khan.

The hydroclimatology research group within the School of Civil and Environmental Engineering is engaged in cutting edge research across a range of multi-disciplinary fields on hydrology and its interactions with our changing climate. The group has specializations in climatology, stochastic hydrology, remote sensing, ecohydrology, coupled system modelling and field based observational techniques, and many other areas of expertise. The group has championed the assessment and response to the implication of climate change on hydrology in Australia, especially those related to the estimation of design for floods under changed climatic conditions, and the design and management of water supply storages in a warmer climate.

The group consists of four academic members (Sharma, McCabe, Mariethoz and Johnson), a total of three ARC Future Fellows - the most in any single group in the discipline in Australia, several other Research Fellows, and close to 20 PhD students- all funded through a range of grants from the Australian Research Council, Engineers Australia (in relation to the Australian Rainfall and Runoff revision project), and other competitive and invited industry research grants.

Engineering in Climate Change Adaptation

During 2012, WRL was commissioned to assess the coastal adaptation needs for extreme events and climate change of the Cook Islands. The focus of this investigation is Avarua in Rarotonga - the administrative, economic and tourism hub of the Cook Islands. Late in 2012, Project Engineers Matt Blacka and Duncan Rayner travelled to the Cook Islands to undertake a detailed topographic survey of the Avarua area and neighbouring villages, with a specific focus on the coast and the fringing lagoon system - regions that are difficult to capture using conventional or airborne techniques. They were assisted by local engineer Ben Parakoti.

In a seven day surveying campaign, RTK-GPS surveying equipment was used to survey land levels throughout the study area, as well as measuring bathymetric levels throughout the fringing lagoon. An area of approximately 3 km2 was covered by the survey, with 25,000 topographical points measured over a linear distance of 85 km.

The data from the surveying campaign is vital in order to undertake physical and numerical wave process modelling for the area, as well as for mapping hazards to houses and infrastructure from wave impact and inundation during extreme cyclone events. Later stages of the project will see future adaptation strategies canvassed in conjunction with relevant stakeholders, with conceptual designs for the most suitable strategies developed.

WRL are undertaking this project for Climate Change Cook Islands, with funding provided by the Australian Government Department of Climate Change and Energy Efficiency, under the Pacific Adaptation Strategy Assistance Program (PASAP).

WRL Senior Coastal Engineer Matt Blacka undertaking survey of lagoon bathymetry.

MEngSc for Leighton

In 2012 the School continued its delivery of a specialized Master of Engineering Science in Project Management specifically designed for Leighton Holdings. Eighty staff from the Leighton group of companies including John Holland, Habtoor, Leighton Asia, Leighton Contractors and Thiess were enrolled in 2012 and by the end of the year nine graduates had successfully completed this groundbreaking MEngSc. The School congratulates Nicola Abrahams, William Holden, Patrick Kwong, Brett Lumsdaine, Steve Merange, Mark Norris, Brett O'Leary, Paul Steendyk and Jordan Tomasel on their significant achievement.

The MEngSc was established in 2009 when Leighton identified a need for targeted postgraduate education to develop the management skills of its professional staff, and in particular the need for a corporately identified postgraduate degree programme in project management.

The MEngSc provides Leighton staff with technical knowledge such as contracts, cost planning, design management, safety, tendering and estimating as well as developing their professional skills such as leadership and team building, negotiation skills and people management.

The program is taught by distance methods, with the School providing hard copy notes and facilitating online teaching and learning discussions. The Leighton Coordinator Janette Stewart also organises an important residential week for each cohort of students, at which senior CVEN academics and Leighton staff from across the companies impart their knowledge, expertise and experience to students.

The CVEN-Leighton team
Back L-R; CVEN HoS Professor Stephen Foster, Leighton Masters Coordinator Janette Stewart, Academic Program Leader: Professor David Carmichael, External Relations Manager Dr Mary O'Connell
Front: CVEN Student Manager Julijana Baric, General Manager, Project & Group Services, Leighton Holdings Iain Scoular

Leighton Holdings

Prizes and Awards

John Connell Gold Medal awarded to Scientia Professor Mark Bradford

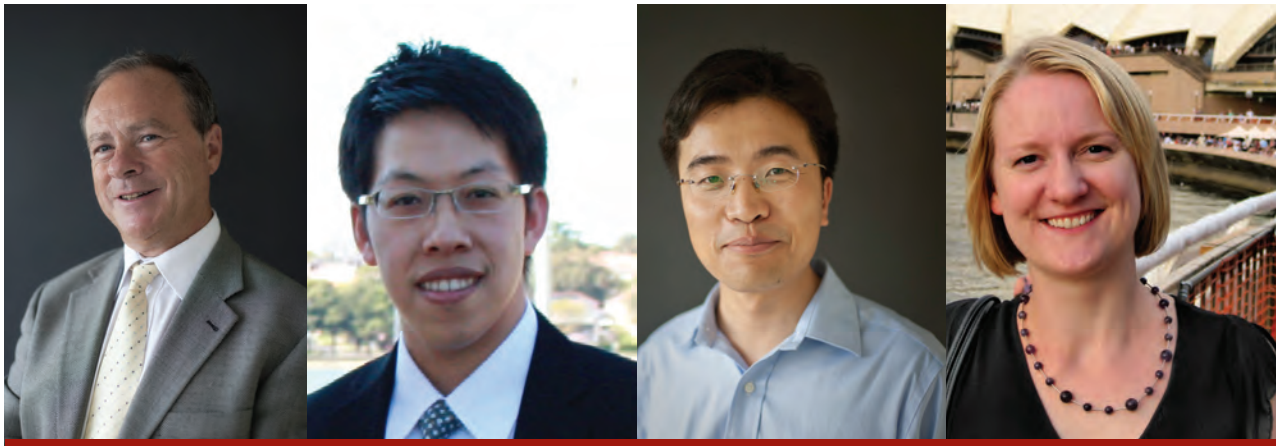
CIES Director of Research and Founding Director, Scientia Professor Mark Bradford, was awarded the John Connell Gold Medal by Engineers Australia's Structural College for 2012.

The John Connell Gold Medal is awarded annually to an eminent structural engineer who has made a significant contribution to the standing and prestige of the structural engineering profession.

Dr Michael Man, a Research Fellow in the School's Centre for Infrastructure Engineering and Safety (CIES) was awarded the prestigious **Mike Crisfield Prize** at the 20th Annual Conference on Computational Mechanics (ACME) in Manchester, UK 2012 Michael's research interests are in computational mechanics, scaled boundary finite element method, material modelling using artificial neural networks, and advanced composite materials and his prizewinning paper 'A semi-analytical technique for plate bending analysis with Padé expansion' involves work undertaken with CIES colleagues Chongmin Song, Wei Gao and Francis Tin-Loi.

Congratulations to lecturer **Dr GaoFeng Zhao** – who won a 2013 ARC Discovery Early Careers Researcher award (DECRA) for his work in the area of 'Dynamic fracturing in shale rock through coupled continuum-discontinuum modelling.'

Dr Rita Henderson, Senior Research Associate at the School's Water Research Centre won a prestigious 2012 NSW



M Bradford, M Man, GF Zhao, R Henderson, R Collins, Bill Peirson, C F Hilmer with TD Waite, External Relations Committee

Young Tall Poppy Award for her work on water quality and treatment. These highly sought after awards, presented by the Australian Institute of Policy and Science, recognise early career researchers who excel in their field and are actively engaged in community outreach and education. Rita's research interests lie in the field of drinking and recycled water treatment where her area of expertise is in the characterisation, treatment and monitoring of algae and organic matter (OM), working to ensure that contaminants are safely removed from our drinking water supply.

Dr Richard Collins, a Senior Research Fellow and an ARC Future Fellow was awarded a 2012 Fulbright Scholarship in Nuclear Science and Technology sponsored by the Australian Nuclear Science and Technology Organisation (ANSTO). As a result Richard undertook research at the Pacific Northwest National Laboratory in Washington State, at the US Department of Energy. He uses computational modelling to improve the efficiency of acid leaching processes, which are becoming increasingly used as a way of maximising the extraction of uranium from the waste of low-grade uranium mines.

Associate Professor Bill Peirson was awarded a UNSW ARC Postgraduate Council Award for Excellence in Postgraduate Research Supervision. The ceremony was held on 22nd November 2012 at the ASB Business Lounge. A/Prof Peirson received the prestigious award in recognition of his exemplary supervisory conduct and invaluable contributions to the supervision of higher degree research candidates. The award was endorsed by not only the ARC Postgraduate Council but also the Dean of Graduate Research, Professor Laura Poole-Warren.

The **Head of School, Scientia Professor T David Waite** was presented with the 2012 UNSW Staff Excellence Award for Excellence in Senior Leadership by the Vice-Chancellor, Professor Fred Hilmer AO in December 2012. Since 2007 David led the School through an extraordinary period of growth and expansion, in undergraduate and research student enrolments, in research publications and income. He inspired a hardworking School team with his own dynamic creativity and commitment.

DOUBLE WINNERS: At the end of 2012 the School's **External Relations Committee** won both the 2012 Faculty of Engineering Professional Staff Excellence Award for outstanding achievements and the 2012 UNSW Staff Excellence Award (group) for Excellence in Community Engagement. In his nomination, the HoS noted that 'the strategic objectives of the External Relations Committee (ERC) include the development of effective outreach and marketing programs, and the building and maintenance of mutually beneficial relationships with industry partners and supporters, ex-staff and alumni. The ERC have been dedicated, motivated, highly professional, enthusiastic and endlessly creative in carrying out these objectives and, indeed, in expanding and exceeding them.'

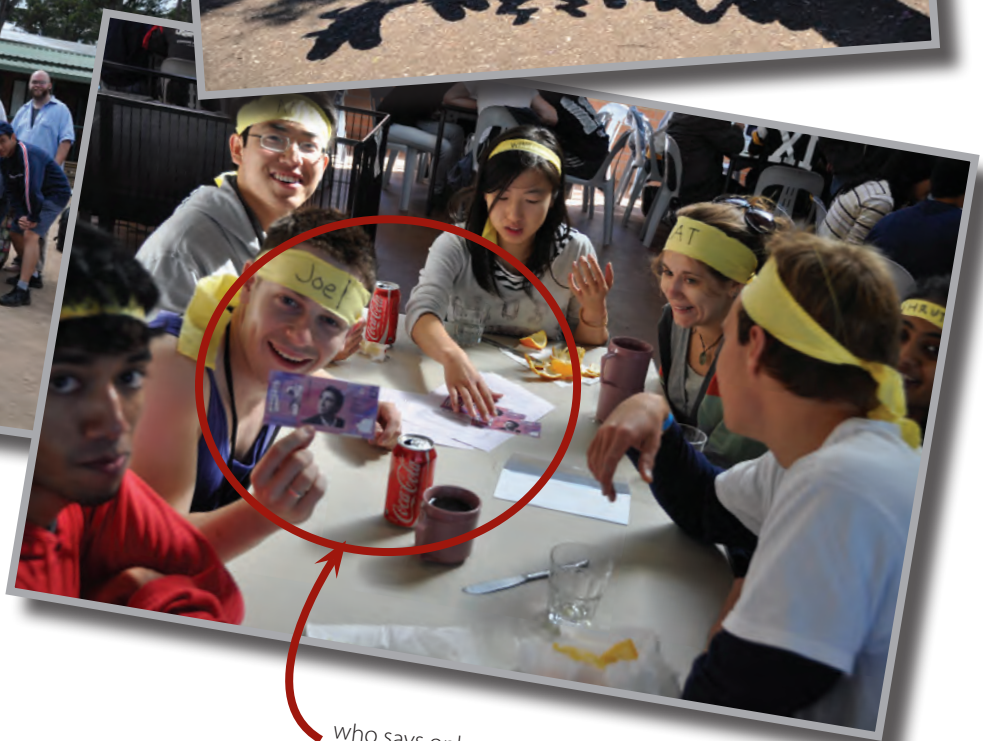



CEVSOC First Year camp

The CEVSOC First Year camp is a student initiative supported by the School. It offers our first year students a chance for closer engagement and connection with one another, with Year 3 and Year 4 students, and with the School.

In 2012, the first year of the camp, 70 students took part in a two night camp held at Wombaroo Outdoor Adventure Centre – with various activities, including engineering challenges, trivia quizzes, sport, scavenger hunt and team building exercises.

yes that's right... we have a storm trooper.... making CVEN the cooliest school on campus.



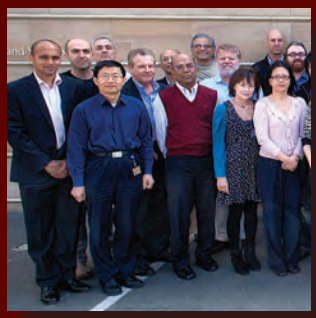
who says only accountants can play with money....

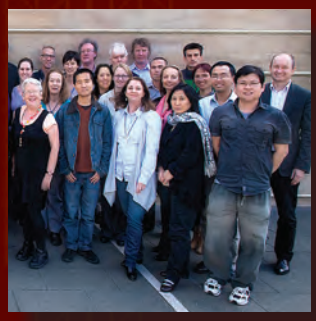
OUR PEOPLE

UNSW AUSTRALIA

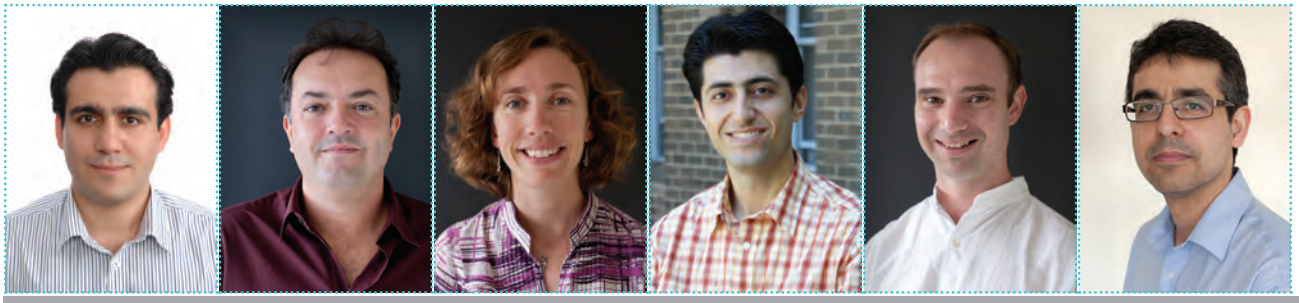
School of Civil and Environmental Engineering

Never Stand Still | Faculty of Engineering





Welcome to new staff 2012



Dr Ali Akbarnezhad – BE (Amirkbar, Tehran), PhD (NUS) - has joined the engineering construction and management group as a lecturer in project management and sustainability in construction. Before joining UNSW, he was a Research Fellow in the Department of Civil Engineering, National University of Singapore, where he worked on a number of research projects on sustainable design and construction in collaboration with the Housing and Development Board of Singapore. His research interests include Sustainability Assessment, Design for Sustainability, Information Modelling, Prefabrication, Microwave-Assisted Concrete Technology and Microwave NDT Tests.

Associate Professor Arnaud Castel – BE, MEngSc, PhD Toulouse - joined the School from the University of Nice-Sophia Antipolis (UNS) in September 2012 bringing with him his internationally recognized expertise in the areas of concrete technology and concrete structures. Arnaud is an expert in the durability of concrete structures in aggressive environments, life cycle assessment and sustainability of structures, and his appointment will greatly enhance the capability of the School and CIES in the development of solutions to the provision of durable and sustainable infrastructure in Australia.

Dr Fiona Johnson – BE, PhD UNSW - joined the water engineering group in September, coming to the School from the Australian Bureau of Meteorology, where she was involved in the revision of Intensity-Frequency-Duration (IFD) data for Australia as part of Australian Rainfall and Runoff. Her teaching areas are hydrology, water resources and environmental engineering. Fiona's research interests are in statistical hydrology and modelling. She is particularly interested in climate change impacts on water resources systems -and the resulting implications for engineering design -and developing methods to evaluate and correct the simulations from climate models.

Dr Arman Khoshghalb – BEng, MEng, Sharif University of Technology, Tehran, PhD UNSW - joined the teaching staff in January 2012, lecturing in the areas of fundamentals of geomechanics and soil mechanics. His PhD, completed in 2011, was on mesh-free analysis of unsaturated porous media including hydraulic hysteresis and large deformations.

Hugh McMullen is the new Health & Safety Implementation and Facilities Officer, a new position created by the School to manage the huge increase in student usage of labs and facilities as our enrolments have soared. Hugh came to the School from Noel Arnold & Associates Risk Management consultancy.

Dr Hamid Valipour – BE, MEngSc, PhD UNSW – came from UTS to join the structural engineering group as a senior lecturer. His teaching areas include engineering mechanics and mechanics of solids; steel and reinforced concrete design, and bridge design. His research areas involve behaviour modelling of structural components and materials, earthquake engineering, mechanics of materials, as well as non-linear finite element modelling of structures, and 3D finite element modelling of reinforced concrete structures.

Looking ahead for 2013

At the end of 2012 the School welcomed two new appointments for the expanding future.

Professor Brian Uy is the new Director of the School's Centre for Infrastructure Engineering and Safety (CIES), after serving as Professor of Structural Engineering and the Foundation Director of the Institute of Infrastructure Engineering at the University of Western Sydney. Involved in research in steel-concrete composite structures for over 20 years, Brian has co-authored over 500 publications including over 140 journal articles. Much of this research has been underpinned by competitive grant funding from most of the ARC granting schemes and from industry totalling over $22 million Australian dollars.

Currently Professor Uy is Chairman of the Standards Australia Committee BD32 on Composite Structures and a member of BD90 on Bridge Structures which are developing standards on Steel and Composite Structures for buildings and bridges respectively. Brian also serves on the editorial boards of eleven international journals for structural engineering and is Chief Editor (Asia-Pacific) for Steel and Composite Structures. Back at his alma mater where he commenced his undergraduate studies in civil engineering some 25 years ago and where he also served on academic staff from 1999-2004, Brian is looking forward to leading CIES together with its illustrious group of Directors - Professors Bradford, Gilbert, Khalili and Song - to further excellence and growth and hopes his previous academic/industry relationships developed over the last decade at Wollongong and Western Sydney can also help to increase the breadth and diversity of the research and engagement activities within CIES and the School.

Associate Professor Tommy Weidmann, a Senior Research Scientist at CSIRO, was appointed to lead the Sustainability Assessment Program in the School. Tommy has long-standing expertise in integrated sustainability assessment and environmental footprint analysis. He develops and applies environmental input-output analysis as part of a holistic concept to life cycle assessment, industrial ecology and sustainable consumption and production research. His main research question is how to achieve human wellbeing without increasing environmental impacts. Tommy has published over 25 peer-reviewed journal articles and is a regular reviewer of articles in more than twenty high-ranking scientific journals.

In 2012 Tommy received the Thomson Reuters Citation Award in Economics. In his previous affiliations with the Stockholm Environment Institute and CSIRO Ecosystem Sciences Tommy coordinated a number of research projects funded by the European Commission and Australian and UK Governments. In particular he led a groundbreaking research project which provided, for the first time, information on the UK's national carbon footprint.

ACADEMIC STAFF 2012

Acworth, R. Ian
Director, Connected Waters Initiative
Gary Johnston Professor of Water Management
BSc Leeds, MSc PhD Birm, FGS

Research Interests: Investigation of groundwater dynamics and hydrochemical processes in the coastal zone: Development of field instrumentation and analysis methods in groundwater studies: Electrical methods in the investigation of groundwater and salinity: Relationship between Palaeoclimate and dryland salinity.

Akbarnezhad, Ali
Lecturer
BE Amirkbar, Tehran, PhD NUS

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

Andersen, Martin
Senior Lecturer
MSc in Engineering, PhD DTU, Denmark

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

Attard, Mario
Associate Professor
Associate Head – Academic
Chair, Teaching & Learning Committee
BE PhD MHEd UNSW, MIEAust, CPEng

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

Baker, Andrew
Professor
BSc PhD Bristol

Research Interests: climatology and paleoclimatology, karst hydrology; organic matter characterisation in engineered and aquatic systems; and fluorescence technologies.

Bernold, Leonhard
Associate Professor
Dip Civ Eng, NIT, Switzerland: PhD Georgia IT, MBA St Gall, USA, MASCE

Research Interests: Quantitative Assessment of (Equipment Operator) Skill. Real Time Automated Process Control in Construction: Development of prototype hardware tested and evaluated for their impact on safety, quality, productivity, and carbon. Engineering Education: Testing of constructivist teaching and learning, formative assessment, and engineering sketching considering personal learning preferences. Technology Adoption in Construction: Study of decision making and internal dissemination procedures of a new technology: Lunar Mining and Construction.

Birk, Carolin
Lecturer
BEng DEng Dresden

Research Interests: Numerical modelling of wave propagation in unbounded domains: Soil-structure interaction, fluid-structure interaction: Longitudinal railway track-structure interaction: Artificial boundary conditions for diffusion: Fractional calculus.

Blenkinsopp, Christopher
Lecturer
MEng(Hons) Nottingham, PhD Southampton

Research Interests: swash zone sediment transport and hydrodynamics: wave breaking: LIDAR measurements of coastal hydrodynamics: aeration and splash in breaking waves.

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

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

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

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

Castel, Arnaud
Associate Professor
BE, MEngSc, PhD Toulouse

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

Cox, Ron
Associate Professor
Co-Chair, External Relations
Convenor, ACCARNSI
BE PhD UNSW, CPEng, FIEAust

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

Davis, Steve
Lecturer
BE PhD UNSW

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

Dixit, Vinayak
Senior Lecturer
MT Institute of Technology, Delhi, PhD University of Central Florida

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

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

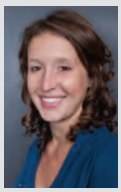
My main interests lie in the field of rock mechanics. Predicting strengths of large-scale rock masses (hundreds of meters) continues to be a major challenge. I am attempting to improve our understanding using laboratory tests, field studies and numerical methods. I am also currently involved in an ARC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

Foster, Stephen
Professor
Director, CIES
BE NSWIT, MEngSc PhD UNSW, MIEAustdf

Research Interests: *Non-flexural members in Reinforced Concrete* - Analysis and design of reinforced concrete deep beams, corbels, and nibs. Strut-and-tie modelling: *High strength concrete* -The use of high strength concrete for civil engineering structures. Design of high strength concrete columns. Design and analysis methods for non-flexural members of high strength concrete. Design with reactive powder concretes. *Fibre reinforced concrete* -Modes I and II fracture of fibre reinforced concrete elements. Design with reactive powder concrete: *Repair and Strengthening using CFRP* - Debonding failure of CFRP strengthened beams. Fatigue in CFRP strengthened members. Modelling of bond: *Numerical modelling* - Non-linear finite element modelling of concrete structures, 3D finite element modelling of reinforced and confined concrete structures. Modelling of fatigue in concrete structures. Modelling of blast and impact effects in RC framed structures.

Gao, Wei
Senior Lecturer
BE HDU, ME PhD Xidian, MIIAV, MAAS

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



Gardner, Lauren
Lecturer
BS ArchE, MSE, PhD University of Texas at Austin

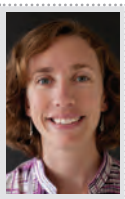
Research Interests: Network modelling for multi-domain integrated systems: congestion pricing models accounting for uncertainty, the role of real-time information and adaptive pricing: Sustainability models integrating transportation and electricity systems: developing network-based optimization models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

Hamed, Ehab
Senior Lecturer
BSc MSc PhD Technion

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

Han, Sangwon
Lecturer
BEng WKU, MSc HYU, PhD UIUC

Research Interests: Dynamic Project Management (DPM): Hybrid Simulation Modelling:Lean Construction: Building Information Modelling (BIM): Genetic Algorithm (GA) / Artificial Neural Network (ANN): Green Building / Sustainable Construction.



Johnson, Fiona
Lecturer
BE, PhD UNSW

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

Khalili, Nasser
Professor
Associate Dean, Research
BSc Teh, MSc Birm, PhD UNSW

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

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

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

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

Research Interests: large deformation analysis in geomechanics, advanced numerical methods in geomechanics, mechanics of unsaturated soils and coupled analysis of porous media.

Mariethoz, Gregoire
Senior Lecturer
MSc, MAS, PhD University of Neuchatel, Switzerland

Research Interests: geostatistics applied to surface and subsurface problems, uncertainty modelling, stochastic hydrogeology, paleoclimate data analysis, high-order statistics, characterization of complex spatial structures, subsurface flow and transport modelling, inverse problems, hydrology, processing of remote sensing and climatic data, parallel computing.

McCabe, Matthew
Senior Lecturer
BE, PhD Newcastle

Research Interests: Applying remote sensing approaches to improve knowledge of the Earth System, focusing predominantly on water and energy cycles at the land surface, but broadly interested in all applications encompassing terrestrial, atmospheric and oceanic components.

Moore, Stephen
Senior Lecturer
Chair, Teaching and Learning Committee
BE UNSW, MEngSc Adel., CPEng, MIEAust

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

Peirson, William
Associate Professor
Co-Director, Water Research Centre
Director, Water Research Laboratory
BE BSc MEngSc PhD UNSW

Bill is an international expert in Civil and Environmental Engineering fluid mechanics and undertakes specialist research in the fields of coastal engineering, air-sea and air-water interaction and exchange, fluvial hydraulics, estuarine processes and the hydraulics and mechanical behaviour of turbomachines.

Russell, Adrian
Senior Lecturer
Chair, Technical Services
BE, PhD UNSW, PGCert Bristol

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

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

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

Song, Chongmin
Professor
Chair, Computing Services
BE ME Tsinghua, DEng Tokyo

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

Stuetz, Richard
Professor
Co-Director, Water Research Centre
BSc, PhD UNSW

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

Taiebat, Hossein
Senior Lecturer
PhD USyd

Research Interests: Caisson foundations: Vertically loaded anchors: Shallow foundations under combined loading: Numerical modelling and liquefaction analysis.

Turner, Ian
Associate Professor
BSc (Hons) USyd, MEnvEngSc UNSW, PhD USyd, MIEAust, MAGU

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

Valipour, Hamid
Senior Lecturer
BE, MEngSc, PhD UNSW

Research Interests: Structural Mechanics: Behaviour modelling of structural components and materials including reinforced concrete and steel, steel-concrete, timber and timber-concrete composite materials, membrane action in framed structures: Mechanics of Materials - Continuum mechanics, damage and fracture mechanics, theory of plasticity, quasi-brittle materials and localisation limiters: Earthquake Engineering -Dynamics response of structures subjected to impact and earthquake, ductile design of structure: Numerical modelling -Non-linear finite element modelling of structures, force-based formulations of frame elements, 3D finite element modelling of reinforced concrete structures.

Vandebona, Upali
Senior Lecturer
BSc (Eng) Ceylon, MEng AIT, PhD Monash

Research Interests: Modelling of Transport Systems: Development of simulation and animation models for light rail train systems and bus services. Facility Location: Environmental considerations related to transport facility location: Demand Modelling: Analysis of public awareness and attitudes related to transport systems: Air Transport: Intelligent Transport Systems: Signage systems.

Vrcelj, Zora
Senior Lecturer
BE (Hons 1) W'gong, PhD UNSW

Research Interests: Composite Steel-Concrete Structures: Creep and Shrinkage: Innovation in Engineering Education: Structural Stability: Steel Structures, Composite Plates, Biomimetics, Engineering Education.

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

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

Waller, S Travis
Evans & Peck Professor of Transport Innovation
BSc Ohio State, MSc, PhD Northwestern

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

All the best to

Dr Nadarajah Gowripalan (Gowrie) – who had been with the School since 1993 - retired in March 2012. Gowrie was an effective and popular teacher, who was awarded the Vice-Chancellors Teaching Excellence Award in 1999. His research interests were in concrete technology and advanced materials technology, but his real passion was cricket. By all reports he was an excellent spin bowler.

In September **Dr Sangwon Han**, lecturer in engineering construction and management, returned home to Korea for family reasons. Sangwon had taught at the school since 2008 and was very involved in developing stronger international links between construction academics and professionals.

Goodbye

In July 2012 **Dr Zora Vrcelj** left to take up a new position in Victoria. Her prodigious work for the School in innovative engineering education and her development and introduction - with A/Prof Mario Attard -of the very successful BE Civil with Architecture - made her a wonderful colleague who is very much missed. .

We wish Gowrie, Sangwon and Zora all the very best in their new lives.

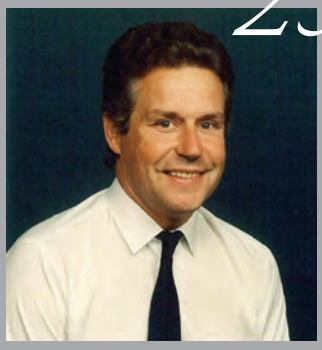
Silver Celebrations

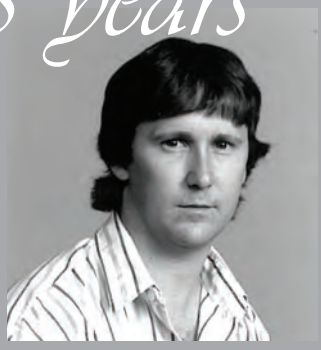
25 years

In 2012 three academic staff members celebrated twenty five years at the School.

These are not quite baby photos but clearly they began work at a very early age!

Congratulations to **David Carmichael**, **Stephen Foster** and **Upali Vandebona**





Promotions

Congratulations

Congratulations to **Chongmin Song** for his well deserved promotion to Professor in 2012.

Chongmin's research is on the development of advanced numerical methods and their application in structural and geotechnical engineering. He is one of the two original developers of the Scaled Boundary Finite-Element Method and has published more than 50 papers in the area of numerical methods, earthquake engineering, structural dynamics and fracture mechanics.

Congratulations to **Ehab Hamed** for his well deserved promotion to Senior Lecturer in 2012.

Professional and Technical Staff

School Manager

Karenne Irvine
BA UNSW

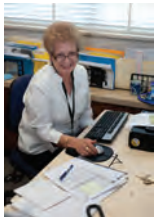
Student Services Manager

Julijana Baric

Administrative Officers

Flora Fan
BA CUHK, MEd HKU, MLib-IM UNSW

Patricia McLaughlin



Angela Spano

Administrative Assistants

Les Brown

Alice Yau

Web/IT

Kate Brown
BArch SU Thailand, MArch UNSW

Patrick Vuong
BIT

Xiaobo Ni, 2012 Web Developer

EA to Head of School

Betty Wong

External Relations Manager

Dr Mary O'Connell
BA UNSW PhD CSU

Patricia Tesoriero, Special Projects – IAC & IPP

Professional Officers

Dr Gautam Chattopad-hyay
BE PhD Jadavpur, MS Youngstown

Paul Gwynne
PDMPMR Sheffield Poly

Hugh McMullen
H&S and Facilities Officer

Centre Managers

Sylvia Brohl
BCom Bonn rCITI

Irene Calaizis
BCom UNSW CIES

Grantley Smith
BE(Hons) MEngSc CPEng WRL

Robert Steel
BSc (Hons) UNSW, BE UQ
WRC Kensington

ACCARNSI Coordinator

Tamara Rouse
BA UNSW

Senior Technical Officers

Anthony Macken

Rudino Salleh

William Terry

Technical Officers

Richard Berndt
BSc Macq

Ron Moncay

Kelvin Chun H Ong
BEng MSciTech UNSW, Grad Dip NUS

Larry Paice

Greg Worthing

Research, Adjunct & Visiting Academic Staff

Emeritus Professors

John Andrew Black, BA *Manc*, MTCP *USyd*, PhD *Bradford*, CPEng,FIEAust

Thomas Chapman, BSc *Leeds*, PhD *Southampton*,FIEAust

Robin Fell, BE MEngSc *Qld*, CPEng, FIEAust

Raymond Ian Gilbert, BE PhD *UNSW*, CPEng, FIEAust

David Pilgrim AM, BE PhD DSc *UNSW*, CPEng HonFIEAust

Francis Shay Khiet Tin-Loi, BE PhD *Monash*, CPEng, MIEAust

Somasundaram Valliappan, BE *Annam*, MS *Northeastern*, PhD DSc *Wales*, CPENG FIEAust FASCE FIACM

Senior Research Associate

Shikha Garg, *BE IIT Kanpur PhD UNSW*

Research Fellows

Huiyong Ban, BE PhD *Tsinghua University*, China
Taha Hossein Rashidi, BSc MSc, *Sharif UT Tehran;* PhD, *UI Chicago*

Atsushi Ikeda, BE *Meiji Univ* (Japan), ME, PhD *Tokyo Tech*

David Kellerman, BE PhD *UNSW*

Sundararajan Natarajan, BE *Bharathiar University*, India, PhD *Cardiff*, UK

Vice-Chancellor Postdoctoral Research Fellow

Tongxu Liu, BSc *SDU*, MSc &PhD *GSCAS, China*

Research Associates

Christopher Miller, BE BSc *UNSW*

Post Doctoral Teaching Fellows

Xavier Barthelemy, PhD *Paul Sabatier, Toulouse*

Samaneh Mohammadi

Ali Khajeh Samani

Visiting Professorial Fellows

Dr Nicholas Ashbolt, BAgSc PhD *Tas,* MASM

Dr Kourosh Kayvani, BSc *Tehran,* MEngSc PhD *UNSW,* MIEAust, CPEng, MIABSE, MIASS

Dr Brian Shackel, BE *Sheff* , MEngSc PhD *UNSW,* CPEng FIEAust

Senior Visiting Fellows

Dr Reza Attarnejad, BScMSc *U Tehran*, PhD *UPC Barcelona*

Dr Ian Cordery, BE ME PhD *UNSW*

Dr Mark Davidson, BSc, PhD *UCS Swansea*

Dr Andrew L Rose, BE BSc PhD *UNSW*

Visiting Fellows

Dr Bruce Cathers, BE *Syd,* DipHE *Delft,* MEngSc *UNSW,* PhD *Manc*

Mr Hauke Gravenkamp, Dip Physics, *Hamburg*

Dr Hironobu Hasegawa, PhD *Muroran IT*, Japan

Dr Peter Hidas, MCEng Dip TP, PhD *Budapest*

Dr Atsuko Ikeda, BE *Meiji*, ME, PhD, *Tokyo Institute of Technology*

Dr Xiaomin Li, BSc *China Ag Uni*, PhD, *Guangzho Inst of Geochemistry*

Dr Dunja Perić, Dipl. Ing *U Zagreb*, MS, PhD *U Colorado*

Dr Gregory Peters, BE, PhD *Syd*

Dr Shan Qiu,

Mr Frank Robert Scharfe

Dr Gareth Edward Swarbrick, BE *Adel,* PhD *UNSW*

Centres and Research Staff

Australian Climate Change Adaptation Research Network for Settlements & Infrastructure (ACCARNSI)

Convenor

Associate Professor Ron Cox

Coordinator

Ms Tamara Rouse

Research Assistants

Dr Philip Booth

Alicia Begonia

Dr Hazel Rowley

Centre for Infrastructure Engineering and Safety (CIES)

Director

Professor Stephen Foster, BE *NSWIT*, MEngSc PhD *UNSW*, MIEAust

Research Director

Scientia Professor Mark Bradford, BSc BE PhD *Syd* DSc *UNSW*
FTSE PEng CPEng CEng FIEAust FIStructE MAICD MASCEt MACI

Deputy Directors

Emeritus Professor Ian Gilbert, BE PhD *UNSW* CPEng FIEAust MACI

Professor Nasser Khalili, BSc *Teh* MSc *Birm* PhD *UNSW*

Centre Manager

Irene Calaizis, BCom *UNSW*

Other Academics

Professor Yong Lin Pi, BE *Tongji* ME *Wuhan* PhD *UNSW* CPEng MIEAust

Professor Chongmin Song, BE ME *Tsinghua*, DEng *Tokyo*

A/Professor Mario Attard BE PhD MHEd *UNSW*, MIEAust, CPEng

A/Professor Arnaud Castel BE, MEngSc, PhD *Toulouse*

Dr Carolin Birk BE DEng *Dresden*

Dr Kurt Douglas BE Syd. PhD *UNSW*, MIEAust

Dr Wei Gao BE HDU, ME PhD *Xidian*, MIIAV, MAAS

Dr Ehab Hamed, BSc MSc PhD *Technion*

Dr Arman Khoshghalb BE ME *Sharif Uni of Tech, PhD UNSW*

Dr Adrian Russell BE, PhD *UNSW*, PGCert *Bristol*

Dr Hossein Taiebat BSc *Isfahan* M.E.S. PhD *Syd*

Dr Hamid Vali Pour Goudarzi BSc MSc *Tehran*, PhD *UNSW*

Dr Zora Vrcelj BE *W'gong*, PhD *UNSW*

Other Research Staff

Dr Huiyong Ban BE PhD *Tsinghua University, Beijing*

Dr Zhen-Tian Chang, BE ME *Hunan* PhD *UNSW*

Dr Liao-liang Ke, BE *Wuhan*, PhD *Beijing Jiatong*

Dr David Kellerman BE, PhD *UNSW*

Dr Xiaojing Li, BEng *Wuhan* PhD *UNSW*

Dr Xinpei Liu BE *SCUT*, MEngSc MPhil PhD *UNSW*

Dr Michael Man, BE PhD *UNSW*

Dr Sundararajan Natarajan BE Mech Eng, PhD *Cardiff*

Dr Tian Sing Ng, BE PhD *UNSW*

Dr Ean Tat Ooi, BE *UTM*, PhD *NTU*

Dr Maziar Ramezani, BSc MSc *Semnan* Iran, PhD *Sains* Malaysia

Dr Ghaofeng Zhao,BSc MSc *CUMT*, PhD *EPFL*

Technical Team

John Gilbert

Ron Moncay

Greg Worthing

Emeritus Professor

Somasundaram Valliappan BE *Annam*, MS *Northeastern*, PhD DSc *Wales*, CPEng, FASCE, FIACM

Professorial Visiting Fellow

A/Prof Brian Shackel, BE *Sheff*, MEngSc PhD *UNSW*, CPEng FIEAust

UNSW Members

Professor Alan Crosky
School of Materials Science & Engineering

A/ Professor Gangadhara Prusty
School of Mechanical Engineering

Connected Waters Initiative Research Centre

Director

Prof Ian Acworth (until September 2012)

Professor Andy Baker (from September 2012)

Associate Director

Dr Martin Andersen (from September 2012)

Centre Manager

Mr Antonio Woo

Academics

Associate Professor Bryce Kelly

Dr Cameron Holley

Dr Gregoire Mariethoz

Dr Wendy Timms

Visiting Fellow

Dr Denis O'Carroll *PEng, BASc, Ottawa, MS Clarkson, PhD Michigan*

Post-Doctoral Researchers

Dr Hoori Ajami

Dr Steve Bouzalakos

Dr Alessandro Comunian

Dr Mark Cuthbert

Dr Anna Greve*

Dr Ander Guinea Maysounave

Dr Adam Hartland*

Dr Catherine Jex

Dr Sanjeev Jha

Dr Joshua Larsen

Dr Gabriel Rau

Dr Hamid Roshan

Dr Helen Rutlidge

Dr Andrew McCallum

* post-doctoral researchers that completed in 2012

Professional Staff

Jodi Adams - Administration

Peter Graham - Manager -NCGRT Wellington Research Farm

Sam McCulloch – Field Engineer

Dayna McGeeney – Laboratory Manager

Mark Whelan – Centrifuge Engineer

Research Centre for Integrated Transport Innovation (rCITI)

Director

Professor S. Travis Waller, Evans & Peck Professor of Transport Innovation

Deputy Director

Dr Vinayak Dixit

Academics

Dr Lauren Gardner

Dr Upali Vandebona

Research Staff

Dr David Fajardo

Dr Taha Hossein Rashidi,

Centre Manager

Sylvia Brohl

Water Research Centre (WRC) 2012

Co-Directors

Associate Professor Bill Peirson (Director, WRL)

Professor Richard Stuetz

Business Managers

Grantley Smith (WRL)

Robert Steel

Academics

Professor Ashish Sharma

Professor David Waite

Associate Professor Ron Cox

Associate Professor Ian Turner

Dr Chris Blenkinsopp

Dr Stuart Khan

Dr Gregoire Mariethoz

Dr Matthew McCabe

Research Staff

Dr Hoori Ajami

Michael Allis (WRL)

Dr Xavier Barthelemy (WRL)

A/Prof Sivakumar Bellie

Dr Mark Bligh

Dr Heather Coleman

Dr Richard Collins

Dr Chris Duesterberg

Dr Shikha Garg

Adam Hambly

Dr Rita Henderson

Dr Adele Jones

Dr Andrew Kinsela

Dr Nhat Le

Dr Yi Liu

A/Prof Sven Lundie

Dr James McDonald

Dr Rajeshwar Mehrotra

Dr Kate Murphy

Dr Gavin Parcsi

Dr An Ninh Pham

Dr David Roser

Dr Hazel Rowley

Dr Michael Short

Dr Eric Sivret

Dr Kristen Splinter (WRL)

Dr Jacqueline Stroud

Dr Lixin Wang

Dr Xinguang Wang

Dr Yuan Wang

Principal Project Engineers - WRL

Brett Miller

Grantley Smith

Senior Project Engineers - WRL

Doug Anderson

Matt Blacka

James Carley

Dr William Glamore

Project Engineers – WRL

Alexandra Badenhop

Ian Coghlan

Erica Davey

Chris Drummond

Barry Farrelly

Dr Francois Flocard

Nathan Guerry

Alessio Mariani

Duncan Rayner

Priom Rahman

James Ruprecht

Dr Tom Shand

Dr Wendy Timms

Conrad Wasko

Administration and Technical Staff

Anna Blacka (WRL)

Bela Carvosso

Robert Jenkins (WRL)

Coral Johnson (WRL)

Patricia Karwan

Ross Matthew (WRL)

Larry Paice (WRL)

Anna Piorkowska

Hamish Studholme (WRL)

Joan Terlecky (WRL)

Wendy Thomason-Harper (WRL)

Robert Thompson (WRL)

Library – WRL

Caroline Hedges

Jane Fortt

Visiting Academics

Associate Professor Sankar Arumugam, North Carolina State University, USA

Professor Nicholas Ashbolt, University of Cincinnati, USA

Dr Antonio Dorado Castaňo, Polytechnic University of Catalonia, Barcelona

Dr Bruce Cathers, UNSW, Australia (WRL)

Associate Professor Ian Cordery, UNSW, Australia

Dr Stuart Dever, GHD, Australia

Professor Jorg Drewes, Colorado School of Mines, Colorado, USA

Dr Manabu Fujii, University of Tohoku, Japan

Dr Bruce Jefferson, Cranfield University, UK

Professor Ian King (WRL)

Professor Peter Rasmussen, University of Manitoba, Canada

Associate Professor Andrew Rose, Southern Cross University, Australia

Professor Mel Suffet, UCLA, USA

Dr Gareth Swarbrick, Pells Sullivan & Meynink, Sydney Australia

Vale

Emeritus Professor Thomas Grandin Chapman 1929 – 2012

BSc (Civil Engineering) Leeds, PhD Southampton, FIEAust
Former Head of School, Emeritus Professor Tom Chapman passed away in December 2012.

Tom Chapman was born in Shanghai but spent most of his childhood on the Channel Island of Jersey where he was a schoolboy during the German occupation. At the end of World War II he studied civil engineering at Leeds University. Unimpressed by the English climate ('I had an attic room in Leeds with a sky-light, through which no actual light penetrated for six weeks because it remained covered in snow') he headed for Australia, working for seven years on a variety of civil engineering projects, mainly for Government departments. He ventured back to England to undertake a PhD in groundwater hydraulics at Southampton University, then returned to Australia to work for 13 years with the CSIRO Division of Land Research in Canberra. He then held the Chair of Engineering at UNSW Faculty of Military Studies in Duntroon for a decade, before joining the School in 1981 as Professor of Water Engineering, replacing Rupert Vallentine.

Tom's research expertise was in hydrology, with particular emphasis on interactions between surface water and groundwater. His primary scholarly contribution was in the national review of predictive methods for Australian hydrology – with the landmark publication in 1975 of *Prediction in catchment hydrology / a National Symposium on Hydrology*; sponsored by the Australian Academy of Science - edited by Tom and F X Dunin.

Tom was Head of School from 1984 – 1987 where he oversaw the introduction of the new world of IT into the School. He also was a strong proponent of community building for the School staff, and recalled a more collegial era. 'When I became Head of School, Ian Somervaille and I used to travel to Randwick on Friday afternoon to purchase cask wine, orange juice and snacks, which were available in Room 601 to any staff member prepared to make a contribution of $1. This activity became known as 'The 1630 Club.'

Tom retired in 1987 – but remained active as a researcher, writer and scholarly adviser for many years afterwards. As his successor as Head of School, Professor Max Irvine noted at the time, 'Tom's concern for students was well known and his efficient administration of school affairs and wise counsel on many matters are features that staff and students alike are indebted to him for.'

Ken Faulkes (1933 – 2012)

BE Hons '55, ME '58, PhD '74 UNSW

Emeritus Professor Ken Faulkes was one of the first alumni and academics of the School. He taught structural engineering from 1968 to 1981, before leaving the School to join and then lead the Faculty of Engineering at UTS.

Associate Head (Academic) A/Prof Mario Attard recalls, 'I studied Civil

Engineering in the early 70s at UNSW and Ken was my lecturer in structural design. I looked up to Ken and admired his inspired style. He was one of those special teachers that made every class enjoyable and would instil passion for designing creative structures. His forte was prestressed concrete with his book on that subject being a key resource in Australia for structural engineers. He later became Dean of Engineering at UTS. He was a very humble and fine gentleman.'

Brian Shackel (1940 – 2012)

BE Sheff, MEngSc PhD UNSW, CPEng, FIEAust
Associate Professor Brian Shackel lost his battle with cancer on the 18th November 2012.

Brian Shackel obtained his BE from the University of Sheffield in 1962 and shortly afterwards emigrated to Australia. He worked with the Department of Main Roads, and later with the Shire of Central Darling, and completed his MEngSc at UNSW in 1966 before joining UNSW as a Teaching Fellow. In 1979, Brian joined the Department of Geotechnical Engineering within the School of Civil Engineering, later serving as Departmental Head from 1989 to 1992.

He was a key member of the Faculty of Engineering's International Committee which was established in 1989 to develop strategies for recruitment of full fee paying international students. The outcomes of the work of this Committee and UNSW's

International Office placed the School and Faculty as leaders in international student recruitment. During the mid 90s Brian also gave lectures and workshops on pavements to Mahanakorn University staff and civil engineers in Bangkok, as well as to government highway engineers in Pakistan. From 1994 to 1998 Brian was Director of the School's Munro Centre – which successfully sought closer ties with industry.

With nearly 40 years experience in teaching and consulting on pavement engineering including pavement design and construction, Brian was a recognised world authority on concrete block paving (CBP), and was the author of numerous research papers and 3 books on this topic. One of these, *Design and Construction of Interlocking Concrete Block Pavements,* Elsevier Applied Science, London, (1990) was probably the only book by a School staff member to have been published in four languages.

Brian was also the author of the well-known LOCKPAVE software package for the design and specification of concrete block paving. His work on concrete block paving won him an Award for Excellence from the Concrete Institute of Australia.

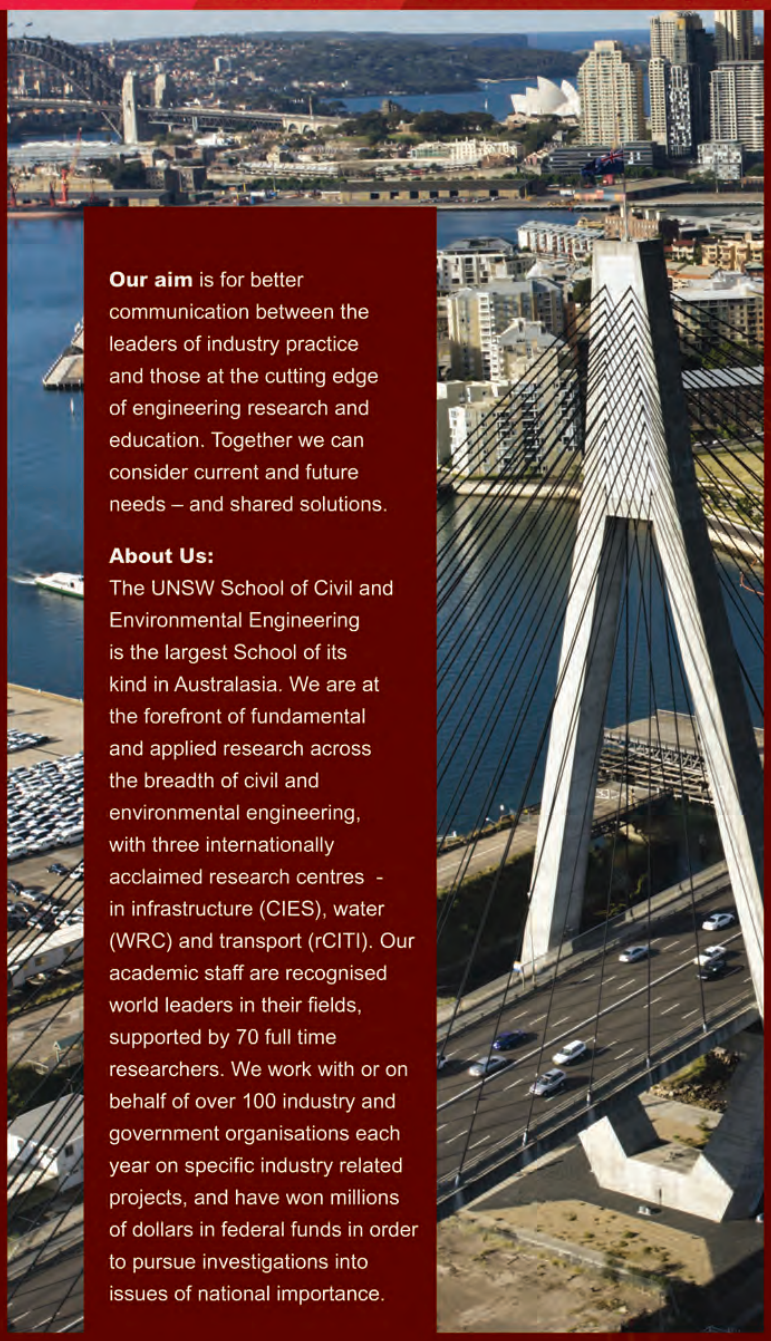
Brian retired from the School of Civil & Environmental Engineering in 2001 and took an honorary visiting appointment. He was a very busy retiree; giving public seminars, and presenting papers around the globe.

OUR RESEARCH

UNSW AUSTRALIA

Innovative Industry Research

Never Stand Still | Faculty of Engineering | School of Civil and Environmental Engineering



Our aim is for better communication between the leaders of industry practice and those at the cutting edge of engineering research and education. Together we can consider current and future needs – and shared solutions.

About Us:
The UNSW School of Civil and Environmental Engineering is the largest School of its kind in Australasia. We are 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). Our academic staff are recognised world leaders in their fields, supported by 70 full time researchers. We work with or on behalf of over 100 industry and government organisations each year on specific industry related projects, and have won millions of dollars in federal funds in order to pursue investigations into issues of national importance.

Research Management Committee Report 2012

Continuing Growth in Research

Publications	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Books	3	4	5	5	2	6	5	5	4	3
Chapters in Books	3	3	7	8	11	12	4	11	9	9
Refereed Journal Articles	74	76	90	98	113	128	125	183	196	241
Refereed Conference	81	94	83	87	100	88	114	68	148	115
Total	161	177	185	198	226	234	248	267	357	368
ARC Grants (year announced)	$1.94M	$3.33M	$2.13M	$1.53M	$1.74M	$3.06M	$4.32M	$1.75M	$3.26M	$1.38M
Total Research Income pa	$6.0M	$6.3M	$6.9M	$7.7M	$8.0M	$10.7M	$13.6M	$15.1M	$17.35M	$15.56M

The School's Research Management Committee (RMC) manages and supports research activities within the School, including research undertaken by both the staff and the School's postgraduate research students, and liaises with and contributes directly to the Faculty's Research Management Committee. In 2012, the RMC met every month to oversee and progress all research related aspects of the School's operation.

RMC Committee Membership 2012

Steve Foster	Chair, CIES Director
Ian Turner	Deputy Chair, Postgrad Research Student Coordinator, WRL Research Director
Mark Bradford	CIES Research Director
Richard Stuetz	WRC Co-Director
Travis Waller	rCITI Director
Ian Acworth/Andy Baker	CWI Director
Adrian Russell	
Ashish Sharma/Matt McCabe	
Sangwon Han	
Wei Gao	Taste of Research Coordinator
Patricia McLaughlin	Admin

Postgraduate Research Student Management

An important aspect of the Committee's work involves the management of the School's postgraduate research student's program. In 2012, the School had 136 postgraduate research students enrolled in either ME or PhD programs. Management of this vital research activity within the School 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 a suitable supervisor, 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 2012. Much of the work load in this area is carried by the School's Postgraduate Coordinator Associate Professor Ian Turner and the Postgraduate Research Student Administrator Ms Pattie McLaughlin.

Research Grants

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

ARC Funded Projects

ARC Discovery Projects:

Professor Ian Gilbert – "Control of cracking caused by early-age contraction of concrete" $355K

Professor Nasser Khalili and Dr GaoFeng Zhao – "Dynamics analysis of unsaturated porous media subject to damage due to cracking" $300K

Professor Chongmin Song, Dr Wei Gao and Professor Yong-Lin Pi – "A high-performance stochastic scaled boundary finite-element framework for safety assessment of structures susceptible to fracture" $330K

LIEF Grant:

Professor Travis Waller and Dr Vinayak Dixit of rCITI, with Professors Michiel Bliemer (USyd) and Dennis Del Favero (iCinema) – "Travel Choice Simulation Laboratory (TRACSLab): a visualisation laboratory to study travel behaviour and drivers' interactions" ($390K)

In addition to the above successes, School researchers are partners in four other successful grants:
Professor Mark Bradford is a partner on a LIEF grant for "Performance level structural testing facility" ($500k) in collaboration with the University of Queensland.

Professor Nasser Khalili is a partner on a LIEF grant for "A national facility for in situ testing of soft soils" ($300k) in collaboration with the University of Newcastle.
Dr Xiaojing (Jean) Li, working with CIES, is CI on a grant "Advanced techniques for imaging radar interferometry" ($330k) in collaboration with Linlin Ge and others from UNSW Surveying.

Associate Professor Mathew McCabe is a partner on a LIEF grant for "Mobile weather radar system for advanced environmental monitoring and modelling" ($340k) in collaboration with Monash University.

UNSW Goldstar* Award winners: Dr Adrian Russell, Professor Nasser Khalili and Dr Hossein Taiebat were awarded $40K for their research project on 'Mechanistic design tools for shallow foundations in unsaturated soils derived through numerical modelling, analysis and experimental investigation'.

*Goldstars are awarded annually to UNSW researchers who narrowly miss out on project grants in the major ARC funding rounds.

Image of Grant winners is on p7 of this report.

Research Facilities & Capabilities

The Randwick Heavy Structural Laboratory at UNSW King St campus, and the **Materials Research Laboratory and Geotechnical Engineering Laboratories**, collectively known as the **Infrastructure Laboratories**, support the research of the School's Centre for Infrastructure Engineering and Safety (CIES), while the Water Research and Water Quality Laboratories support key research in the School's Water Research Centre. The laboratories also provide extensive support for undergraduate and postgraduate teaching and learning.

Infrastructure Laboratories: The structures and materials laboratories support the research of academic staff, and postgraduate and undergraduate students involved in experimental research on various aspects of Structural Engineering. The laboratories are equipped with state-of-the-art servo-controlled hydraulic actuators and universal testing machines. The laboratories maintain a capacity for high load testing, ranging from 10 kN to 5000 kN. Strength testing is often combined with X-Ray measuring of laboratory specimens under load, pioneered by CIES researchers, enabling improved understanding at the materials level and for the development of refined, mechanically based, structural models.

The Geotechnical Engineering Laboratories within the School contain a diverse range of conventional soil, rock and asphalt testing equipment, along with specialist equipment used primarily to support the School's research. Notable inclusions are modified triaxial cells, pressure plates and an oedometer for testing unsaturated soils at normal and elevated temperatures, rotating cylinder and a specialist pin-hole apparatus for testing erosion of soils, ring shear apparatus, a large shear box and high pressure triaxial cells for testing gravel, rock and sands undergoing particle crushing, as well as an asphalt testing laboratory. Recent additions are the calibration chamber for conducting cone penetration tests in unsaturated soils and the design and construction of a Lateral Earth Pressure testing rig to assist with research on unsaturated soil-retaining wall interaction; as well as a high performance thermal imaging camera to research progressive development of instability and failure in soil and rock samples.

The Water Quality Laboratories (WQL) include specialist laboratories for chemical and microbial analysis, pilot hall facilities for large scale bioreactor studies, a radiation laboratory for isotope studies and an olfactory laboratory for odour characterisation. They contain a wide range of analytical instruments for the chemical, microbial and physical analysis of environmental samples from water, wastewater, waste and the atmosphere. These include gas chromatograph coupled with a tandem mass spectrometer (GC-MS/MS), high pressure liquid chromatography-tandem mass spectrometer (HPLC-MS/MS), inductively coupled plasma-atomic emissions spectroscopy (ICP-AES) and inductively coupled plasma-mass spectrometry (ICP-MS). Specialised equipment includes an olfactory-GC-MS for odorant characterisation coupled with thermal desorption (TD) for gas sample pre-concentration and odorant characterisation and UV-VIS and fluorescence spectrophotometers for spectral analysis of samples.

WRC staff also have access and expertise in equipment held and managed by the **UNSW Mark Wainwright Analytical Centre** including the DOC Labor Liquid Chromatography – Trace Organic Carbon Detector (LC-OCD). Speciation and trace analysis of total carbon and nitrogen in water samples, such as drinking water, is available using the LC-OCD. The system uses size-exclusion chromatography to separate classes of dissolved organic materials (such as humic acids) then uses a catalysed UV oxidation to measure low levels of total carbon in the eluent.

The UNSW Odour Laboratory is a research group within the School's UNSW Water Research Centre. The laboratory is a leading edge facility that specialises in interdisciplinary research and training for the assessment and management of odour and gaseous emissions. The odour research laboratory was established in 1991.The Odour Laboratory provides specialist olfactory and chemical analysis for the characterisation of odorous and gaseous emissions from point and area sources. The laboratory attracts funding from a mixture of competitive CAT1 research grants (ARC,CRC) supported by applied research from government agencies, industry associations (WERF) and utilities.

The Water Research Laboratory Manly Vale (WRL) employs a vast range of numerical (computer) models in its projects and research efforts. These software programs include hydrodynamic models, water quality models, sediment transport models, wave transformation models, rainfall and runoff models, and groundwater models. WRL also continues to develop and maintain state-of-the-art equipment and instrumentation to undertake its investigations. Such equipment includes the following:

- An ARGUS coastal imaging system capable of monitoring several kilometres of coastline with high resolution in time and space over years. Sophisticated image processing software is used to analyse the images, enabling measurements to be made of a wide range of coastal features and processes.
- Groundwater investigations equipment ranges from specific to general use, with a multitude of tools to aid in: bore design, aquifer delineation and testing, acid sulfate soil investigation, downhole geophysical investigation, electrical imaging, resistivity imaging and groundwater quality testing.
- As well as having a long history in hydraulic research, WRL continues to develop and use state-of-the-art instrumentation to undertake its investigations. Such equipment includes: Particle image velocimetry (PIV) using non-coherent and laser light sources: Laser induced fluorescence (LIF) measurements of aqueous concentration and sediment particle fields: Suspended sediment particle sizers: Acoustic techniques for measuring turbulent fluid stresses (Sontec ADVs and RDI ADCPs): Conductivity measurements of bubble size and speed in multiphase flows: Conductivity measurements of aqueous concentration fields .
- WRL also has a wide range of hydrology equipment that has been employed in numerous field activities and hydrology studies including: Automatic weather station, Data logger, Gamet grab sampler , Water level follower, Rain gauge, Ultrasonic probe, Hydrolab water quality probe, Solar panel, FloPro sensor, GSM/GPRS modem.

With the unique large-scale physical facilities at the Manly Vale site, a mobile lab for accurate on-site analysis, a track record for addressing computationally-demanding numerical modelling in water engineering and significant experience in undertaking field investigations, WRL continues to maintain an international reputation.

Coming soon to the Research Centre for Integrated Transport Innovation (rCITI): a driving simulation laboratory, the **Travel Choice Simulation Laboratory (TRACSLab)**. TRACSLab is a world-first facility to observe collective travel choice in a realistic lab environment. It is unique due to the focus on travel choice, networked interaction and strong teaming. The findings of the lab will support a new generation of transport analysis techniques for emerging issues such as sustainability, reliability, and ITS.

2012 CVEN Publications

Book - Scholarly Research

Fairchild, IJ, & Baker 2012, Speleothem Science, Wiley. Linden, K, McClellend, C, Drewes, J, Khan, SJ, & et al, 2012, Water Reuse 2030: Identifying Future Challenges and Opportunities, Water Reuse Research Foundation, Alexandria, VA, USA.

Book - Edited

Cox, RJ, Doug Lord, Miller, BM, Peter Nielsen, et al, (ed) 2012, Climate Change adaptation guidelines in coastal management and planning, Engineers Media, Australia.

Chapter - Scholarly Research

Bradford, MA, & Pi, YL 2012, Analytical non-linear stability of a continuous system as a benchmark study for computational formulations, Computational Methods for Engineering Science (pp. 351 - 362) Saxe-Coburg, Kippen, FK8 3DY, UK.

Fell, R, Stapledon, D, & MacGregor, P 2012, Landslides and geologic environments, Landsides Types, Mechanisms and Modeling (first, pp. 134 - 143). Cambridge University Press, Cambridge UK.

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Glamore, W 2012, Incorporating Innovative Engineering Solutions Into Tidal Restoration Studies, Restoring Tidal Flow to Salt Marshes: A Synthesis of Science and Management. Island Press.

Kezunovic, M, & Waller, ST 2012, Vehicle-Power Grid Interaction for Multi-fueling (EV, PHEV), Encyclopedia of Sustainability Science and Technology, Springer.

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Chapter - Textbook

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Wang, C, Gao, W, Song, C, & Zhang, N 2012, 'Stochastic interval analysis of structures', 2012 Spring World Congress on Engineering and Technology, Xi'an, China, 27-30 May, 2012.

Wang, C, Gao, W, & Song, C 2012, 'Stochastic interval dynamic analysis of structures with mixed uncertainties', International Conference on Computational Method, Gold Coast, Australia, 25-28 November 2012.

Wu, D, Gao, W, Tangaramvong, S, & Tin Loi, F 2012, 'Limit analysis with uncertain-but-bounded parameters by kinematic approach', ICCM2012, Gold Coast, Australia, 25-28, Nov, 2012.

Wu, L, Peirson, WL, Pells, S. Douglas, KJ, & et al, 2012, 'Aeration drag effects on unlined spillways - Paper 24/ICSE2012/000024', Sixth International Conference on Scour and Erosion, Paris, France, 27-31 August 2012.

Yang, C, Wang, C, Gao, W, & Song, C 2012, 'Dynamic analysis of structures with interval parameters under random process earthquake excitations', 22nd ACMSM, UTS Sydney, 11th to 14th December 2012.

Yap, R, Holmes, M, Peirson, WL, Whittaker, M, et al, 2012, 'The selectivity of pH regulated alum coagulation in dissolved air flotation of algae laden stabilization pond effluent a case study', OZwater'12, Sydney Convention and Exhibition Centre, 8-10 May 2012.

Zargarbashi, S, & Khalili-Naghadeh, N 2012, 'Effective stress in unsaturated soils under wetting and drying', 5th Asia-Pacific Conference on Unsaturated Soils 2012, Pattaya, Thailand, 29 February - 2 March, 2012.

Zekavat, PR, & Leonhard Emil Bernold 2012, 'A mobile electronic site kiosk for construction', 37th AUBEA International Conference, UNSW, Sydney, 4-6 July 2012.

Zekavat, PR, & Leonhard Emil Bernold 2012, 'Effectiveness of Interactive Teaching in Construction', 37th AUBEA International Conference, UNSW, Sydney, 4-6 July 2012.

Zhang, YQ, Viney, NR, Chiew, FHS, Van Dijk, A, & et al, 2012, 'Improving hydrological and vegetation modelling using regional model calibration schemes together with remote sensing data', MODSIM 2011 - 19th International Congress on Modelling and Simulation - Sustaining Our Future: Understanding and Living with Uncertainty, Perth, WA, 12-16 December, 2011.

Zhao, GF, Khalili-Naghadeh, N, & Zhao, J 2012, 'An introduction to Distinct Lattice Spring Model (DLSM)', 12th International Congress on Rock Mechanics of the International Society for Rock Mechanics, ISRM 2011, Beijing, China, 18-21 October, 2011.

Zhu, J, & Attard, MM 2012, 'In-Plane Buckling Analysis of Funicular Arches with Pinned Supports',22nd Australasian Conference on the Mechanics of Structures and Materials, Sydney, Australia, 11th-14th, December 2012.

Zoorabadi, M, Saydam, S, Timms, WA, & Hebblewhite, B 2012, 'Sensitivity analysis of effective parameters on the permeability of rock mass around a tunnel', 7th Asian Rock Mechanics Symposium , Seoul, Korea, 15-19 Oct, 2012.

Conference - Full Paper, Not Refereed

Bradford, MA, & Heidarpour, A 2012, 'Semi-analytical element for geometric and material non-linear dynamic analysis of steel members subjected to blast loading', 6th European Congress on Computational Methods in Applied Sciences and Engineering, Vienna, September.

Castel, A, Gilbert, RI, & Foster, SJ 2012, 'Numerical modelling of reinforced concrete beam response to repeated loading including steel-concrete interface damage', Numerical Modelling Strategies for Sustainable Concrete Structures, Aix-en-Provence, France, May 29 - June 1.

Chiong, I, Song, C, Ooi, ET, & Tin Loi, F 2012, 'Limit analysis using the scaled boundary finite element method', The 20th Annual Conference on Computational Mechanics UK , Manchester, UK, 27-28 March 2012.

Chowdhury, M.S. Song, C, & Gao, W 2012, 'Probabilistic fracture mechanics using the scaled boundary finite element method', The 20th Annual Conference on Computational Mechanics UK, Manchester, UK, 27-28 March 2012.

Clark, M, Payne, TE, Collins, RN, Harrison, JJ, et al, 2012, 'Unravelling metal binding on modified bauxite refinery residues', 9th International Alumina Quality Workshop, Perth, Australia, March 2012.

Cox, RJ, Stacey Atkinson, & Joseph, K 2012, 'Climate change adaptation for the Solomon Islands', 8th International Conference on Coastal and Port Engineering in Developing Countries, Chennai India, February 2012.

Dixit, V V, Harrison, GW, & Rutstrom, EE 2012, 'The Subjective Risks of Driving', Foundations and Applications of Utility, Risk and Decision Theory, Atlanta, Georgia, June 30 - July 3, 2012.

Fang Yuan, & Cox, RJ 2012, 'Sensitivity of longshore sediment transport to changes in offshore wave climate', Coast to Coast Living on the edge, Brisbane, September 2012.

201369208, Glamore, W, & Rayner, D 2012, 'Coastal wetlands remediation in a changing climate: process understanding and application', 2012 NSW Coastal Conference, Kiama, NSW, 6-9 November 2012.

Gravenkamp, H, Saputra, AA, Song, C, & Prager, J 2012, 'Detection of defects in thin-walled structures by means of Lamb waves', International Congress on Ultrasonics, ICU 2011, Gdansk, 5-8 September, 2011.

Jeong, C, Mukerji, Z, & Mariethoz, G 2012, 'Adaptive Spatial Resampling Applied to Seismic Inverse Modeling', Geostats 2012, Oslo, Norway, June 11-15.

Jha, S, & Mariethoz, G 2012, 'Statistical downscaling of land-atmospheric variables using Direct Sampling method', Geomatrix12, Mumbai, India, 26-29 February.

Khoshghalb, A 2012, 'On creep laboratory tests in soil mechanics', advances in multiphysical testing of soils and shales, EPFL, Lausanne, Switzerland, 3-5 Sep. 2012.

Lanckriet, T, Puleo, J, Masselink, G, Turner, IL, & et al, 2012, 'Detailed field measurements of sheet flow sediment transport in the swash zone', 33rd International Conference on Coastal Engineering, Santander, Spain, July 1-6, 2012.

Lenehan, N, Coghlan, IR, & McIllveen, M 2012, 'Two dimensional planning: the application of tidal projections to determine risk management triggers', NSW Coastal Conference, Kiama, NSW, 6-9 November, 2012.

Lundie, S, McLaren, J, van Buuren, N, Moore, A, et al, 2012, 'Greenhouse Gas Footprinting of the Australian Dairy Industry', 2nd New Zealand Life Cycle Assessment Conference: Life Cycle Assessment: A Business Compass for Sustainable Development, Auckland, 28-29 March 2012.

Man, HM, Song, C, Gao, W, & Tin Loi, F 2012, 'A semi-analytical technique for plate bending analysis with PadExpansion', The 20th Annual Conference on Computational Mechanics UK, Manchester, UK, 27-28 March 2012.

Mariethoz, G, Comunian, A, Irarrazaval, I, & Renard, P. 2012, 'Conditional simulation of realistic meandering channels using 1D multiple-point simulations'. Geostatistics Oslo 2012, Norway, June 11-15.

Mariethoz, G, Kelly, B.F.J. & Baker, A 2012, 'Insights in paleoclimate variability through the variographic analysis of stalagmite time series'. Geostatistics Oslo 2012, Norway, June 11-15.

Mariethoz, G, Renard, P. & McCabe, MF 2012, 'Reconstruction of multivariate satellite images using multiple-point statistics', Geostats 2012, Oslo, Norway, June 11-15.

McCarroll, Brander, R, Macmahan, JH, Turner, IL, et al, 2012, 'RIPSAFE - Rip current swimmer and flater experiments', 2nd International Rip Current Symposium , Sydney, 30 October – 11 November.

Merschman, E, Merschman, E, Mariethoz, G, Straubhaar, J. et al, 2012, 'Guidelines to Perform Multiple-Point Statistical Simulations with the Direct Sampling Algorithm'. Geostatistics Oslo 2012, Norway, June 11-15.

Mole, MA, Davidson, MA, Turner, IL, Splinter, K, et al, 2012, 'Modelling Multi-Decadal Shoreline Variability and Evolution', 33rd International Conference on Coastal Engineering, Santander, Spain, July 1-6, 2012.

Puleo, J, Conley, D, Masselink, G, Russell, P, et al, 2012, 'Comprehensive study of swash-zone hydrodymanics and sediment transport.', 33rd International Conference on Coastal Engineering, Santander, Spain, July 1-6, 2012.

Sano, M, Baum, S, Bussey, M. Carter, B. et al, 2012, 'Adapting coasts to climatic futures, an Australian perspective', 33rd International Conference on Coastal Engineering, Santander, Spain, July 1-6, 2012.

Song, C 2012, 'The scaled boundary finite element method: recent and further developments', The 20th Annual Conference on Computational Mechanics UK, Manchester, UK, 27-28 March 2012.

Van rooijen, A, Reniers, A, van Thiel de Vries, J, Blenkinsopp, CE, & et al, 2012, 'Modelling swash zone sediment transport at Le Truc Vert, France', 33rd International Conference on Coastal Engineering, Santander, Spain, July 1-6, 2012.

Vandebona, U, & Tsukaguchi, H 2012, 'Concept of Pedestrian Travel Culture and Methodology', International Seminar on Theory and Application of Pedestrian Travel Culture, Ministry of Public Works and Transport, Vientiane, Lao PDR, April 2012.

Yap, R, Whittaker, M, Peirson, WL, Jefferson, B, et al, 2012, 'Poly-Surfactants as Micro-Bubble Surface Modifiers for the Flotation of Microcystis', 6th International Conference on Flotation for Water and Wastewater Systems, New York City, USA, 29 October - 1 November 2012.

Yap, R, Whittaker, M, Peirson, WL, Jefferson, B, et al, 2012, 'The impact of Microcystis aeruginosa strain on cell removal using bubbles modified with poly(diallyldimethyl ammonium chloride)', 6th International Conference on Flotation for Water and Wastewater Systems, New York City, USA, 29 October 1- November 2012.

Conference - Proceedings Editor

Zhao, J, Ohnishi, Y, GF. Zhao, & Sasaki, T 2012, 'Proceedings of the 10th International Conference on Advances in Discontinuous Numerical Methods and Applications in Geomechanics and Geoengineering, ICADD 10', 10th International Conference on Advances in Discontinuous Numerical Methods and Applications in Geomechanics and Geoengineering, ICADD 10, Honolulu, HI, 6-8 December, 2011.

Research Funding 2012 Total $15,563,749

Researcher(s)	Research Topic	Granting Organisation	Value at 2012
MA Bradford	An Innovative and Advanced Systems Approach for Full Life-Cycle, Low-Emissions Composite and Hybrid Building Infrastructure	ARC Laureate Fellowship including Faculty of Engineering & UNSW support	562,462
MA Bradford	Thermal-induced unilateral plate buckling of concrete pavements: design and evaluation	ARC Discovery	207,695
C Song; W Gao ; W Becker	Non -deterministic fracture analysis of structures by extending the scaled boundary finite -element method	ARC Discovery	161,508
N Khalili ; RK Niven; M Oeser	CO2 sequestration in deformable, chemically interactive, double porosity media	ARC Discovery	129,206
N Khalili; AR Russell	Erosion of variably saturated soils - a fundamental investigation	ARC Discovery	96,905
RI Gilbert	Anchorage of reinforcement in concrete structures subjected to loading and environmental extremes	ARC Discovery	96,905
RI Gilbert	Time-dependent stiffness of cracked reinforced concrete	ARC Discovery	66,580
Chongmin Song, Francis Tin-Loi, Wilfried Becker	Scaled boundary finite-element approach for safety assessment of plates and shells under monotonic and shakedown loadings	ARC Discovery	124,617
Ehab Hamed; Stephen Foster	Nonlinear long-term behaviour and analysis of high strength concrete panels	ARC Discovery	114,232
S Foster; Hamid Valipour	Progressive collapse resistance of reinforced concrete framed structures with membrane action	ARC Discovery	74,617
Y L Pi	Interval nonlinear analysis of spatially curved structures with material and geometric uncertainties	ARC Discovery	43,069
RI Gilbert; MA Bradford; R Zeuner; GR Brock	Time-dependent in-service behaviour of composite concrete slabs with profiled steel decking Collaborating/Partner Organisation(s) Fielders Australia Pty Ltd; and Prestressed Concrete Design Consultants Pty Ltd	ARC Linkage	65,293
Markus Oeser, Alan Pearson, Nasser Khalili, Brian Shackel	Permeable Pavements with Concrete Surface Layers- Experimental and Theoretical Basis for Analysis and Design	ARC Linkage	72,430
Gianluca Ranzi (USYD), Raymond I Gilbert, Rodney Mackay-Sim	Behaviour of lifting inserts for precast concrete construction Partner/Collaborating Organisation: Universal Concrete Lifting Systems	ARC Linkage	26,389
Uni of Melbourne, Xiaojing (Jean) Li	A new approach to structural design that incorporates the effect of non structural components	ARC Linkage	2,486
L. Ge	Integrated radar and optical satellite remote sensing for safeguarding carbon capture and storage	Federal Department of Resources, Energy and Tourism (the Australia-China Joint Co-ordination Group on Clean Coal Technology Research & Development Grants)	40,040
Stephen Foster; Ehab Hamed; Zora Vrcelj	Advanced Composite Structures	Cooperative Research Centre for Advanced Composite Structures Ltd (CRC-ACS)	83,917
Stephen Foster; Ehab Hamed; Zora Vrcelj	Advanced Composite Structures	Faculty of Engineering	25,000
Carolin Birk	FRG Grant	Faculty of Engineering	20,000
Zora Vrcelj	FRG Grant	Faculty of Engineering	15,000
Wei Gao	Goldstar Project	Faculty of Engineering	40,000
Gaofeng Zhao	ECR	Faculty of Engineering	21,984
		TOTAL	**$2,090,335**

CONNECTED WATERS

Connected Waters Initiative Funding Summary 2011-2012

Researchers / investigators	Research Topic	Granting Organisation	Value at 2012
Ian Acworth	Super Science Groundwater Research and Training	DIISRTE	4,000,000
Andy Baker, Ian Acworth, Bryce Kelly, Wendy Timms, Matt McCabe,	National Centre for Groundwater Research and Training	ARC & NWC	1,594,933
Andy Baker	Source - receptor analysis of lignin and liquid macromolecules	ARC DP110102124	105,483
Wendy Timms	CRC for Cotton Catchment Community	CRC	5,000
		TOTAL	**5,705,416**

rCITI Research Centre for Integrated Transport Innovation THE UNIVERSITY OF NEW SOUTH WALES

2012 rCITI Funding / Grant Summary

Senior Investigator(s) / Advisor(s) / Researcher(s)	Subject Area / Research Topic	Granting Organization(s) / Industry Sponsor(s)	Value at 2012
Prof. S. Travis Waller	Federal Highway	US DOT, Booz Allen Hamilton	270,000
Dr. Lauren Gardner	Quantifying the Spatiotemporal Energy Consumption Patterns of Electric Vehicles in Regional Transport Networks	Faculty Research Grant Program / Early Career Researcher Grants Program	20,000
Prof. S. Travis Waller	Adaptive Stochastic Network Behaviour Modeling Approaches for Representing and Responding to Disrupted Conditions	UNSW Goldstar	40,000
Dr. Vinayak Dixit	Experimental Economic Methods to Evaluate Impact of Risk Aversion and Subjective Beliefs on Route Choice	Faculty Research Grant Program / Early Career Researcher Grants Program	15,000
Dr. Lauren Gardner	Quantifying the Role of International Transport Network Connectivity in Modelling Australian Epidemiological Risk via Passenger Travel and Freight Importation	Faculty Research Grant Program / Early Career Researcher Grants Program	20,000
		TOTAL	**365,000**

NCCARF National Climate Change Adaptation Research Facility Adaptation Research Network SETTLEMENTS AND INFRASTRUCTURE

ACCARNSI

Researchers/Investigators	Research Topic	Granting Organisation	Value at 2012
R Cox, R Stuetz, W Peirson (CVEN at UNSW): B Randolph, M Neuman (FBE at UNSW); R Tomlinson (Griffith Uni); G Hugo (U Adelaide); M Taylor (Uni SA)	Nationwide network to support the coordination of the Australian research community in the field of Climate Change Adaptation – supporting multi-disciplinary research, building research capacity, and promoting and supporting information exchange relating to coastal settlements, urban planning, the built environment and infrastructure.	Commonwealth Department of Climate Change and Energy Efficiency (DCCEE) through the National Climate Change Adaptation Research Facility (NCCARF) ($406,364): also Griffith Uni, ($5K) U South Australia, ($2.5K) U Adelaide – ($2.5K) plus industry support from NSW OEH ($20K) and NSW Dept of Services ($5K)	441,364
As above	As above	UNSW support: including DVC – Research FBE and WRC	160,000
		TOTAL	**601,364**

water@ UNSW water research centre

Water Research Centre 2012 Funding Summary

Researchers / investigators	Research Topic	Granting Organisation	Value at 2012
D. Waite, S. Khan, B Vigneswaran	Physico-Chemical controls on Growth, Toxicity and Succession of microcystis and Anabaena Species in Sydney Water Supply Reservoirs	Australian Research Council (ARC) Linkage Project LP0883561, WQRA, Sydney Catchment Authority	61,000
R. Stuetz, Z. Yuan, J. Keller, R.E Melchers, P.L Bond. M. Valix, J. R Witherspoon, W. Verstraete,P.A Vanrolleghe, J. Steyer, H.A Bustamante, I. H Suffet	Optimal Management of Corrosion and Odour Problems in Sewer Systems	ARC Linkage Project LP0882016 through U.Q, Brisbane City Council (Brisbane Water is a business unit with BCC), CH2M HILL, Gold Coast Water, SA Water, South East Water Limited, Sydney Water Corporation, United Water, Water Corporation	190,382
A. Sharma, AJ Pitman, NK Tuteja	Integrated assessment of climate change, climate input errors and land-use change on soil-moisture and carbon-balance in a catchment simulation framework	ARC Linkage Partner LP0883296, NSW Department of Environment and Climate Change (DECC), APAI, Southern Rivers Catchment Management Authority (SRCMA)	66,530
R. Henderson, R. Stuetz, W. Peirson, G. Newcombe, B. Jefferson, V Bulmus	Optimising dissolved air flotation (DAF) for algae removal by bubble modification in drinking water and advanced wastewater systems	ARC Linkage Project Grant 2009 Round 2 LP0990189, APAI, APDI, Melbourne Water Corporation, United Water, SEQWater, South Australia Water Company	93,277
R. Cox, W. Randolph, W. Peirson	National Climate Change Adaptation Research Facility. Climate Change Adaptation Research Network - Settlement and Infrastructure	Department of Climate Change	36,000
M. McCabe, J. P Walker, R. C Pipunic; M. Abuzar, D. M Whitfield	A new paradigm for improved water resource management using innovative water modelling techniques	ARC Linkage project LP0989441 Shared Grant / Subcontract, University of Melbourne, Department of Primary Industries, Victoria	16,970
W. Peirson, N. Ashbolt, G. Peters	Interdisciplinary greenhouse gas assessment - nitrous oxide emissions from marine wastewater disposal	ARC Discovery Project DP1095722	118,439
R. Stuetz, K. R Murphy, R. Bro	Olfactory Characterisation of Odours for Optimising Impact Assessment	ARC Discovery Project DP1096691, APDI	86,089
D. Waite, R. Luthy, S. Al-Abed, G. Batley	Synthesis of Activated Carbon Supported Zero Valent Iron Nanoparticles and Application to Contaminant Degradation in Benthic Sediments.	ARC Linkage Project LP100100852, APAI, NSW Department of Environment and Climate Change (DECC), NSW Maritime - Sydney Ports Corporation, Orica Australia, Maritime Authority of NSW, Sydney Metropolitan Catchment Authority	300,363
S. Khan, L. D Nghiem, J.E Drewes	Assessment and optimisation of N-nitrosamine rejection by Reverse Osmosis for planned potable water recycling applications	ARC Linkage Project LP0990705, Uni Wollongong, Veolia Water Australia, Queensland Manufactured Water Authority	54,657
D. Waite, X. Wang, G. Leslie, X. Huang, H. Bustamante, X. Wen, J. Guan	Optimisation of nutrient removal, membrane fouling and sludge dewatering in hybrid coagulation/ submerged membrane bioreactor treatment of wastewaters	ARC Linkage Project LP100100056, APAI, Beijing Origin Water Technology Co Ltd, Sydney Water Corporation, Water Quality Research Australia Ltd (WQRA)	198,042
S. Moore	Sustainability of water and wastewater treatment chemicals	ARC Linkage Project, APAI, South Australia Water, Sydney Water Corporation, Melbourne Water, Yarra Valley Water, Water Corporation, Gold Coast City Council	32,358
H. Coleman, F. D. Leusch, R. Lim, D.Nugegoda, L. A. Tremblay, H. F Chapman, V. Pettigrove, S. J Blockwell, T. J Reitsema	Investigation of endocrine disruption in Australian aquatic environments	ARC Linkage Project through Griffith University - LP100100163, Landcare Research, Melbourne Water Corporation, QLD Department of Environment and Resource Management, South East Queensland Water Corporation, Sydney Water, Water Quality Research Australia Ltd, Western Australia Department of Water	1,408
D. Waite, R. N Collins, B. A Neilan, G. Sinclair, R. J Ring	BioGeoChemical Controls on efficacy and sustainability of uranium heap leaching	ARC Linkage Project LP100200792, APAI, Energy Resources of Australia	177,672
R. Henderson, A. Baker, J.Bridgeman	Monitoring organic matter in drinking water systems using fluorescence spectroscopy: improved early warning, process optimisation and water quality	ARC Linkage Project LP100200259, Hunter Water Corporation, Melbourne Water Corporation, Queensland Bulk Water Authority, Water Quality Research Australia Ltd, APAI,	83,531
R. Collins	Exploiting natural processes to effectively remediate acidified coastal environments	ARC Linkage Project LP110100480, Tweed Shire,NSW Cane Growers, NSW Sugar Milling Co-Op Scholarship	208,029
A. Sharma	Representing low-frequency variability in hydro-climatic simulations for water resources planning and management in a changing climate	ARC FT100100197	195,100
R. Henderson, C. A Joll, J.W Charrois,K. L Linge, S. E Hrudey	Advanced water treatment technologies to minimise nitrogenous disinfection by-products in drinking water: understanding the role of organic nitrogen.	ARC Linkage Project LP110100548 through Curtin University, Water Corporation of WA, Water Quality Research Australia Ltd	8,000
S. Khan, G. Peters, N. J Ashbolt	Deeper and broader life cycle risk assessment - extending the frontier for hybrid methodologies	ARC Linkage Project LP110200594, Environmental Protection Authority (EPA)Victoria, APAI	46,910
R.Collins	Fate of Cr(VI) associated with Fe (II)-catalysed Fe(III) oxide transformations	Australian Synchrotron Access Program	760

Researchers / investigators	Research Topic	Granting Organisation	Value at 2012
A.Sharma	Managing change in soil moisture and agricultural productivity under a global warming scenario using a catchment scale climate change assessment framework	Dept of Innovation, Industry, Science and Research. Australia-India Strategic Research Fund	38,000
A.Sharma	Project 4: Continuous rainfall sequences at point locations	Engineers Australia	66,667
R.Stuetz	Minimising emissions from wastewater biosolids for beneficial reuse	Degremont Pty Ltd	50,000
R.Collins	Iron, sulfur and phosphorus speciation to optimise phosphorus speciation to optimise phosphorus and iron recovery from wastewater treatment	Australian Synchrotron/International Synchrotron Access Program	5,901
R.Henderson	Advanced characterisation of organic matters in desalination pretreatment and its removal strategies - Scholarship for Barun Karna	National Centre of Excellence in Desalination	10,000
D.Waite	Reactive oxygen species generation by zerovalent silver nanoparticles; implications to toxicity and contaminant degradation	Australian Research Council / Discovery Project - DP120103222	135,002
D.Waite	New perspectives on iron oxide transformations in oxic and anoxic aqueous environments: Implications for iron bioavailability and contaminant mobility	Australian Research Council / Discovery Project - DP120103234	126,541
A.Sharma	A new strategy for design flood estimation in a non-stationary climate	Australian Research Council / Discovery Project - DP120100338	86,540
M.McCabe	Closing the water cycle using land surface modelling, remote sensing and an Australian hydrological observatory	Australian Research Council / Discovery Project - DP120104718	135,002
R.Collins	Iron- A solution for uranium resource recovery and pollutions response	Australian Research Council / Future Fellowships FT110100067	227,292
B.Sivakumar	Development of generic catchment classification framework in hydrology	Australian Research Council / Future Fellowships FT110100328	293,086
S.Garg	Interaction between silver ions, silver nanoparticles and reactive oxygen species: implication to toxicity	Australian Research Council / (DECRA) - DE120102967	126,539
R.Collins	Effect of pH on the Fe(II)-catalysed transformation of Fe(III) oxides	Australian Synchrotron/International Synchrotron Access Program	3,645
R.Collins	Effect of pH on the fate of U(VI) associated with Fe(II)-catalysed Fe(III) oxide transformations (AS)	Australian Synchrotron/International Synchrotron Access Program	1,070
A.Sharma	Simulating persistence in future rainfall: correcting GCM bias in regional climate models - Scholarship for Eytan Rocheta	NSW Office of Water / 2012 Peter Cullen Postgraduate Scholarship	20,000
R. Henderson	Optimising dissolved air flotation (DAF) for algae removal by bubble modification in drinking water and advanced wastewater systems - Scholarship for Russell Yap	Water Quality Research Australia (WQRA)	15,625
D. Waite	Physico-chemical controls on growth, toxicity and succession of Microsystis and Anabaena species in water supply reservoirs. Scholarship for Anna Yeung	Water Quality Research Australia (WQRA)	7,076
D. Waite	Australian Synchrotron Postgraduate Award for Daniel Boland	Australian Synchrotron Company	13,000
R. Stuetz	Fate of Volatile Organo-Sulfur Compounds (VOSCs) in Odour Assessment - Scholarship for Mr Hung Viet Le	CRC for Poultry	35,000
S. Khan	Impact of Hazardous Events on Membrane Bioreactor performance - Scholarship for Ms Trang Trinh	Water Quality Research Australia (WQRA)	11,695
R. Henderson	Monitoring Organic Matter removal in Drinking Water Systems using Fluorescence Spectroscopy - Scholarship for Ms Yulia Shutova	Water Quality Research Australia	7,683
A. Sharma, R Mehrotra	Experimental Streamflow Predictions at Decadal and Inter-Decadal Time Scale	Bureau of Meteorology	57,200
A. Kinsela, R. Collins	Sources of Environmental Contaminants: Upper and Southern Christies Creek Catchment	Tweed Shire Council	10,000
H.Rowley	Dairy Australia Project	PE International	27,510
S. Khan, J. McDonald	Development of Nitrosamines method	Agilent	30,000
S. Khan J. McDonald	Analysis of samples	Sydney Catchment Authority	31,680
S. Khan J. McDonald	Analytical Method Development	Sydney Water	17,210
S. Khan	Physicochemical degradation of Taste and Odour Compounds- parts 2 and 3	Sydney Catchment Authority	55,000
S. Khan	Physicochemical degradation of Taste and Odour Compounds- parts 4, 5 and 6	Sydney Catchment Authority	89,588
X. Wang, E. Sivret	Odour Analysis	Aero 247	2,900
X. Wang, E. Sivret	Activated Carbon Capacity Testing	Actew AGL	19,500
D. Roser	QMRA - inititation	Hunter Water	3,000
S. Khan J. McDonald	Water Samples analysis	Golder Associates	5,280
X. Wang, E. Sivret	Identification of odourants from a leachate dam	Blue Mountains Council	8,500
X. Wang	Odour analysis of samples	Yates	5,000
X. Wang, E. Sivret	Odorant analysis	Airepure Australia	1,500
		TOTAL	**3,754,749**

Funding for fundamental research led by WRL investigators (excl. CWI & ACCARNSI)

Topic	Senior investigators	Funding Source	Value at 2012
Transitions in wave breaking from deep to shallow water	Michael Banner (UNSW Mathematics), Bill Peirson, Frederic Dias (ENS Cachan, France)	Australian Research Council – Discovery DP120101701	135,002
Bed shear stress on beach sediment and coastal structures under wave run-up	Chris Blenkinsopp, Ian Turner, Tom Baldock (Queensland), Hocine Oumeraci	Australian Research Council – Discovery DP110101176	67,046
Erosion of embankment dams and dam spillways	Robin Fell, Chongmin Song, Bill Peirson, Kurt Douglas	Australian Research Council – Linkage LP110100389	328,854
Australian Coastal Observation Network: Monitoring and Forecasting Coastal Erosion in a Changing Climate	Ian Turner, Ian Goodwin (Macquarie), Mark Davidson (Plymouth), Andrew Short	Australian Research Council – Linkage LP100200348	175,056
		TOTAL	**$705,958**

Industry funded research undertaken by the WRL Projects Team

Subject area	Senior investigators and advisers	Industry Sponsors	Value at 2012
Coastal Engineering and Management	Matt Blacka, Ian Turner, Ian Coghlan, Ron Cox, Alessio Mariani, Francois Flocard, James Carley, Bill Peirson, Tom Shand, Chris Blenkinsopp	BioPower Systems Pty Ltd, Byron Shire Council, Cook Islands Government, Engineers Australia, Local Government Association of Tasmania, Manly Council, Manly Hydraulics Laboratory, Moyne Shire Council, NSW Department of Lands, NSW Office of Environment and Heritage, NSW Department of Primary Industries, Sydney Coastal Councils Group, Umwelt (Australia) Pty Ltd, University of Tasmania, US Army RDECOM ACQ CTR, Warringah Council.	626,705
Coastal Structures and Wave Protection	Matt Blacka, Ian Turner, Ian Coghlan, Ron Cox, Alessio Mariani, Francois Flocard, Bill Peirson, Duncan Rayner, James Carley, Tom Shand, Jamie Ruprecht, Chris Blenkinsopp, Bruce Cathers	Aurecon, Aurecon Hatch, Local Government Association of Tasmania, NSW National Parks and Wildlife Service, NSW Office of Environment and Heritage, NT Department of Natural Resources, Ove Arup Dan Rakan-Rakan, SMEC, SRK Consulting (South Africa) Pty Ltd, Sydney Coastal Councils Group, Treharnes Manly Boatshed, Tweed Shire Council, VIC Department of Sustainability and Environment.	301,268
Desalination Outfalls	Brett Miller, Grantley Smith	Veolia Water Operations Pty Ltd	10,675
Sewage Disposal in Coastal Waters and Environmental Impacts	Brett Miller, Duncan Rayner, Conrad Wasko, Bruce Cathers	Sydney Water Corporation	77,000
Environmental Restoration Projects	Will Glamore, Jamie Ruprecht, Duncan Rayner, Grantley Smith, Conrad Wasko, Brett Miller	Department of Sustainability, Environment, Water, Population and Communities, Fitzroy Basin Association Inc, Greater Taree City Council, JP Environmental, Northern Rivers Catchment Management Authority, Newcastle City Council, NSW Department of Industry and Investment, NSW Department of Primary Industries, NSW Office of Environment and Heritage, NSW Office of Water , Ross Human Directions Limited, RPS Aquaterra Pty Ltd, SA Department of Environment, Water & Natural Resources, SMEC , Umwelt (Australia) Pty Ltd, WetlandCare Australia, Wyong Shire Council	149,378
Estuarine Water Quality and Environmental Flows	Will Glamore, Brett Miller, Duncan Rayner, Grantley Smith, Bill Peirson	GHD, Hunter Water Corporation, NSW Office of Environment and Heritage,Sinclair Knight Merz, SMEC, Southern Rivers Catchment Authority, Sydney Water Corporation, UNSW – ACCARNSI, URS Australia Pty Ltd	294,040
Groundwater Studies, monitoring, salinity and pollutant transport	Alexandra Badenhop, Brett Miller, Conrad Wasko, Grantley Smith, Will Glamore, Wendy Timms, Ian Acworth, Martin Andersen	Australian Institute of Marine Science, Campbelltown City Council, Geoscience Australia, Hansen Bailey, NSW Public Works, Origin Energy, QER Pty Ltd, SHOROC	363,641
Civil Engineering Hydraulics	Brett Miller, Jamie Ruprecht, Francois Flocard, Bill Peirson	Abate Fire Services, Aurecon, NSW Department of Primary Industries, Outotec (Australia) Pty Ltd	212,626
Water Resources including river morphology	Grantley Smith, Will Glamore, Conrad Wasko, Ron Cox, Duncan Rayner	Coffey Mining, Department of Sustainability, Environment, Water, Population and Communities, Hunter Water Corporation, Jennifer Hale Consulting, Sydney Catchment Authority	174,541
Flooding and Floodplain Management	Grantley Smith, Conrad Wasko, Ron Cox, Duncan Rayner, Ian Coghlan	Engineers Australia, IAG Re Australia Pty Ltd, Myriax Pty Ltd, NSW Department of Planning and Infrastructure, VIC Department of Sustainability and Environment	131,053
		TOTAL	**$2,340,927**

PhD Students

Agarwal, Ankit
Strengthening of tubular steel structures using CFRP
Supervisor: Foster, S

Aljassmi, Hamad Abdulla Mohd
Dynamic project management
Supervisor: Han, S

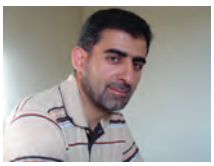
Allan, Rebecca Jane
Backward erosion piping of dams
Supervisor: Douglas, K

Allis, Michael James
Wave breaking onset, speed and strength for 3D deep water waver
Supervisor: Peirson, W

Alvarez Gaitan, Juan Pablo
Sustainability of water and wastewater treatment chemicals
Supervisor: Moore, S/ Peters, G

Amin, Ali
Steel fibre reinforced concrete
Supervisor: Foster, S

Asadi Zarch, Mohammad Amin
Hydroclimatology
Supervisor: Bellie, S/Sharma, A



Ataei, Abdolreza
Steel and composite structures
Supervisor: Bradford, M

Azcurra, Cecilia
Isotopes in hydrology
Supervisor: McCabe, M

Bai, Yun
Coupled thermo-chemo-flow- deformation analysis of multiphase multi-porous media
Supervisor: Khalili, N

Bertuzzi, Robert
Estimating rock mass strength and stiffness with particular interest in the load on a tunnel lining
Supervisor: Douglas, K

Boland, Daniel
Fate of metal contaminants during iron oxide crystallisation
Supervisor: Waite, TD

Cai, Yingzhe Mick
Isotope hydrology, water resources
Supervisor: McCabe, M / Evans, J

Castilla Rho, Juan Carlos
The effects of climate change on coastal aquifers
Supervisor: Andersen, M/ Mariethoz, G

Chen, Xiaojun
Computational Mechanisms
Supervisor: Song, C/Birk, C

Chiong, Irene
A scaled boundary finite-element limit and shake-down approach
Supervisor: Song, C

Chowdhury, Morsaleen Shehzad
Structural Engineering
Supervisor: Song, C

Dang, The Cuong
Kinetics of iron uptake by the freshwater cyanobacterium Microcystis aeruginosa
Supervisor: Waite, TD

Das Gupta, Monami
Biogeochemical controls on efficacy and sustainability of uranium heap leaching
Supervisor: Collins, R/ Kinsela, A/Waite, TD

de Burgh, James Matthew
Practical modelling and analysis of concrete building and tunnel structures in fire
Supervisor: Foster, S

Do, Duy Minh
Structural safety assessment, non-deterministic analysis vehicle bridge interaction dynamics, numerical analysis
Supervisor: Gao, W

Duell, Melissa
Strategic traffic assignment: methods of modelling day-to-day flow volatility
Supervisor: Waller, ST

Ebrahimi Nejad Rafsanjani, Meysam
Projects and carbon
Supervisor: Carmichael, DG

Elhadayri, Farj
Constitutive modelling of lightly cemented unsaturated soils
Supervisor: Khalili, N

Ershadi Esmaeilabadi, Ali
Remote sensing hydrology
Supervisor: Evans, J/Mc-Cabe, M

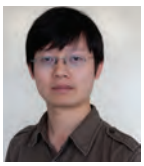
Esfahani Kan, Mojtaba
Seismic deformation analysis of earth and rockfill dams
Supervisor: Taiebat, H

Foerster, Jean
Natural resource projects
Supervisor: Carmichael, DG

Gharib, Mohammad Mahdi
Numerical modelling for service life prediction and performance evaluation of deteriorated reinforced concrete structures due to climate change impacts
Supervisor: Foster, S

Gholamhoseini, Alireza
The time-dependent behavior of composite concrete slabs with profiled steel decking
Supervisor: Gilbert, RI

Graham, Peter William
Groundwater, hydrogeology
Supervisor: McCabe, M



Gui, Yilin
Cracking in unsaturated soils
Supervisor: Khalili, N

Guo, Yi Fei
Construction simulation for productivity improvement
Supervisor: Han, S

Halloran, Landon James Szasz
Groundwater
Supervisor: Acworth, I

Hambly, Adam Christopher
Fluorescence as a portable tool for cross-connection detection within dual reticulation systems
Supervisor: Khan, S/Stuetz, R

Hasan, Mohammad Mahadi
Hydrology
Supervisor: Sharma, A

Hashemiheidari, Seyedkomeil
Blast loading on bridges
Supervisor: Bradford, M

He, Di
Silver nanoparticle-mediated generation of reactive oxygen species
Supervisor: Waite, TD

He, Xudong
Modelling of systems with discontinuities using the scaled boundary finite element method
Supervisor: Birk, C

Ho, Lam
Synthesis of activated carbon supported zero valent iron nanoparticles and application for contaminant degradation in benthic sediments
Supervisor: Waite, TD

Hossenian, Seyedmahdi
The principal-agent problem and project delivery methods
Supervisor: Carmichael, DG

Howe, D
Coastal engineering
Supervisor: Blenkinsopp, C/ Turner, I

Huang, Yue
Long-term behaviour of high-strength concrete panels
Supervisor: Hamed, E

Islam, Md Kamrul
Modelling route choice behaviour under uncertainty
Supervisor: Vandebona, U

James, Edward Malcolm
Payment systems for soft soils
Supervisors: Oeser,M/Russell, A

Jeremiah, Erwin Joachim
A Bayesian framework for reducing structural and parameter uncertainty in hydrological modelling
Supervisor: Sharma, A

Jury, Karen Lillian
Investigation of the role of antibacterial drugs in municipal wastewater as a selective influence on the spread of bacterial resistance
Supervisor: Stuetz, R

Kaboli, Seyed Alireza
Lifecycle costs of steel petrochemical structures
Supervisor: Carmichael, DG

Karna, Barun Lai
Advanced characterisation of organic matters in desalination pre-treatment
Supervisor: Henderson, R/Le Clech, P

Kearney, Edward Tah Dah
Monitoring and Modelling of Storm Induced Beach Erosion
Supervisor: Turner, I

Khajeh Samani Ali
Ductility in reinforced concrete columns
Supervisor: Attard, M

Khan, Mohammad Zaved Kaiser
Hydrology
Supervisor: Sharma, A

Khan, Mst Shakera Karim
Development of a generic catchment classification framework in hydrology
Supervisor: Bellie, S

Khan, Urooj
Semi-distributed modeling
Supervisor: Sharma, A

Khezei, Mani
Buckling and post-buckling behaviour of composite laminated structures with material non-linearities
Supervisor: Bradford, M

Kobayashi, Yumi
Life cycle assessment and risk assessment
Supervisors: Khan, S/ Peters, G

Le, Hung Viet
Fate of volatile Organo-Sulfur compounds in odour assessment
Supervisor: Stuetz, R

Lee, Sing Siu Michael
Composite steel/concrete structures
Supervisor: Bradford, M

Li, Chao
Fracture analysis of piezoelectric composites by using scaled boundary finite element method
Supervisor: Song, C

Li, Xiang
Advanced characterisation of dissolved organic nitrogen in drinking water sources
Supervisor: Henderson, R/ Khan, S

Liu, Nengguang
Uncertain modeling and uncertain methods; Vehicle - bridge interaction dynamics; Wind and/or sersmic induced random vibration; structural stability and reliability analysis
Supervisor: Gao, W

Lui, Gough Yumu
Photovoltaic powered UV diode disinfection of drinking, surface, and groundwater
Supervisor: Corkish,R/ Roser, D

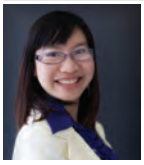
Luo, Kai
Structural analysis and optimization, computational mechanics, structural safety and reliability
Supervisors: Gao, W/Pi, Y-L

Luu, Trung Kien
Numerical simulation of the behaviour of composite frames at elevated temperatures
Supervisor: Bradford, M

Ma, Jianjun
Coupled flow deformation of fractured porous media subject to elasto-plastic damage
Supervisor: Khalili, N

Ma, Tian
Photochemistry of silver halides: implications to reactive oxygen species generation and water treatment
Supervisor: Waite,TD

Ma, Xiaoming
Application of nanoparticulate zero valent iron to remediation of contaminated benthic sediments
Supervisor: Waite, TD



Mac, Thi Ngoc
Time dependent behaviour of slope
Supervisor: Khalili, N/ Zhao, G

Maghrebi, Mojtaba
Performance assessment of process based planning and control in construction
Supervisor: Sammut, C/ Waller, ST

Maheshwari,Pradeep
Optimisation of coagulant addition to submerged membrane bioreactors using computational and experimental methods.
Supervisor: Waite, TD

Mahmud, Kashif
Groundwater modelling, heterogeneity, transport processes, contaminated sites
Supervisor: Mariethoz, G

Masoumi, Hossein
Experimental investigation into the mechanical behaviour of intact rock at different scales
Supervisor: Douglas, K/ Russell, A

Mazumder, Maruful Hasan
Structural engineering, Anchorage of reinforcement in concrete structures subjected to loading and environmental extremes
Supervisor: Gilbert,R I

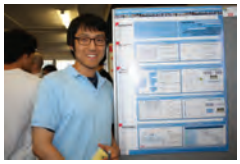
McCallum, Andrew Murray
River-aquifer interactions in stressed semi-arid environments
Supervisor: Acworth, I / Andersen, M

Mohamad Abas, Fairul Zahri
Strength of fibre reinforced concrete slabs with profiled steel decking
Supervisor: Gilbert, RI

Mohammadi, Samaneh
Large deformation analysis of slopes
Supervisor: Taiebat, T

PhD students

Mole, Melissa Anne
Monitoring and modelling scale coastal variability: implications for the establishment of a national coastal observing network
Supervisor: Turner, I



Moon, Sungkon
Process centered dynamic quality control in construction
Supervisor: Bernold, L/ Davis, S

Moutabsherkati, Shahrokh
Dynamics Analysis of Unsaturated Porous Media Subject to Damage due to Cracking
Supervisor: Khalili, N

Musa, Idris Ahmed
Buckling of thick plates
Supervisor: Attard, M

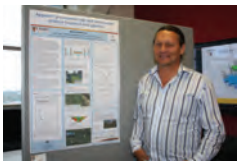
Naseem, Bushra
Surface water hydrology
Supervisor: Sharma, A

Parvez, Md. Ahsan
Fibre reinforced concrete structures
Supervisor: Foster, S

Pells, Steven Edward
Erosion of rock in spillways
Supervisor: Douglas, K/ Peirson, W

Peng, Yuan
Cost contingency
Supervisor: Davis, S

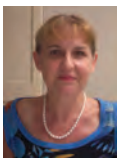
Perera, Weebadda Arachchilage Salinda
Study causes of defect occurrence and issues
Supervisor: Davis, S



Peterson, Mark Aaron
Ground water resources in fractured rock aquifers using geochemical and isotopic methods
Supervisor: Andersen, M/ Cendon, D

Rahman, Shaikh Mohammad Hasibur
Optimisation of ferry network
Supervisor: Vandebona, U

Rahnamayie Zekavat, Payam
Effect of information richness on project performance
Supervisor: Bernold, L



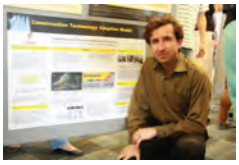
Rancic, Aleksandra Sanja
Groundwater levels in fractured rocks - climate and land use impacts
Supervisor: Acworth, I

Rocheta, Eytan
Simulating persistence in future rainfall: correcting GCM bias in regional climate models
Supervisor: Sharma, A

Salimzadeh, Saeed
Numerical modelling of two phase fluid flow through deformable fractured porous media
Supervisor: Khalili, N

Saputra, Albert Artha
Computational mechanics and structural analysis
Supervisor: Birk, C/Song, C

Scaturro, Salvatore
Fluid Mechanics
Supervisors: Pierson, B/ Cathers, B



Sepasgozar, Samad
Technology adoption decision making in construction management
Supervisor: Bernold, L

Shi, Xue
Uncertain analysis of engineering structures, structural reliability analysis, structural dynamics
Supervisor: Gao, W/ Pi, Y-L

Shutova, Yulia
Water Quality
Supervisor: Baker, A / Henderson, R

Siew, Yung Jhien Renard
Sustainability analysis
Supervisor: Carmichael, DG

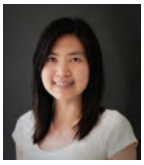
Singh, Sachin
Fluorescence as an online tool for monitoring Membrane integrity
Supervisor: Khan, S

Sriskandarajah, Sanchayan
Reactive powder concrete subjected to high temperature and temperature cycles
Supervisor: Foster, S

Su, Lijuan
Lateral and post buckling with shear effects
Supervisor: Attard, M

Sun, Zhicheng
Fracture analysis by using the scaled boundary finite element method
Supervisor: Song, C

Tang, Yi
Numerical modelling of installation and pullout capacity at caissons
Supervisor: Taiebat, H



Teo, Tiffany Li Lee
Analysis of true chemical contaminants in water
Supervisor: Coleman, H

Torbaty, Mohammadali
Computational hydraulics and computational fluid mechanics
Supervisor: Cathers, B/ Yeoh, G

Tran, Hanh Van
Alternative formulations in project management
Supervisor: Carmichael, DG

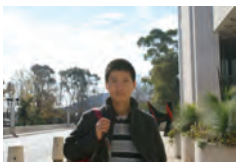
Tran, Thao Minh
Fouling of anaerobic membrane bioreactors
Supervisor: Stuetz, R/ LeClech, P

Tran, Trong Binh
Project and organisational staffing – cultural issues
Supervisor: Davis, S

Trinh, Trang Thi Thanh
Decentralized MBR for Water Reuse
Supervisor: Khan, S

Tsarev, Sergey
Biogeochemistry
Supervisor: Collins, R

Vazquez Campos, Xavier
Urabuyn heap leaching biogeochemistry
Supervisor: Neilan, B/ Waite,TD



Vo, Thanh Liem
Soil-structure interaction
Supervisor: Russell, A

Wang, Bei
Treatability of odorants in abatement system
Supervisor: Stuetz, R

Wang, Chen
Hybrid probabilistic and non-probabilistic analysis of structures with uncertainties
Supervisor: Gao, W

Wang, Kai
Resources recovery from biosolids
Supervisor: Waite, TD

Wang, Lili
Using of Enantiomeric fraction to characterize the performance of biological waste water treatment processes
Supervisor: Khan, S

Wasko, Conrad Dominic
Hydro climatology
Supervisor: Sharma, A

Wijayaratna, Kasum Pradeepa
Modelling the reliability of transport network
Supervisor: Waller, ST

Woldemeskei, Fitsum Markos
Hydrology
Supervisor: Sharma, A

Wu, Di
Limit and shake down analysis, uncertain methods and non-deterministic analysis, structural analysis and optimization
Supervisors: Gao, W/Tin-Loi, F

Wu, Hao
Optimisation of excess sludge dewatering and phosphorus recovery in submerged membrane bioreactors
Supervisors: Waite, TD/ Wang, Y

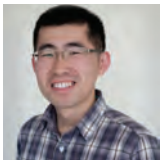
Xiang, Tingsong
Scaled boundary finite element analysis of plates and shells
Supervisor: Song, C

Xin, Yongija
Membrane fouling control
Supervisor: Waite,TD

Xing, Guowei
Reactions of Cu(1) and Cu(11) with H2O2 in natural waters: kinetics, mechanism and the generation of reactive oxidizing intermediates
Supervisor: Waite, TD

Yan, Xia
On the enhancement of air-water constituent transfer by vorticity generated by non-breaking water waves
Supervisor: Peirson, W

Yang, Chengwei,
Nondeterministic analysis of linear and nonlinear structures
Supervisor: Gao, W



Yang, Hongwei
In-situ testing of unsaturated soils
Supervisor: Russell, A

Yap, Russell Kong Leng
Water treatment
Supervisors: Henderson, R / Peirson, W

Yeung, Anna Chi Ying
Factors influencing the growth and toxicity of cyanobacteria in drinking water supplies
Supervisor: Waite, TD / Neilan, B

Yin, Peijie
Micromechanics of unsaturated flow in fractured porous medium
Supervisor: Zhao, G

Yousefnia Pasha, Amin
Numerical modeling of cone penetration in unsaturated soils
Supervisor: Khalili, N/ Khoshghalb A

Yu, Huijie
Contaminant degradation by supported Ag nanoparticles
Supervisor: Waite, TD

Yuan, Fang
Climate chance impacts on coastal shoreline processes
Supervisor: Cox, R

Yuan, Xiu
Light and free-radical mediated transformation kinetics of copper species in natural waters
Supervisor: Waite, TD

Yvanes-Giuliani, Yliane Auriane Morgan
Effective remediation of acidified coastal environments using biogeochemical processes
Supervisor: Collins, R / Waite, TD

Zainuddin, Nur Syahiza
Sources and mobility of arsenic in alluvial river sediments
Supervisor: Andersen, M

Zhang, Xinlei
Alternative project management practices
Supervisor: Carmichael, DG

Zhang, Zhenghua
Optimisation of hybrid coagulation/submerged membrane bioreactor treatment of wastewaters
Supervisor: Waite, TD

Zhou, Yuening
Research on Impact of information redundancy in project documentation on project quality
Supervisor: Davis, S

Zhu, Jianbei
Elasto-plastic thermal lateral buckling analysis of submerged oil and gas pipelines curved in plan
Supervisor: Attard, M

PhD students

CVEN PhD Graduates 2012

Chung, Jin
Development and application of cryptosporidium surrogates to evaluate water treatment
Supervisor: Ashbolt NJ

Coad, Peter Williams
Estuarine algal bloom prediction
Supervisor: Cathers B /Van Senden

Dang, The Cuong
Kinetics of iron uptake by the freshwater cyanobacterium Microcystis aeruginosa
Supervisor: Waite, TD

Hashim, Nor Haslina
Use of chiral pharmaceutical compounds to characterise sewage treatment processes and sewage contamination in surface water
Supervisor: Khan S

Khoshghalb, Arman
Numerical algorithms of penetration problems in variably saturated media
Supervisor: Khalili, N

Liu, Xinpei
Time-dependent behaviour of composite curved beams
Supervisor: Bradford, M

Liu, Yi
Hydrology, remote sensing, climate variability
Supervisor: Evans, J /McCabe, M

Miller, Christopher James
The transformation and Implication of reactive oxygen species in natural aquatic systems
Supervisor: TD Waite

Ng, Tian Sing
Fibre reinforced high performance geopolymer concrete
Supervisor: Foster S

Pournaghiazar, Mohammad
Cone penetration in unsaturated porous media
Supervisor: Khalili, N

Pui, Alexander Charles
Stochastic hydrology
Supervisor: Sharma, A

Rau, Gabriel Christopher
Using heat as a tracer to study surface water groundwater and interactions
Supervisor: Andersen, M

Thomas, Jacqueline Marie
Pathogen ecology within drinking water biofilms
Supervisors: Ashbolt NJ /Stuetz, R

ME Graduate 2012

Hao, Pan
Risk management in infrastructure project
Supervisor: Han, S

Peter Cullen Postgraduate Scholarship awarded to Eytan Rocheta

CVEN PhD candidate Eytan Rocheta has been awarded the 2012 Peter Cullen Postgraduate Scholarship at Parliament House by the Minister for Primary Industries, Katrina Hodgkinson and Peter's widow, Vicky Cullen.

The Peter Cullen Scholarship is supported by the NSW Office of Water and NSW water agencies including the Sydney Catchment Authority, State Water, Sydney Water and Hunter Water, and is worth $60,000 over three years. It honours the memory of Professor Peter Cullen, a visionary in Australian water resource management and mentor to young water scientists. The scholarship also brings with it the opportunity to participate in the mentoring program run by the Wentworth Group of Concerned Scientists, of which Professor Cullen was a founding member.

Eytan's research focuses on one of the key challenges facing climate scientists and hydrologists, simulating climate change's impacts on the water cycle, particularly sustained anomalies of climate extremes which cause floods and droughts. His research aims to develop a methodology to improve the simulation of persistence in rainfall through correcting global climate model bias in regional climate models.

Eytan is studying in the School of Civil and Environmental Engineering under the supervision of Professor Ashish Sharma and Dr Jason Evans from the UNSW Climate Change Research Centre.

(L-R) Award winner Eytan Rocheta, Vicky Cullen, and the Hon. Katrina Hodgkinson, MP

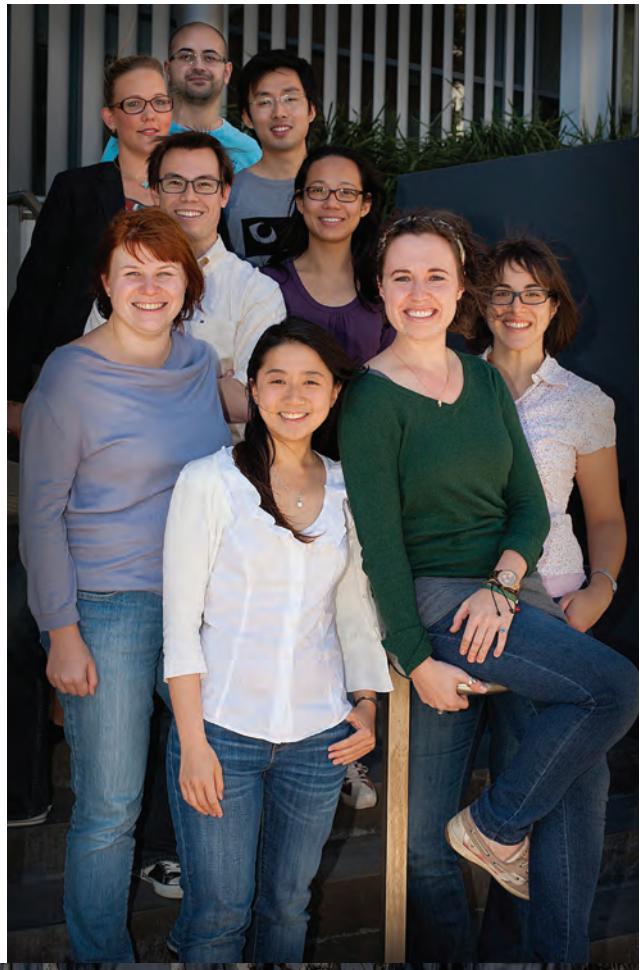
CERSA

The Civil and Environmental Engineering Research Student Association (CERSA) is the organization that represents postgraduate research students within the School.

CERSA provides support for students in many ways including answering questions about the research experience, providing networking opportunities, and organising social events. The CERSA committee, composed of research students elected by their colleagues to liaise with the school and administer the organisation, works with the School management to ensure that the PhD experience is as successful as possible for every student.

During the past year CERSA experienced a great turnout at all events. As always, we welcomed new students with our bi-annual BBQ at the beginning of each semester. We had a number of successful networking events, including Movie & Pizza Nights (some with more than 50 attendees), and a non-School sponsored trip to the Blue Mountains. CERSA has always enjoyed the generous support of the School and this year was no exception - the CERSA committee worked with the School to provide a new state-of-the-art coffee machine which will be appreciated by students for many years to come.

Next year, CERSA will continue engaging students in the research community by facilitating social and academically oriented events. Official ARC-affiliation, a research writing skills development workshop, reinstatement of the popular "Post PhD Careers Night", and of course, BBQs and Movie & Pizza Nights are a sample of the planned activities to look forward to!



2012 CERSA Committee

President - Melissa Duell
Vice President - Yulia Shutova
Treasurer - Anna Yeung
Secretary - Yliane Yvanes-Giuliani
Committee Members:
Cecilia Azcurra
Irene Chiong
Lam Ho
Xavier Vazquex Campos
Chengwei Yang
Russell Yap

Prize winners for the 2012 Annual Research Student Poster Forum:

Environmental Engineering Prize – **XIAOMING MA**

Geotechnical Engineering Prize – **JIANJUN MA** (pictured)

Infrastructure Engineering Prize – **ALI KABOLI**

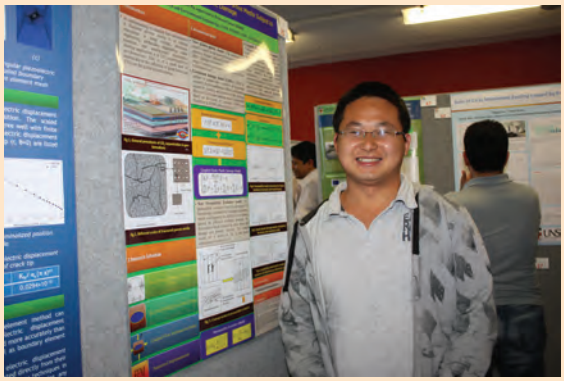
Structural Engineering Prize – **ANKIT AGARWAL**

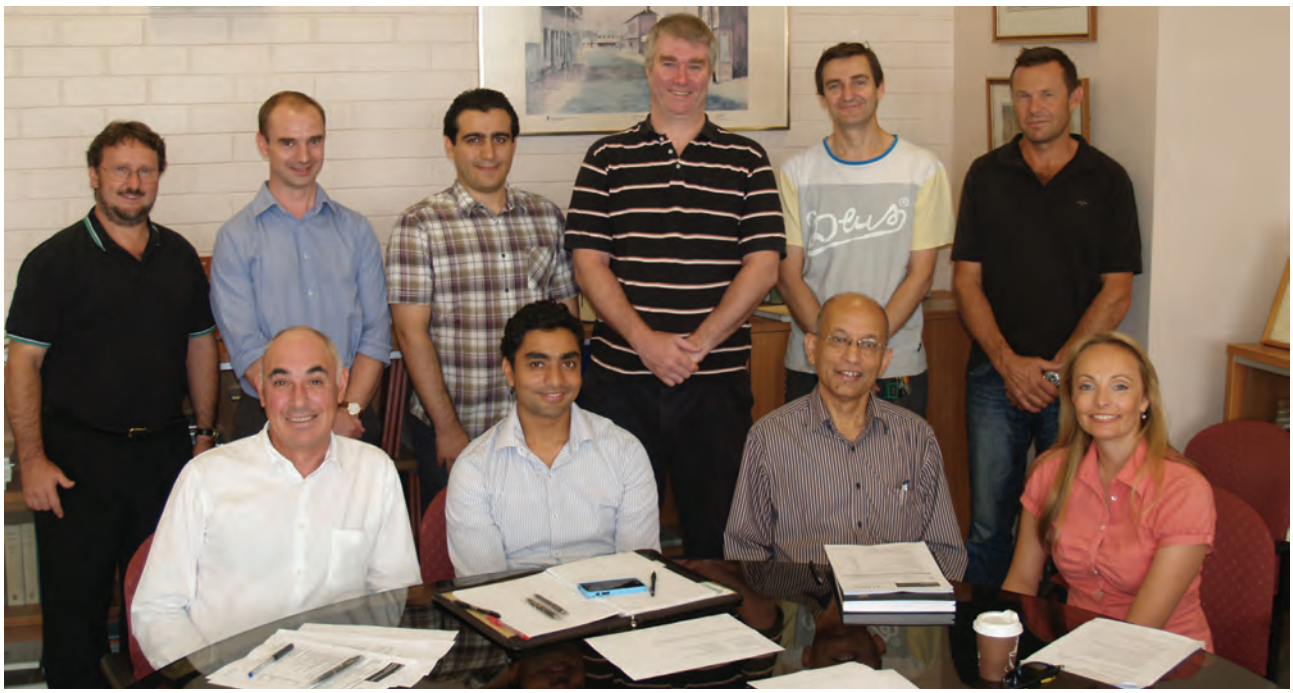
Structural Engineering Prize – **JIANBEI ZHU**

Water Engineering Prize – **DANIEL HOWE**

Overall Engineering Prize – **DANIEL HOWE**

Research Student Peer Engineering Prize – **RUSSELL YAP**





Back L-R: Stephen Foster, Hugh McMullen, Ali Akbarnezhad, Steve Davis, Paul Gwynne, Hamish Studholme
Front L-R: Les Brown, Rohan Singh Panwar, Gautam Chattopadhyay, Patricia Karwan

Level 3 Workplace Safety Committee 2012

1st January 2012 saw the implementation of Harmonised Work Health and Safety (WHS) legislation in NSW and ACT. The ***Work Health and Safety Regulation 2011*** expands on the requirements of the ***Work Health and Safety Act 2011*** by providing details on how certain sections of the Act are to be implemented.

The School of Civil and Environmental Engineering has a Workplace Safety Committee in accordance with the Work Health and Safety Act 2011.

As required by the WHS Regulation 2011, the 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).

The School consults with all staff and students on WHS issues as they arise, through the School's Level 3 Health and Safety Consultation Committee. Minutes of the meetings are posted on School noticeboards and on the School's website.

The School continues to implement and use the UNSW HS Management System which contains six key elements; commitment, planning, consultation, implementation, measurement and review, for the continual improvement of safety both in the School and in the field.

All School Laboratory users complete the compulsory 'RIPA' (Registration, Induction and Project risk Assessment) documentation which provides the mechanisms by which safe systems of work can be implemented and monitored. The School's system is closely integrated with the UNSW HS Management System.

During 2012, the Committee had full voluntary membership, and met regularly every two months with excellent attendance. Several positions on the Committee are now shared to improve attendance and guarantee prompt feedback to each work group. The Committee scheduled regular workplace inspections, authorised various training courses for staff and students, and resolved a wide range of WHS issues.

In 2012 several laboratory and office refurbishments were completed. A new gas bottle storage facility at the rear of the building was completed, and the lifts can now be locked-out for safe transportation of gas bottles. The Committee liaised closely with Facilities Management on these projects.

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

Committee Members and Representation for 2012:

David Waite (HoS), Paul Gwynne – Chair (Infrastructure Lab and First Aid), Hugh McMullen – Secretary (HS and Facilities), Les Brown (Admin. and IT), Irene Calaizis (CIES), Hamish Studholme/Larry Paice (WRL), Gautam Chattopadhyay/Kelvin Ong (WQL and First Aid), Steven Davis (Academic and Chief Warden), Ron Moncay/John Gilbert (Heavy Structures Lab), Patricia Karwan (WRC), Lam Ho (Postgraduate Rep.), Maritsa Kakopieros (Undergraduate Rep.) and Rohan Singh Panwar (Faculty OHS Coordinator).

TEACHING AND LEARNING

The Teaching and Learning Committee

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 tutors through PRSC, setting policy regarding academic aspects of undergraduate and postgraduate examinations and enrolments, and 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 2012 were:

Teaching and Learning Committee 2012

Stephen Moore	Chair & Environmental Eng Program Coordinator
Mario Attard	Assoc Head (Academic) Civil Engineering Program Coordinator
Julijana Baric	Student Services Manager
Leonhard Bernold	Year 2 Coordinator
Carolin Birk	Structures Representative
David Carmichael	EC&M Representative
Vinayak Dixit	Year 4 Coordinator
Kurt Douglas	Geotechnical Representative
Karenne Irvine	School Manager
Matt McCabe	Year 3 Coordinator
Bill Peirson	Water Representative
Hossein Taiebat	Year 1 Coordinator Postgraduate Coursework Coordinator
Upali Vandebona	Industrial Training Coordinator
Zora Vrcelj	Civil with Arch Program Director

Undergraduate Student Enrolments in 2012

Degree	Admisssions in 2012	Total Enrolments	Graduations
Bachelor of Engineering, BE (Civil) 3620	180	730	236
Bachelor of Engineering, Civil Engineering with Architecture 3624	41	175	38
Bachelor of Engineering, BE (Environmental Engineering) 3625	27	65	28
Bachelor of Engineering/Arts, BE BA (Civil/Arts) 3621	n/a	14	5
Bachelor of Engineering/Arts, BE BA (Environmental/Arts) 3626	n/a	4	0
Bachelor of Engineering. BE BE (Civil & Environmental) 3631	19	88	15
Bachelor of Engineering, BE BE (Civil & Mining) 3146	44	107	10
Bachelor of Engineering/Science, BE BSc (Civil/Science) 3730	9	47	9
Bachelor of Engineering/Science, BE BSc (Environmental Engineering/Science) 3735	1	10	5
Bachelor of Engineering/Law, BE LLB (Civil/Environmental Law) 4775/4776/4777	2	20	1
Bachelor of Engineering/Commerce, BE BCom (Civil/Environmental Commerce) 3715	66	230	35
Bachelor of Engineering/Arts, BE BA (Engineering/Arts) 3703/3704	6	19	0
Total	**395***	**1509**	**382**

*Does not include Flexible First Year entry students

The ratio EFTSU/Academic as an indicator of student access to staff as a measure of learning outcomes can be misleading. The ratio is seen to have increased significantly in recent years due to the large increase in student numbers. Certainly most lectures must now be held in the larger theatres at UNSW. But, while the student to staff ratio is 1:39, the School has maintained the more important student to tutor ratio at less than 1:20 to preserve quality teaching outcomes.

Trends in the School Profile

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
STUDENT NUMBERS										
Total EFTSU*	581	567	582	592	669	805	985	1172	1312	1410
BE	634	647	615	730	859	1,012	1173	1307	1430	1509
MEngSc/MEnvEngSc	339	292	323	287	322	329	345	358	391	454
GradDip/GradCert	72	38	28	32	23	25	30	40	35	56
PhD	81	82	79	80	70	72	60	88	102	121
ME/MSc	16	17	11	10	6	5	5	2	3	3
GRADUATES										
PhD	15	8	14	8	23	11	13	19	14	13
ME	1	3	0	0	1	2	2	0	2	1
MSc	0	0	0	0	1	0	0	0	0	0
MEngSc	117	119	95	114	80	121	119	177	192	302
MEnvEngSc	13	13	13	7	8	7	3	8	n/a	n/a
GradDip/GradCert	6	7	7	13	8	8	6	7	7	7
BE (Civil)	64	67	87	80	120	97	99	120	166	290
BE (Environmental)	19	28	21	23	23	22	23	22	14	54
BE (Civil with Architecture)	-	-	-	-	-	-	-	-	21	38
STAFF (Full-time, tenured)										
Academic	32	33	29.5	25	25	28	30.5	28	32	36
Technical (School)	15	14	15	13	13	13	12	9	12	12
Administration (School)	8	8	8	7	8	9	10	9	12	12
STUDENT/STAFF RATIO										
— EFTSU/ACADEMIC	18.2	17.2	19.7	23.7	26.8	28.8	32.3	39.01	41.0	39.2

* Effective Full-Time Student Unit

Leighton CEO addresses students

'Engineers are known to be logical, task oriented and solution focused. But they also need to be good people managers and leaders', Hamish Tyrwhitt, CEO of Leighton Holdings informed students of the School of Civil and Environmental Engineering when he visited UNSW in July. 'Just as importantly, a good engineer needs to have a clear set of values and a vision for themselves, their companies, and their society.'

Hamish was addressing a packed class of third year students studying Civil Engineering Practice – a project based course designed to assist students further develop their research, teamwork, managerial and self-directed learning skills. Drawing from his own extensive experience, the CEO of Australia's largest construction company offered students insights and advice on life after university.

Hamish impressed upon the students that 'the key to success in the world is teamwork. To be a good engineer you need to be able to work effectively in a team. You need to learn now how to do that. Get involved in university in team activities, be it sport or student organisations or other collective community efforts.'

Hamish reminded students that 'the best and most successful engineers are not self- serving. You have to be comfortable with supporting, with contributing as part of the team, as well as being able to lead and manage. The important thing is that on any job or project, you are part of the solution, not part of the problem.'

Students asked many questions, during the talk and after the class, ranging from general careers advice to specific questions on Leighton procedures and performance. Leighton Holdings, which employs 55,000 people around the world, annually recruits 400 young Australian graduate engineers to its operating companies which include John Holland, Thiess and Leighton Contractors.

Invest in yourselves

'Invest in yourselves' Hamish urged students. 'Choose where you want to go. A lot of people think that their employer is responsible for their career. But actually, you are! Choose the direction that you want to go in – there is no point in turning up to a job you don't care about.'

'And just remember that your learning is not over. It will never be over. The best thing you are learning at university is how to learn. Be prepared, when you come out to work, for even more learning - and enjoy the ride.'

Curriculum Review 2012

In 2012 the school embarked upon an internal review of the undergraduate curriculum for the BE civil engineering. The revision process involved the seeking of advice from both past and present students, representatives from the Student Society CEVSOC, as well as from industry, through our Industry Advisory Committee. Student input was sought through email and focus group discussions. Academic staff were also asked for comment and there were discussions with the major discipline groups within the School.

Most stakeholders were happy with the overall structure of the curriculum and the performance of the curriculum since its major rebirth in 2006. Although there have been several important minor changes since 2006, the curriculum balance between the various discipline groups and the proportion of electives to core courses was considered appropriate and shouldn't be changed.

One of the main proposed changes was the introduction of a new CVEN course in Systems and Optimization. Systems were a key element of the Civil program prior to the 2005 revision and were identified as an important deficiency in the current program. Electives in fourth year for environmental engineering students will be broadened to include sustainable energy course options, and a number of courses will get assignments associated with the new CRC for Low Carbon Living centred at UNSW.

In fourth year, all students, including honours students, will now be required to complete a Capstone Design Practice in either semester 1 or semester 2. The capstone design practice course would contain multi-disciplinary design projects undertaken in groups. It would also have material on the issues related to the design of sustainable infrastructure.

A day in the life....

Imagine a world where we live within our environmental resources. Imagine a world where we don't pollute the air, the sea and spread our waste in a thin layer that is never recoverable nor recyclable. Imagine a world where a third of the world's population does not lack clean water and sanitation. If we are to live in such a sustainable and socially just world it will be civil and environmental engineers who will play a disproportionate part.

- Alumnus Dr Robert Care, AM

One morning in September 2012, our photographer Mike Gal roamed classrooms, labs and lecture halls to capture the essence of the School in its daily teaching and learning work…these are some of the images he caught of our dedicated students and staff.

To the optimist, the glass is half full.
To the pessimist, the glass is half empty.
To the engineer, the glass is twice as big as it needs to be.

Undergraduate Studies

The School's undergraduate programs offer students the broadest and most comprehensive civil and environmental engineering education with the opportunity to specialise in their final year by majoring in a range of sub-disciplines. The curricula have proved a model for engineering educators and have been widely benchmarked by other academic institutions.

Undergraduate BE student enrolments have more than doubled over the past six years (617 in 2005 to 1430 in 2011). While the student to staff ratio is 1:41, the School has preserved a tutor to student ratio of less than 1:20 to preserve quality teaching outcomes.

BE Program Outlines

Disclaimer: Information provided about subjects, units, courses and any arrangements for courses including staffing, are an expression of intent only and are not to be taken as a firm offer or undertaking.

Key:
UOC - Units of Credit
HPW - Hours per Week

BE Civil Engineering

Year 1 | Semester 1

Course Code	Course Name	UOC	HPW
MATH1131	Maths 1A **or**	6	6
MATH1141	Higher Maths 1A	6	6
PHYS1121	Physics 1 **or**	6	6
PHYS1131	Higher Physics 1A	6	6
ENGG1000	Engineering Design and Innovation	6	4
ENGG1811	Computing for Engineers	6	5

Year 1 | Semester 2

Course Code	Course Name	UOC	HPW
MATH1231	Maths 1B **or**	6	6
MATH1241	Higher Maths 1B	6	6
GMAT1110	Engineering Surveying & GIS	6	3
CVEN1300	Engineering Mechanics for Civil Engineers	6	5
MATS1101	Engineering Materials and Chemistry	6	5

Year 2 | Semester 1

Course Code	Course Name	UOC	HPW
CVEN2301	Mechanics of Solids	6	5
CVEN2501	Principles of Water Engineering	6	5
	General Education	6	4
MATH2019	Maths 2E	6	6

Year 2 | Semester 2

Course Code	Course Name	UOC	HPW
CVEN2101	Engineering Construction	6	5
CVEN2201	Soil Mechanics	6	5
CVEN2302	Materials & Structures	6	5
CVEN2002	Engineering Computations for Civil Engineers	6	5

Year 3 | Semester 1

Course Code	Course Name	UOC	HPW
CVEN3401	Sustainable Transport & Highway Engineering	6	5
CVEN3201	Applied Geotechnics and Engineering Geology	6	5
CVEN3301	Structural Analysis & Modelling	6	5
CVEN3501	Water Resources Engineering	6	5

Year 3 | Semester 2

Course Code	Course Name	UOC	HPW
CVEN3302	Structural Behaviour & Design	6	5
CVEN3101	Engineering Operations & Control	6	5
CVEN3502	Water & Wastewater Engineering	6	5
CVEN3031	Civil Engineering Practice	6	4

Year 4 | Semester 1

Course Code	Course Name	UOC	HPW
CVEN4030	Honours Thesis A **or**	6	4
CVEN4002	Design Practice A	6	4
	General Education	6	4
	Professional Elective 1	6	4
	Professional Elective 2	6	4

Year 4 | Semester 2

Course Code	Course Name	UOC	HPW
CVEN4031	Honours Thesis B **or**	6	4
CVEN4003	Design Practice B	6	4
	Professional Elective 3	6	4
	Professional Elective 4	6	4
	Professional Elective 5	6	4

BE Civil with Architecture as in 2012

Year 1 | Semester 1

Course Code	Course Name	UOC	HPW
MATH1131	Maths 1A **or**	6	6
MATH1141	Higher Maths 1A	6	6
PHYS1121	Physics 1 **or**	6	6
PHYS1131	Higher Physics 1A	6	6
ENGG1000	Engineering Design and Innovation	6	4
BENV1080	Enabling Skills and Research Practice	6	3

Year 1 | Semester 2

Course Code	Course Name	UOC	HPW
MATH1231	Maths 1B **or**	6	6
MATH1241	Higher Maths 1B	6	6
CVEN1300	Engineering Mechanics for Civil Engineers	6	5
ARCH1121	Architectural History and Theory 1	6	4
MATS1101	Engineering Materials and Chemistry	6	6

Year 2 | Semester 1

Course Code	Course Name	UOC	HPW
MATH2019	Maths 2E	6	6
CVEN2301	Mechanics of Solids	6	5
ARCH1142	Architectural Communications	6	3
ARCH1101	Architectural Design Studio 1	6	5

Year 2 | Semester 2

Course Code	Course Name	UOC	HPW
CVEN2002	Engineering Computations for Civil Engineers	6	5
CVEN2101	Engineering Construction	6	5
CVEN2201	Soil Mechanics	6	5
CVEN2302	Materials & Structures	6	5

Year 3 | Semester 1

Course Code	Course Name	UOC	HPW
CVEN2501	Principles of Water Engineering	6	5
CVEN3201	Applied Geotechnics and Engineering Geology	6	5
CVEN3301	Structural Analysis & Modelling	6	5
CVEN3501	Water Resources Engineering	6	5

Year 3 | Semester 2

Course Code	Course Name	UOC	HPW
CVEN3302	Structural Behaviour & Design	6	5
CVEN3101	Engineering Operations & Control	6	5
CVEN3502	Water & Wastewater Engineering	6	5
ARCH1102	Architectural Design Studio 2	6	5

Year 4 | Semester 1

Course Code	Course Name	UOC	HPW
CVEN4030	Honours Thesis A **or**	6	4
	Professional Elective 2	6	4
	Professional Elective 1	6	4
ARCH1201	Architectural Design Studio 3	6	6
CVEN 4002	Design Practice A **or**	6	4
	Professional Elective 2 (if doing Hons)	6	4

Year 4 | Semester 2

Course Code	Course Name	UOC	HPW
CVEN4031	Honours Thesis B **or**	6	4
	Professional Elective 4	6	4
	General Education	6	4
	Professional Elective 3	6	4
CVEN4003	Design Practice B **or**	6	4
	Professional Elective 2 (if doing Hons)	6	4

BE Environmental Engineering

Year 1 | Semester 1

Course Code	Course Name	UOC	HPW
MATH1131	Maths 1A **or**	6	6
MATH1141	Higher Maths 1A	6	6
CHEM1011	Chemistry A **or**	6	6
CHEM1031	Higher Chemistry A	6	6
ENGG1000	Engineering Design and Innovation	6	4
PHYS1121	Physics 1 **or**	6	6
PHYS1131	Higher Physics 1A	6	6

Year 1 | Semester 2

Course Code	Course Name	UOC	HPW
MATH1231	Maths 1B **or**	6	6
MATH1241	Higher Maths 1B	6	6
CVEN1701	Environmental Principles and Systems	6	5
CVEN1300	Engineering Mechanics	6	5
ENGG1811	Computing for Engineers	6	5

Year 2 | Semester 1

Course Code	Course Name	UOC	HPW
BIOS1301	Ecology Sustainability & Environmental Science	6	5
CVEN2501	Principles of Water Engineering	6	5
CVEN2701	Water & Atmospheric Chemistry	6	5
MATH2019	Maths 2E	6	4

Year 2 | Semester 2

Course Code	Course Name	UOC	HPW
CEIC2009	Mass & Energy Balances in the Chemical Process Industry	6	5
CVEN2201	Soil Mechanics	6	5
	General Education	6	3
CVEN2702	Engineering Computations for Environmental Engineers	6	5

Year 3 | Semester 1

Course Code	Course Name	UOC	HPW
CVEN3701	Environmental Frameworks, Law & Economics	6	5
CVEN3201	Applied Geotechnics and Engineering Geology	6	5
CVEN3402	Transport Engineering & Environmental Sustainability	6	5
CVEN3501	Water Resources Engineering	6	5

Year 3 | Semester 2

Course Code	Course Name	UOC	HPW
CVEN3702	Solid Wastes & Contaminant Transport	6	5
CVEN3101	Engineering Operations & Control	6	5
CVEN3502	Water & Wastewater Engineering	6	5
CVEN3731	Environmental Engineering Practice	6	4

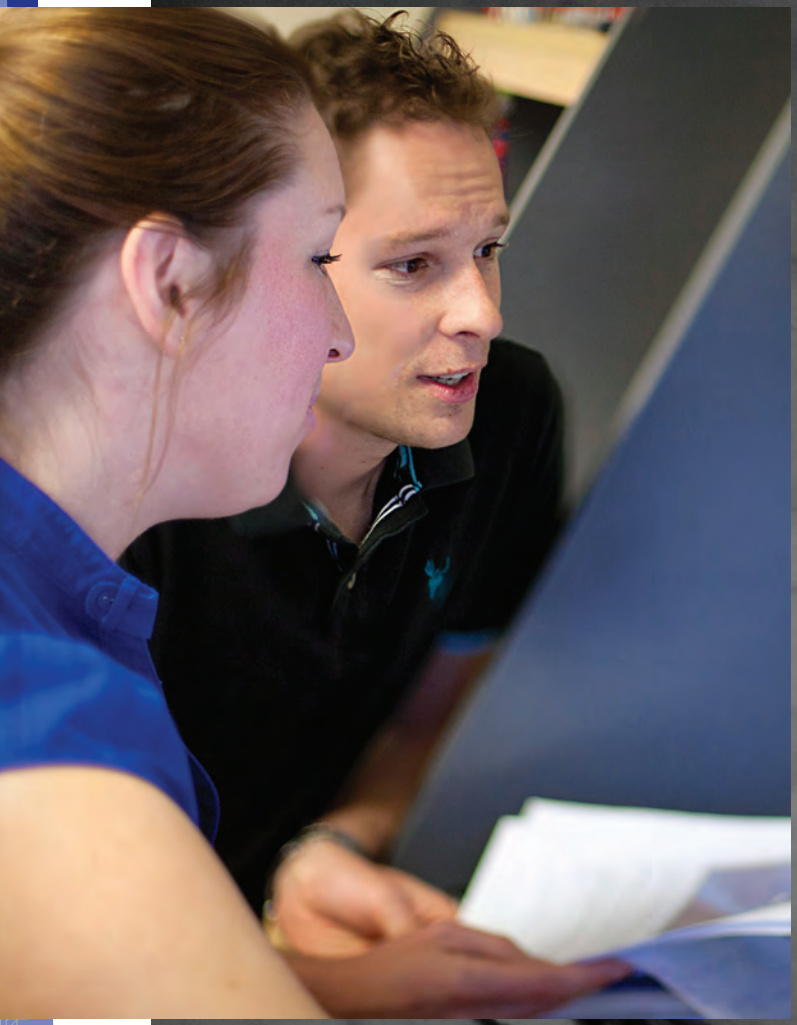
Year 4 | Semester 1

Course Code	Course Name	UOC	HPW
CVEN4030	Honours Thesis A **or**	6	4
CVEN4002	Design Practice A	6	4
CVEN4701	Planning Sustainable Infrastructure	6	5
	Professional Elective 1	6	4
	Professional Elective 2	6	4

Year 4 | Semester 2

Course Code	Course Name	UOC	HPW
CVEN4003	Design Practice B **or**	6	4
CVEN4031	Honours Thesis B	6	4
	General Education	6	4
	Professional Elective 3	6	4
	Professional Elective 4	6	4

Postgraduate Courses



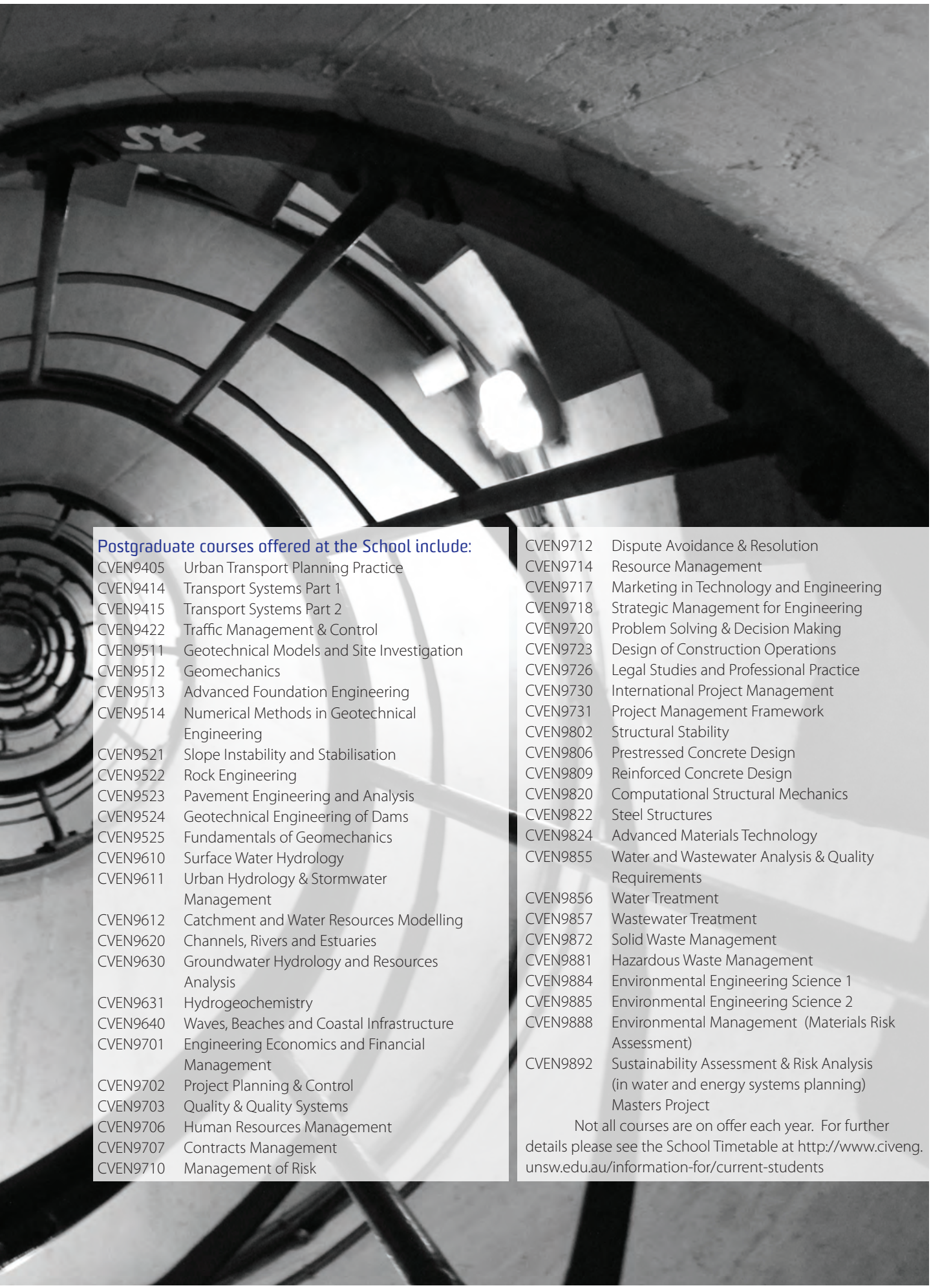
Postgraduate coursework teaching and learning has been one of the core activities and major strengths of the School of Civil and Environmental Engineering for over fifty years. With 426 coursework students enrolled in 2011 the School continued to be the leading provider of postgraduate engineering education in Australia. All our courses provide essential specialist knowledge, backed by cutting edge research, to enable industry professionals to improve their performance and advance their careers.

Our Master of Engineering Science (MEngSc) educates students to the top level required nationally in seven specialisations:

- Civil Engineering
- Environmental Engineering
- Geotechnical Engineering and Engineering Geology
- Project Management
- Structural Engineering
- Water Resources (includes coastal engineering)
- Water, Wastewater and Waste Engineering

Courses in construction management and transport engineering are also offered on campus and by distance.

The School offered 42 postgraduate courses in 2011 either as internal weekly courses, in short course mode or in a distance education format, making the program large even by international standards. Continued Commonwealth Support (HECS) makes our MEngSc program financially very competitive for local students.



Postgraduate courses offered at the School include:

CVEN9405	Urban Transport Planning Practice
CVEN9414	Transport Systems Part 1
CVEN9415	Transport Systems Part 2
CVEN9422	Traffic Management & Control
CVEN9511	Geotechnical Models and Site Investigation
CVEN9512	Geomechanics
CVEN9513	Advanced Foundation Engineering
CVEN9514	Numerical Methods in Geotechnical Engineering
CVEN9521	Slope Instability and Stabilisation
CVEN9522	Rock Engineering
CVEN9523	Pavement Engineering and Analysis
CVEN9524	Geotechnical Engineering of Dams
CVEN9525	Fundamentals of Geomechanics
CVEN9610	Surface Water Hydrology
CVEN9611	Urban Hydrology & Stormwater Management
CVEN9612	Catchment and Water Resources Modelling
CVEN9620	Channels, Rivers and Estuaries
CVEN9630	Groundwater Hydrology and Resources Analysis
CVEN9631	Hydrogeochemistry
CVEN9640	Waves, Beaches and Coastal Infrastructure
CVEN9701	Engineering Economics and Financial Management
CVEN9702	Project Planning & Control
CVEN9703	Quality & Quality Systems
CVEN9706	Human Resources Management
CVEN9707	Contracts Management
CVEN9710	Management of Risk
CVEN9712	Dispute Avoidance & Resolution
CVEN9714	Resource Management
CVEN9717	Marketing in Technology and Engineering
CVEN9718	Strategic Management for Engineering
CVEN9720	Problem Solving & Decision Making
CVEN9723	Design of Construction Operations
CVEN9726	Legal Studies and Professional Practice
CVEN9730	International Project Management
CVEN9731	Project Management Framework
CVEN9802	Structural Stability
CVEN9806	Prestressed Concrete Design
CVEN9809	Reinforced Concrete Design
CVEN9820	Computational Structural Mechanics
CVEN9822	Steel Structures
CVEN9824	Advanced Materials Technology
CVEN9855	Water and Wastewater Analysis & Quality Requirements
CVEN9856	Water Treatment
CVEN9857	Wastewater Treatment
CVEN9872	Solid Waste Management
CVEN9881	Hazardous Waste Management
CVEN9884	Environmental Engineering Science 1
CVEN9885	Environmental Engineering Science 2
CVEN9888	Environmental Management (Materials Risk Assessment)
CVEN9892	Sustainability Assessment & Risk Analysis (in water and energy systems planning)
	Masters Project

Not all courses are on offer each year. For further details please see the School Timetable at http://www.civeng.unsw.edu.au/information-for/current-students

Computing Report 2012

The Computing, IT and Education Technology Committee (CIETC) provides support to the School's academic and professional staff, and undergraduate, postgraduate and PhD students. This committee is also responsible for the website of the school.

A summary of the School's computing facilities in 2012 includes:

- 2 Win7 laboratories (Lab 201 and Lab 611) with 85 SOE computers for undergraduate and postgraduate coursework students.
- Networked administrative and technical staff SOE PCs.
- Networked SOE and non-SOE PCs for PhD students.
- Networked laser printers, scanners and other peripherals.
- 2 smart-board systems (CE701 and CE501) for lecture recording and video conferencing.

The general opening hours for the undergraduate and coursework postgraduate laboratories are 8am to 10pm (weekdays), and 10am to 6pm (Saturdays) during Semester. Four student assistants were employed to staff the laboratories after hours (6pm to 10pm) during weekdays and during Saturdays, and also for audiovisual support.

The major operations and changes in our IT infrastructure are as follows:

- All SOE computers in Lab 201 and Lab 611 have been upgraded to Windows 7.
- The computers in Lab 201 have been replaced as the warranty expired in June 2012. The computers in Lab 611 will be replaced when their warranty expires in January 2013.
- Complete the upgrade of internet connection in Civil and Environmental Engineering Building (H20) to 1Gb with the installation of addition 2x48 port switches.
- Upgrade internet connection in Vallentine Annex (H22) to 1Gb.
- Upgrade network ports from dual to quad in offices in Civil and Environmental Engineering Building (H20) and Vallentine Annex (H22).
- Working with Comms and the Faculty IT unit to migrate VLANs (315, 317) to a combined Faculty of Engineering VLAN (172) to release fragmented ranges of IP addresses for further deployment.
- Decommission of the old web server (Webnew). Relocation of all web applications and databases to Drupal CMS server and to a new VM Linux server called CVEPLWS hosted by IT Service Centre.
- Complete new loan booking system on CVEPLWS for audio visual, computer labs, and equipment.
- Creation of an online demonstrator registration to assist with casual academic staff recruitment.
- Review of School web site: Internal review completed. Changes have been made where possible. Additional request for changes at Faculty level have been reported back to the Faculty.
- Migration of CIES website to Drupal CMS and creation of RCITI website on Drupal CMS.
- Migration of email distribution lists from Majordomo to combination of AD based email distribution lists and Mailman distribution lists.
- Complete a new sign-in sheet and work log application for professional staff.
- Provide assistance to the creation of research gateway staff profiles.
- Provide support and space on Drupal CMS for research student profiles.
- Provide local and administrative support to IT Service Centre operations and services (such as File Sharing Service, Manage Print Service, IT Procurement and Service Desk Requests).
- Commencement of online industrial training management system.
- Commencement of technical laboratory equipment booking system.

Xiaobo Ni has been employed from 18 June 2012 as a new fixed-term Web Developer. He undertakes web application projects.

eLearning Report 2012

With the integration of technology in classroom curriculum, most of the School's courses featured either Blackboard 9 (BB9) or Moodle to enhance the student's learning experience. In 2012, we had over 100 online learning Modules with large numbers of academic, visiting, casual teaching staff, and students participating in various online learning and teaching activities. Those activities include online course content delivered in digital documents and videos, online quizzes and assessment submissions, online group discussions and forums, and online marking and mark distribution.

The management of eLearning process is carried out within the School, with some support from IT Service Desk and the UNSW Learning and Teaching Unit. The Modules are automatically created by default along with NSS course catalogue creation by the School's administrative officer, Flora Fan. The School's Web/IT coordinator, Kate Brown, administers and applies appropriate templates to each Module, facilitates staff/teaching assistants enrolment and coordinates training.

There was an announcement at the end of 2012 that Moodle would be replacing Blackboard 9 in S1 of 2014.

Staff continued to produce their lecture videos and uploaded them via UNSW TV to enhance their distance teaching, using our Interactive whiteboard (known as Smartboard), lecture recording and video conferencing facilities. The School's Computer System Officer, Patrick Vuong assists academic staff with any technical issues that may occur during recording.

The Teaching & Learning Committee supported staff's educational technology activities by purchasing 12 HP Tablets 2760p for selected academic staff. The Tablets enabled staff to deliver their face-to-face classroom lecture more effectively especially where engineering designs can be drawn directly to the screen and shown during the class.

The Civil and Environmental Engineering Society - CEVSOC

CEVSOC began 2012 on an exciting note with the successful First Year Camp focused on building a strong grass roots relationship with CEVSOC members through creating a supportive social environment. Throughout the year we continued our commitment to our members by running a series of events with industry support, promoting careers and working closely with the School and other societies on campus.

The office bearers of CEVSOC for 2012 were:

President Daniel Morris
Vice-President Lindsay Collier
Secretary Isabelle Testoni
Treasurer Brendan Walton
Arc Delegate Saskia de Haan
WH&S Coordinator Maritsa Kacopieros
Sports Representative Lucas Earl

Social Report

Throughout 2012 CEVSOC continuously focused on improving the university experience for its members through our events and activities. We held regular social nights within the Civil Engineering building and set record attendances through welcoming students, staff and industry representatives. We also produced CEVSOC jerseys in our school colours, which proved very popular and were worn proudly throughout the year.

First Year Camp

2012 saw the debut of the highly anticipated First Year Camp. The CEVSOC Executive and elected student leaders from senior years took a group of first year students to Camp Wombaroo bordering the Jellore State Forest between Sydney and Canberra.

The all-inclusive weekend camp included outdoor team-building engineering challenges, afternoon BBQ's by the river and social mixers into the evening. With significant support from the School and extremely positive student feedback, the First Year Camp was deemed a great success and is to be a prominent CEVSOC event into the future.

Cardno Cup

The third annual Staff versus Students soccer match was held on 24th April 2012 and for the third year in a row was taken out by the narrowest of margins by the student team. A great turnout of supporters cheered while enjoying the BBQ and drinks provided by our industry partner Cardno. This proved to be the perfect post-match celebration and we look forward to continuing this and other industry-sponsored events in future years.

Harbour Cruise

Our major social event for Semester 1 was the Annual CEVSOC Harbour Cruise run with the theme, "Used To Be Cool." The picturesque Sydney Harbour Cruise was a dance party inside a 1990's time capsule; thoroughly enjoyed by all. With an onboard live DJ set and an abundance of food and refreshments the night provided many students with an opportunity to experience the Harbour for the first time in a uniquely memorable way.

Fourth Year Dinner

CEVSOC was proud to be associated with celebrating the achievements of its members in organizing a formal evening for the graduating class of 2012. The 200 guests included industry sponsors who conducted an awards presentation and various staff members such as Dr. Kurt Douglas who ended the evening with his best wishes and a vote of thanks. We wish the graduating class the best into the future and look forward to hearing of your success.

2013 and Beyond

After a very successful year with record attendances at events, the new committee brings an abundance of experience and enthusiasm to expand CEVSOC in the same way the outgoing committee did. With exciting new ideas as well as proven favorites, CEVSOC will maximize the experience of our members into 2013 and beyond.

Josh Farr
CEVSOC President 2013

Year 4 DINNER

Undergraduate Student Awards and Prizes 2012

University Medallists 2012

A University Medal is awarded to a student in an undergraduate program who has shown highly distinguished merit in completing her or his program of study. The University Medal Committee takes into account the whole academic record of the student. The award of a Medal indicates outstanding academic performance -as in the case of a degree awarded with Honours - the recipient is expected to achieve significantly above the minimum requirements for Honours Class 1.

The University Medal in Civil Engineering - Shuang Guo

The University Medal in Environmental Engineering - Bijoy Joseph

Our sincere congratulations to Shuang and Bijoy.

Dean's Awards for studies undertaken in 2012

The Faculty of Engineering Deans Award is an annual award made to students in all undergraduate degree courses offered in the Faculty. The award recognises significant academic achievements of students currently studying at the leading Engineering Faculty in Australia, and are awarded to students ranked in the top 2 percent in their year.

Civil and Environmental Engineering students – Deans Awards for studies undertaken in 2012

Stage 1: Jonathan Chan, Jason Ko, Geeheon Ngo, Karina Siems, Anh Tran, Shenggang Wang, Hubert Xiao.

Stage 2: Timothy Cheung, Jarrah Duckhs, Anthony Ferraro, Nell Hardy, Sarah Hayes, Kyudong Kim, Tony Ly, Jeremy Rajendram, Kelly Tang, Lennox To.

Stage 3: Danny Abdalla, Mathew Chong, Alison Goddard, Alice Harrison, Kelvin Nguyen, Rohan Stocker

Year 4 Industry Sponsored Prizewinners

At the annual Year 4 dinner, held at the Sheraton in November, students and staff celebrated four years of hard work and achievement. Several industry partners assisted with subsidising students' tickets to the dinner and the awarding of prizes to some of our many outstanding students. We are grateful to these prize sponsors, and to all our industry partners, for their generous support of the work of the School.

The Civil Engineering with Architecture Prize (donated by ARUP)
Garth Miller

The Civil and Environmental Engineering Construction Management Discipline Prize (donated by Brookfield Multiplex)
Bianca Bustamente

The Civil and Environmental Engineering Environmental Discipline Prize (donated by SKM)
Michael Reeves

The Civil and Environmental Engineering Geotechnical Discipline Prize (donated by PSM)
Sam Tagliabue

The Civil and Environmental Engineering Structures Discipline Prize (donated by Aurecon)
Shuang Guo

The Civil and Environmental Engineering Transport Discipline Prize (donated by AECOM)
Edward Robson

The Civil and Environmental Engineering Water Discipline Prize (donated by GHD)
Lisa Granqvist

The Civil Engineering Industrial Training Prize (donated by URS)
Jivanka Perera

The Civil Engineering Practice Prize (donated by Cardno)
Lizhe Sun

The Environmental Engineering Practice Prize (donated by Cardno)
Carol Ka Ho Ng

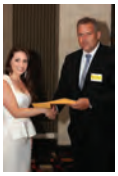
Other prize winners

The Jeffery and Katauskas Prize
Anh Tran

The Welding Technology Institute of Australia Prize
Anthony Ferraro

The Alexander Wargon Prize
Shuang Guo

Engineers Australia Civil and Structural Engineering Prize
Andrew Davis



The Jacob N Frenkel Prize
Jonathan Chan

Fourth Year Honours Students and Topics

Honours Student	Thesis Topic	Supervisor/s
Alarilla, Jan Paolo	Discrete-Event Simulation of Automated Real-Time Monitoring System Impacts for Asphalt Pavement Construction Material Delivery for Assessing the Impact of Automated Real-Time Monitoring System in Asphalt Pavement Operation	Han, S./Hao, P.
Ali Khan, Sami	Retractable Membrane Roof Structures	Kayvani, K.
Anderiesz, Dillon James	Plate and Shell Analysis by Using the Scaled Boundary Finite-Element Method	Song, C.
Aramini, Daniel	Transport of Nitrate, Chloride and Stable Isotopes Within Aquitards	Timms, W./ Hartland, A.
Atalla, Daniel	Critique of the Proposed Method to Determine the Residual Flexural Tensile Strength of Steel Fibre Reinforced Concrete	Foster, S.
Ayob, Alia	Relating Trends in Rainfall Patterns with Climate Change Indicators	Mariethoz, G.
Azizan, Nur Alyaa Zahida	Kinetics of Chlorine Reaction With Trace Organic Compounds	Khan, S./ Aber, S.
Bernard, Danny	Orthotropic Continuum Mechanics	Kellermann, D./ Attard, M.
Bryan, Mark	Preferential Flow in a Cracking Clay Soil and Its Implications	Timms, W. / Hartland, A.
Bustamante, Bianca	The Impact of Variability in Interest Rates on Investment Analysis	Carmichael, D.
Cao, Tommy Kuan Phu	Thermal-Induced Plate Buckling of Concrete Pavements	Bradford, M.
Cavaco, Joshua	Investigation into the Structural Design of the Queen Victoria Building	Attard, M.
Chahine, Michael	Phosphate and Iron(II) Release via the Photoreduction of Colloidal Ferric Oxides	Waite, D.
Chan, Chun Yu	Utility of Satellite Rainfall Measurement	Sharma, A.
Chhour, Bosith	Analysis of Shells Using Reproducing Kernel Particle-Finite Strip Method	Bradford, M.
Collier, Lindsay	Use of a Levels of Approximation Approach for Modelling of Sustainability in Reinforced Concrete Structures	Foster, S.
Cover, Rex	Groundwater Modeling and Water Balance Analysis of the Little River Catchment Using MIKE She	McCabe, M.
Cummins, Michael Robert	Major road construction projects in South-Eastern Australia: trust in client-contractor relationships under traditional procurement methods.	Han, S.
Dalton, Edward	Designing a Computer Program to Provide a Design for a Pre-tensioned Beam or Slab	Attard, M.
Danovan, William	Creep Buckling of Viscoelastic Columns	Hamed, E.
Datirie, George	Prediction of Internal Corrosion in Sewer Pressure Mains	Peirson, W.
Davis, Andrew	Large-Sample Oedometer Testing Relating to Post-Construction Settlement of Deep Engineered Fills	Douglas, K.
De Haan, Saskia Amsale	The Impact of Shear Connection on the Behaviour of Reactive Powder Concrete Sandwich Panel Systems	Foster, S.
Dennett, Scott	The effect of Seasonality and Storage Behaviour on Ephemeral, Mountain-Front Stream Flow	Andersen, M.
Drummond, Jennifer	Analysis of Rail Infrastructure Projects to Reduce Passenger Delay	Waller, T./ Gardner, L.
Duffy, Isabel	Creep Deflection of Composite Timber-Timber Panels	Bradford, M.
Dundovic, Adam	Modelling Energy Dissipation due to Particle Crushing Using a Three-Dimensional Periodic Lattice	Russell, A.
Earl, Lucas	Restoration of the Well Tank at WRL for Heterogeneity Experiments	Mariethoz, G.
Edwards, Lara	Comparison of Topographic and Fixed Rip Current Behaviour	Brander, R./ Turner, I.
Emery, Andrew	Fatigue in Reinforced Concrete Beams Containing Steel Fibres	Foster, S.
Fernando, Geethaka	Parking Advisory Systems	Vandebona, U.
Florie-George, Roslyn	Reducing and Preventing Waste: A Comprehensive Waste Management System for Devikulam, Tamil Nadu (India) (Engineers Without Borders Open Research Challenge, 2012)	Moore, S.
Gibbins, Caleb	Online Trading and Motorcycle Helmets - The Risks of a Global Age	Attard, M./ Grzebieta, R
Giggacher, Kyle-James	Backward Erosion Piping of Cohesionless Soils in Dams, Levees and Their Foundations.	Douglas, K.
Govender, Neshen	Dynamic Characteristics and Response of Cracked Reinforced Concrete Beams	Hamed, E.
Granqvist, Lisa	Saltmarsh Distribution and Resilience in Response to Altered Surfacewater and Climate Change	Cox, R./ Glamore, W.
Green, David	Stochastic Modelling of Material Properties Using Autoregressive Random Fields for Reliability Assessment	Douglas, K.
Grover, Ankit	Can pricing Really Be Used To Save Water	Cordery, I.
Guerry, Nathan	Zero Valent Iron for Remediation of Cyanide Contaminated Groundwater	Waite, D.
Guo, Shuang	Crack Propagation Modelling in Functionally Graded Materials Using the Scaled Boundary Polygons	Song, C.
Hammad, Ahmed	Removal of Endocrine Disrupting Chemicals From Wastewater by Membrane Bioreactors	Khan, S.
Hammad, Mohammed	Construction Waste Reduction With Fibre Reinforced Drywall	Bernold, L.
Hammami, Mohamad Bayan	Real Options	Carmichael, D.
He, Ke	Limit Analysis by Using the Scaled Boundary Finite Element Method	Song, C.
Hein, Win Min	Adoption of Building Information Modelling	Davis, S.
Huang, W.	Prediction of Deflections in Reinforced Concrete Beams and One Way Slabs	Gilbert, I.
Hurley, Katherine	Time Dependent Behaviour of Fly Ash Based Geopolymer Concrete	Foster, S.
Jenkins, Andrew	A Conceptual Groundwater Model At The University of New South Wales Wellington Farm	Andersen, M.
Jin, Shi	Membrane Effect in Using Osmotic Method to Measure Suction	Khalili, N.
Joseph, Bijoy	Determination of Future Streamflow Changes in South-East Australia Under Climate Change Using Regional Climate Model Data and Six Hydrological Models	McCabe, M.
Kairouz, Sobhi	Quality in Construction Projects	Carmichael, D.
Karantonis, John	Convertible Contracts in Construction	Carmichael, D.
Kemp, Jonathan	Assessment of the Use of Surfcam Infrastructure Applied to Broad-scale Coastal Erosion Monitoring	Turner, I.
Khan, Bilal	Investigating a novel inverse modelling methodology for highly heterogenous aquifers	Mariethoz, G.

Honours Student	Thesis Topic	Supervisor/s
King, Phillip Andrew	Hydrogeology of a Thick Clay Aquitard Overlying a Gravel Aquifer	Timms, W./ Hartland, A.
Krishna, Krishneil	Constitutive Modelling of Viscoelastic Behaviour Using Fractional Calculus	Birk, C.
Lai, Jinchen	The Calculation of Long-Term Deflection of Steel Reinforced Beams and Slabs	Gilbert, I.
Lam, Andrew	Seismic Design Of Tall Buildings: A Comparison Between International Codes	Kayvani, K. /Attard, M.
Le, Trung Tin	Reliability Analysis of Structures with Uncertainties	Gao, W.
Lea, Kjell	The Influence of Carbon Price Uncertainty on Clean Development Mechanism Project Additionality	Carmichael, D.
Lee, Damian	Purpose of study: Structural and Sensitivity Analysis on Fractal Structures	Song, C.
Lee, Do-Yeon	Water Quality Impacts Of Extreme Weather Events	Khan, S.
Leong, Chi Hang	Non-Deterministic Fracture Analysis of Structures with Uncertainty	Gao, W.
Leung, Chi Wai	Comparison of Organic Matter Removal by Coagulation Followed by Dissolved Air Flotation and Sedimentation Using Fluorescence Spectroscopy	Khan, S. Henderson, R.
Leung, Man Yiu	The Impact of CO2 Enrichment on Soil Water Dynamics - A Meta Analysis	Wang, L./ McCabe, M.
Leung, Stephen	Prediction of Disinfection By-Products & Precursors Using Fluorescence Spectroscopy Coupled With Multivariate Analysis	Khan, S./ Henderson, R.
Lewis, Galen	Continental scale trends in catchment antecedent moisture conditions	Sharma, A.
Li, Jingwan	Impact of Volcanic Aerosols on Atmospheric Water Vapor	Sharma, A.
Li, Yongjian	Safety Construction	Han, S.
Li, Zhen	Application of Material Flow Analysis to a Substance in Sydney and Australia	Moore, S.
Liang, Ding Hao	Removal of Personal Care Products and Pesticides From Wastewater by a Membrane Bioreactor	Khan, S.
Liang, Yusheng	Risk Assessments of Membrane Bioreactor Treatment Under Hazardous Events	Khan, S.
Lim, Hui Ling	Nanoparticle Contaminant Fate Within Aquitards	Attard, M./ Timms, W.
Lo, Alvin Yan Yin	Radiation of Water Waves By Rigid Bodies Using Scaled Boundary Finite Element Method	Birk, C.
Lo, Tsz Hin	Soil Moisture Dynamics 15N	McCabe, M./ Wang, Linxin
Lui, Lloyd	Biomimetic Application for Deployable Structures	Vrcelj, Z.
Ly, Nuwyy	Waste to Energy in an Australian Context	Moore, S.
MacKintosh, Jamie	Creating A Bond-Slip Model For CFRP Adhesively Bonded To Steel Structures	Foster, S.
Malcolm, Cassandra	Carbon Footprinting and Marginal Abatement Cost Curves for Construction Processes	Carmichael, D.
Mann, Kirsten	Understanding Fugitive Nitrous Oxide Emissions From Sewers and Primary-Treated Wastewater: A Sydney Case Study	Short, M.
Matar, Firas Mohammed	A Study of Tension Stiffening in Reinforced Concrete Beams and Slabs Containing Steel Reinforcement or Fibre Reinforced Polymer Reinforcement	Gilbert, I.
May, Stephanie	Determination of recharge mechanisms in thick clay aquitards	Timms, W./ Hartland, A.
McCann, Elizabeth	Clustering Climate Models using Bibliographic Information	Mariethoz, G.
McGill, William	Joint Probabilities Of Coincident Peak Flows In Nearby Catchments	Sharma, A.
McIntyre, Andrew	The Shear Strength of Fibre-Reinforced Clay	Taiebat, H.
Messinesi, Thomas	An Experimental Study of Liquefaction: The Improvement of Ground Stabilisation by Simulated Explosions	Russell, A.
Metzler, Paul	Fill in The Dams?	Peirson, W.
Milham, Nathan	The Impact of Schedule Pressure on Quality and Productivity	Han, S.
Miller, Benjamin	Comparison Between Walking Vibration Asessment for Reinforced Concrete Floors and Steel Concrete Composite Floors	Kayvani, K./Attard, M.
Miller, Garth	Numerical Modelling of Climate Change Impacts on the Durability of Reinforced Concrete Structures	Foster, S.
Miller, Kristian	The Realignment of the Tarana Section of the NSW Main Western Railway Line	Vandebona, U.
Moore, Aaron	Measurements of Post-Storm Beach Recovery Using ARGUS Monitoring	Blenkinsopp, C.
Munday, David	The Declining Inflows of Perth's Metropolitan Dams	Cordery, I.
Nadjend, Shaheem Ahmad	System and Three Dimensional Laser Scanner	Taiebat, H.
Nagodavithane, Asith Indika	Design Proposal of Economical Integrated Bus Systems to Improve Sydney's Public Transport and Roads	Vandebona, U.
Ng, Carol Ka Ho	Surface Water Quality Monitoring at Kimbriki Resource Recovery	Stuetz, R.
Ngo, Kien Thang	Bearing Capacity of Footings Near Slopes	Taiebat, H.
Nguyen, Julie	Lessons from the natural world	Vrcelj, Z.
Ni, Jun'er	Limit Analysis of Engineering Structures	Gao, W.
Nur, Nazlee	Fiber Reinforced Polymer Strengthening of Short Reinforced Concrete Columns Subjected to Axial or Combined Axial & Bending Forces	Kayvani, K./ Attard, M.
Pan, Xiao	Analysis of Free Vibration of Rectangular Plates via Generalized Reproducing Kernel Particle-Finite Strip Method	Vrcelj, Z.
Pearson, Matthew Stewart	Performance of Crest Containers in Breakwaters Constructed from Sand Filled Geotextile Containers	Cox, R.
Perera, Jivanka	Root Causes of Construction Defects	Han, S. / Aljassmi, H.
Persson, Tomas	Construction Waste Reduction with Fibre Reinforced Plasterboard	Bernold, L.
Prumm, Matthew	Developing a Polymer Concrete For Use on the Earth and Moon	Bernold, L.
Purwa, Jennifer	Plastic Limit Analysis by Kinematic Theorem	Gao, W.
Qian, Fang	Evaluating Subsurface Heterogeneity With Connectivity Functions and NRMSD Through Multiple Facies	Mariethoz, G.
Qian, Xiang	Investigation on Fracture Behaviour of a Bar in Tension based on Probability	Gao, W.
Rashid, Fahim	Probabilistic Analysis of Slope Stability	Khoshghalb, A.
Reeves, Michael	The Effect of Wind on Shoaling Waves	Peirson, W.

Honours Student	Thesis Topic	Supervisor/s
Revay, Alex	Analysis of Relationships Between Rainfall and Solar Activity	Cordery, I.
Robson, Edward	Consumer Benefit Model for Developing Public Transport Networks	Vandebona, U.
Rowe, Megan	Partial Shear Interaction in Deconstructable Steel-Concrete Composite Beams with Bolted Shear Connectors	Bradford, M.
Rudolph, Taya	Hyporheic Processes in Gravel-bed Streams: A Megalong Study	Andersen, M.
Saad, Jerome	Analysis of Information Delivery Manual Methodologies for Facilitating Standardised Data Exchange.	Plume, J./ Attard, M.
Sabaruddin, Patrick	Dynamic Out-of-Plane Response of Masonry Walls	Hamed, E.
Sadeghi, Iman	Drained Bearing Capacity of Foundations Near/On Slopes	Taiebat, H.
Saunders, Nicholas	Climate Change Adaptation of Urban Water Management Systems in the Wet/Dry Tropics of Australia	Peirson, W.
Shao, Dounan	Sensitivity and Reliability Analysis of Cracked Plate Elements	Song, C.
Shiraz, Hassan	Real Time Measurements of Beach Morphology Evolution Using LiDAR	Blenkinsopp, C.
Shrestha, Shweta	Calibration of a Hydrologic Model For Two NSW Catchments	Cordery, I.
Si, Chon Peng Keven	Investigation into membrane structures	Attard, M.
Sia, Shang Ze	Ultraviolet Degradation of Chemicals in Drinking Water	Khan, S.
Simon-Mendoza, Susana	Modelling Recharge Through Analysis Of The Aerobic Degradation Processes In The Unsaturated Zone	Andersen, M.
Simpson, Peter	The Impact of Freeze-Thaw Cycling on Fibre Reinforced Polymer Repaired Steel Structures	Foster, S.
Singh, Sukhdeep	Extreme Climate Trends Over South-East Australia: A Comparative Study Between Observations and Regional Climate Model Simulations	McCabe, M.
Sobti, Anurag	Numerical Modelling of Time Dependent Behaviour of Slopes	Khoshghalb, A.
Stanton, Mark	An Evaluation of Empirical Run-up Prediction Models	Turner, I.
Sun, Lizhe	A Micromechanical Approach To The Compression of Soils Using Homogenisation Techniques	Russell, A.
Sundarjee, Smita	Business Valuation Using A Real Options Approach	Carmichael, D.
Tagliabue, Sam	Investigation of Intact Rock Scale Effects using Particle Flow Modelling	Douglas, K.
Tan, Alan	Rectification Practices within the Defects Liability Period	Carmichael, D.
Tan, Hock Keong	Closed Cycle Suction Drilling Technology for Lunar Mining	Bernold, L.
Tay, Kian Seng	Evaluation of Roundabout Capacity using the Average Circulating Flow	Dixit, V.
Teh, Sek Yee	Buckling Analysis of Thin Plates via Generalized Reproducing Kernel Particle-Finite Strip Method	Vrcelj, Z.
Testoni, Isabelle	Storage Heights In Dams: An Evaluation Of Input Forcing In-situ, Remote Sensing And Regional Climate Model Data	McCabe, M.
Thai, Derick	Time-domain Models For Soil-Structure Interaction Analysis	Birk, C.
Thien, Orsun Sung Lin	Validating a Carbon Footprint Simulation for Sustainable Wastewater Treatment Plant Design	Rowley, H./ Khan, S.
Tou, Ying Hao	A Review And Discussion On Creep Laboratory Tests In Soil Mechanics	Khoshghalb, A.
Tran, Maria	Determining The Sources In End-Member mixing: A Bayes-ic Framework	Andersen, M.
Truong, Thomas	Risk And Opportunities Associated With Using 'Incomplete Construction Drawings' On Fast Tracked Design And Construct Projects.	Davis, S.
Truong, Warren	Numerical Modelling Of Scalar Wave Propagation In Unbounded Domains	Birk, C.
Ung, Veronica	Reliability and On-Time Performance of Buses in Sydney	Vandebona, U.
van den Brink, Chantelle	Social Networking Analysis: Understanding the Relationship Between the Direct and Root Causes of Defects	Han, S.
Waddington, Peter	Spatial Modelling of Electric Vehicle Uptake in the Greater Sydney Area	Waller, T. / Gardner, L.
Walton, Brendon	Hydrodynamic Pressure Fluctuation Within Rock Fissures	Peirson, W.
Wan, Wing Kin	Internal Fracture Analysis of Bars With Uncertainty But Bounded Parameters	Gao, W.
Wanasinghe, Isuru	Exotic Financial Options	Carmichael, D.
Wang, Jieqiao	Shear Strength of Fibre Reinforced Clay	Taiebat, H.
Watson, David	Experimental Pumping Test: Groundwater – Surface Water Interactions	Andersen, M.
Weng, Shiya	The Material Flow Analysis of Carbon in Australia in 2008-2009	Moore, S.
Wickramasinghe, Manod	Emergency Transport Systems in the Balmain Peninsula	Vandebona, U.
Wilson, Brachy James	Interdisciplinary Greenhouse Gas Assessment – Nitrous Oxide Emissions from Marine Wastewater Disposal	Short, M.
Wong, Rebecca	A Simple Method for Predicting Settlements of Foundations Under Eccentric Loading	Taiebat, H.
Xu, Weili	From the Federation Square to Fractal Structure	Attard, M.
Xu, Xiao	Evaluation Of Stress Intensity Factors By Coupling FEM And SBFEM	Song, C.
Yeung, Benjamin	Retaining Walls in Unsaturated Soils	Russell, A.
Yoesman, Monita Fandy	Modelling Static Liquefaction on Tailings Dam	Khalili, N.
Yoh, Li Jie	Characterization of Organic Matter Removal by Membrane Filtration Using Fluorescence Spectroscopy.	Khan, S./ Henderson, R.
Young, Michael Norman	Testing the Ability of Raman-Spectra FIber Optic Distributed Temperature Sensing to Detect Temperature Changes Caused by Groundwater Inflow	Andersen, M.
Zhai, Tianqi	Randwick Hospitals Travel Characteristics and Car Parking Demand Study - A Project Case Study	Waller, T./ Dixit, V.
Zhang, Liyang	Calibration For Rain Gauge Data Using Radar Data	Sharma, A.
Zhang, Ruxi	Non-Deterministic Limit Analysis Of Structures With Probabilistic Uncertainty	Gao, W.
Zhao, Haowei	Cyclonic Inland Penetration Length Estimation Using Bayesian Statistical Algorithms	Sharma, A.
Zhu, Xiao Chuan	Non-destructive Testing by Lamb Waves Using Scaled Boundary Finite Element Method and Artificial Neural Networks	Song, C.
Zographou, Diarne	Measuring Wave Transformation in the Surf Zone Using Light Detection and Ranging Technology	Blenkinsopp, C.

INDUSTRY AND COMMUNITY

UNSW AUSTRALIA

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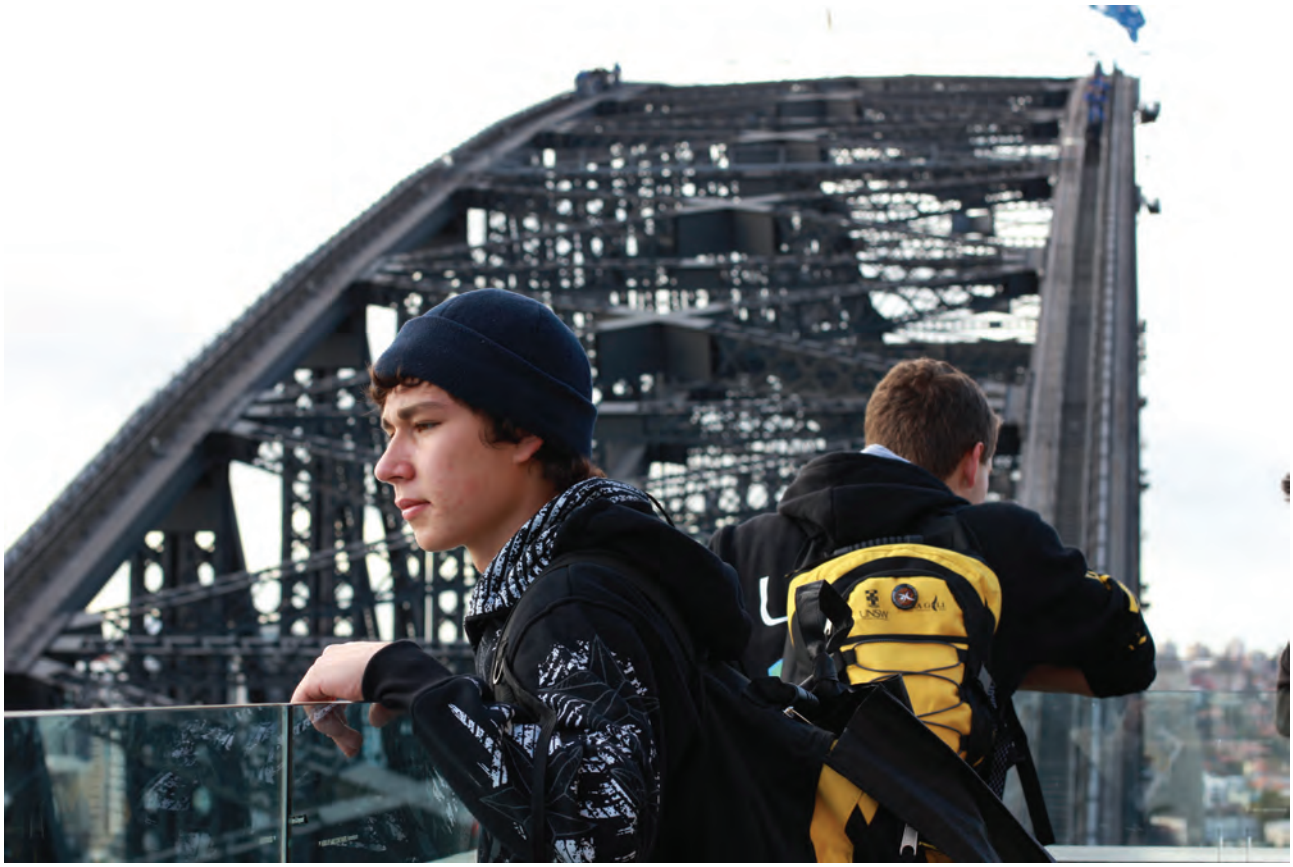
External Relations Committee Report 2012

Ron Cox	*Co-Chair*
Steve Davis	*Scholarships Officer*
Kurt Douglas	*Co-Chair*
Lauren Gardner	
Mary O'Connell	*External Relations Manager*
Hazel Rowley	
Tricia Tesoriero	*Special Projects Admin*

The strategic objectives of the External Relations Committee (ERC) of the School of Civil & Environmental Engineering include the development of effective outreach and marketing programs, and the building and maintenance of good relationships with industry partners and supporters, ex-staff and alumni. The Committee is made up of academic and administrative staff and liaises with the School's Industry Advisory Committee (IAC) which includes senior staff from major engineering companies and state bodies. The ERC also liaises with Faculty of Engineering marketing, scholarships and external relations staff.

ERC members represent and promote the School at many presentations and functions on and off campus. These include UNSW and Engineering Information days, High School visits, the Honeywell Engineering Summer School, Indigenous Australian Engineering Summer School, National Youth Science Forum, UNSW Nura Gili Winter School, (Indigenous students pictured on visit with Kurt Douglas and Faculty of Engineering staff to Sydney Harbour Bridge), UNSW Open Day and facilitating all day school visits with engineering studies lectures and experiments in labs, a program which has been developed for use with the HSC Engineering Studies 'Civil module' Syllabus.

The ERC also administers the Industry Partner Program and within that portfolio organises an annual Industry Partners Careers Market, Elite Student/Industry breakfast, Graduate Women Ambassadors program, and the Maths Primary Prize. The ERC also sponsored careers advisors attendance at the gala night of Sydney EA Engineering Excellence Awards held at the Westin on September 21, and liaised with industry sponsors in order to support the annual Fourth Year Dinner. An Industrial training – information for employers – brochure was also designed and produced in conjunction with the IAC. The ERC also successfully manages the provision of an external MEngSc in project management specially developed for staff within the Leighton Holdings group of companies - in Australia and overseas, and facilitated the visit in 2012 of Leighton CEO Hamish Tyrwhitt to speak to Year 3 students about life beyond university.



The Year 10 work experience bus tour, which was held in June is another clear IAC and ERC creative success. This year 40 students from 26 schools took part. The week's activities included a visit to Royal North Shore Hospital to look at a Thiess construction project, a trip to the Seacliff bridge and RTA road tunnel M5, the Water Research Laboratory, Centennial Park, Port Botany and the Kurnell coastal works and desalination plant as well as time at UNSW in the CVEN Design Studio working on bridge model constructions, and in the School's computer labs working on their daily reports.

A total of 41 primary schools participated in the CVEN Maths primary prizes while 47 new schools were engaged with the new Faculty sponsored prizes. All had been excellently administered by the School's Maths Prize Coordinator Ms Tricia Tesoriero. Members of the School's Industry Advisory Committee, School staff and some illustrious alumni presented the awards at end of year ceremonies, further raising the profile of the profession to hundreds of young people, their families and community. As ERC Co-Chair Ron Cox noted, we were the only university at the awards – the message of UNSW as a concerned and connected university was effectively reinforced at each presentation.

The ERC continues to develop the School's relationship with graduates through the Annual Report and the annual CVEN Alumni newsletter - distributed through the University's alumni magazine UNSWorld. Other School success stories reached all Faculty of Engineering alumni through UNSW Engineers alumni magazine, as the ERC works with both Faculty and UNSW media offices.

In 2012 the work of the committee was recognised by two awards. In November team members were honoured with The Faculty of Engineering's Professional Staff (Team) Excellence Award, for the innovative projects of the Maths Primary Prize and the Year 10 Work Experience Week. In December, the entire team was awarded the UNSW Staff Excellence Award (group) for Excellence in Community Engagement. In nominating the ERC, Professor David Waite, HoS, wrote: 'The ERC have been dedicated, motivated, highly professional, enthusiastic and endlessly creative in carrying out their strategic objectives - of raising the profile and building the connections of the School - and, indeed, have expanded and exceeded them. Their work has significantly benefitted the School, the Faculty and UNSW.

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

Industry Advisory Committee

The Industry Advisory Committee is an important means by which links between the School and industry are maintained. Members of the IAC are drawn from private sector, government and consultant organisations. Its main function is that of "sounding board" for the School in regard to undergraduate and graduate programs, and research directions.

The IAC membership represents a broad cross section of relevant industry sectors at a senior and influential level. Quite apart from specific initiatives, the opportunity for general interaction between the School and industry organisations is important both to the School and to the industries to which it relates, whether by means of formal quarterly meetings or by way of informal exchange of information, perspectives and views.

The IAC has also been the source of many initiatives aimed at maximising the standard of students making application for undergraduate and graduate programs. As a consequence, the School now reaches out to these groups in several practical ways including: Presentation of 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 as a means of increasing the understanding that careers advisers have of engineering.

Each of these means of outreach has received very favourable feedback from participants and the scale of each was increased in 2012.

Ian McIntyre
Chairman

Ian **McIntyre**
Principal, Evans and Peck

Ian McIntyre is the Group Contract Services Leader of Evans & Peck. As a consultant for the past 21 years, Ian has advised in relation to project delivery processes on a wide range of infrastructure, building and systems integration projects throughout Australia and South East Asia. His previous experience was in project management and construction engineering for a contractor on major civil engineering and multi disciplinary projects throughout Australia and in Hong Kong.

He is frequently retained in "trouble shooting", independent review and due diligence roles and has considerable experience in analysis of the reasons for project delivery problems, and of the factors which are typically associated with successful project delivery strategies leading to successful project outcomes. He is an experienced expert witness in relation to project performance issues. He is also a member of the Standards Australia Committee on General Conditions of Contract.

Deirdre **Agnew**
Student Careers Advisor
St Aloysius Kirribilli

Deirdre has worked in banking, insurance broking and market research in UK. She has also been employed in public relations/events manager role for international conferences at the University of the Witwatersrand. She taught at Hornsby Girls' High School, before moving into careers counselling. She spent fifteen years at St. Ignatius' College, Riverview and has been at St. Aloysius College at Milsons Point since 2005. Deirdre is also a director of Australian Careers Advice, a professional careers consultancy.

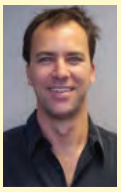
Samantha **Aston**
Senior Contracts Manager
Leighton Contractors

Samantha Aston has fifteen years experience in the construction industry in Australia and overseas and has a strong background in managing commercial matters on major building and civil engineering construction projects.

Samantha held the positions of Commercial Manager for the Leighton Contractors project Botany B9 Paper Mill, ($110mill) (2010-2012); Divisional Commercial Manager in the Leighton Offshore Oil and Gas Division (2008–2010) ; Commercial Manager for Leighton Engineering & Construction (2007–2008). She is currently Senior Contracts Manager at the Hansen Yuncken and Leighton Contractors Joint Venture in SA.

Stephen **Boss**
Regional Director NSW & QLD
Construction + Development
Brookfield Multiplex Limited

Steve Boss has worked in the construction industry for the past two decades. Promoted to Regional Director of Brookfield Multiplex in December 2006, Steve oversees a number of current projects, is responsible for all Queensland projects, is involved in construction planning and feasibility for future projects, oversees allocation of staff to projects in NSW and Queensland and carries out peer reviews on a selection of current major projects.



Adrian **Bull**
Senior Project Manager - Infrastructure Division
NSW Transport & Infrastructure

Adrian is a senior Project Manager in the Infrastructure Division of the NSW Government lead transport agency, Transport NSW. He currently manages the design activities of technical consultants working on infrastructure projects in the Metropolitan Transport Plan as assigned by the NSW Government. Prior to that he managed Hyder Consulting's structures function group in Sydney.

He has directed design teams in the technical and commercial aspects of a number of building and rail sector projects, managed the design of a number of Sydney CBD high rise developments, industrial projects in the UK, tunnels for the Taiwan High Speed Rail, Dubai Metro rail stations and Sydney Metro concept design.

Ian **Hosking**
NSW Regional
Manager AECOM

Ian is the NSW Regional Manager at AECOM and has more than 30 years of professional experience in ground engineering, geo-environmental engineering, professional practice management and major project alliances.

Previously Ian was the Industry Director – Infrastructure Services. In that role he assisted other business sector leaders in AECOM with the growth of their specialist teams across ANZ. Before joining AECOM, he held various senior technical and management positions, including Chief Operating Officer. He has a strong interest in developing people and teams, and at AECOM has enjoyed working with many talented graduates and managers in his role as Director for AECOM's Growing Professional Skills (GPS) program.

Andrew **Johnson**
Principal, ARUP

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 holistic building or structural solutions, and his experience designing and delivering projects in Australia, the UK, and around the world over 17 years includes collaboration with some of the world's leading architects on commercial, education, sport & leisure, industrial, retail, residential, and marine projects for both private sector and government clients.

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

Dr Kourosh **Kayvani**
Innovation Leader - Asia Pacific
Aurecon

Dr Kourosh Kayvani is Aurecon's global Head of Innovation. Over a 20+ year career, he played key roles in the design of many innovative and award-winning structures including Wembley National Stadium (Arch and Roof), London; the ANSTO OPAL Reactor Building, Lucas Height, NSW; and State Hockey Centre, Sydney Olympic Park, Sydney.

Kourosh has been listed in Engineers Australia Top 100 most influential engineers in 2009 in recognition of his Engineering Expertise. He is also a Laureate of the IABSE Prize awarded by the International Association for Bridge and Structural Engineering for his contribution to design of long span structures worldwide. Kourosh is a Fellow of Engineers Australia, a Director of Australian Steel Institute (ASI) and a Director of Association of Structural Engineers, NSW (ASCE).

David **Kinniburgh**
Manager Sydney Operating Centre
GHD

David Kinniburgh, BE (Civil) MIEAust CPEng MAICD, is the Operating Centre Manager for GHD's Sydney operations, responsible for business in Sydney, Wollongong, Dubbo and Orange. David has worked with GHD for more than 14 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 Tasmanian business and Victorian Manager for Transportation and Municipal Engineering.

A/Prof Garry **Mostyn**
Principal, PSM

Garry worked with the NSW Department of Public Works and with consulting geotechnical engineers from 1970 until 1986.He then joined the School of 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. 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 60 journal and conference papers. He has worked on major projects throughout Australia and in Thailand and PNG. He has been an active member of several national and international code and practice committees and been involved at the highest levels of the Australian Geomechanics Society and the International Society for Rock Mechanics.

Bruce **Munro**
Managing Director
Thiess

A civil engineer and School alumnus, with 36 years' experience in the construction and mining industries in Australia, SouthEast Asia and India, Bruce has held a number of senior positions within Thiess. These have included President Director of PT Thiess Contractors Indonesia– a role he held for eight years after his appointment in 1999. He was appointed Executive General Manager Asia in August 2007 and in January 2010 he took on the role of Thiess' Chief Executive Mining. Bruce has a long history with Thiess' parent company, Leighton Holdings, having worked with both Leighton Asia and Leighton Contractors.

Bruce is also on the Boards of the Minerals Council of Australia and Australian Constructors Association and Queensland Chair of the Australia Indonesia Business Council.

Col **Nicholson**
General Manager, Operations Division, Sydney Water

Col is the General Manager of Operations Division for Sydney Water Corporation. He manages the operation of Sydney Water's systems and processes including treatment plants, networks, telemetry and control systems and monitoring services. He also has teams providing specialist technical advice and managing energy supply, emergency management, security and the operational interface with regulators.

Les **Wielinga**
Director-General
Transport NSW

Les has been Director –General of Transport NSW since July 2009.Transport NSW is the state's main agency for public transport and roads in NSW, with responsibility for policy, planning and coordination, infrastructure delivery and asset management. He was previously Chief Executive of the Sydney Metro Authority and the NSW Roads and Traffic Authority.

IAC School Members

Professor T David **Waite**
Scientia Professor
Head of School

A/Prof Ron **Cox**
Co-Chair, External Relations Committee
Convenor, ACCARNSI

Dr Kurt **Douglas**
Co-Chair, External Relations Committee

Dr Mary **O'Connell**
Manager - External Relations

Industry Partners' Sponsored - CVEN Maths Primary Prize - Winners 2012

The UNSW Civil and Environmental Engineering Prize in Mathematics was an initiative of the School's Industry Advisory Committee, developed and managed by the External Relations Committee, to help address the problem of falling numbers and interest in maths and science in the early high school years. We wanted to find a way of communicating the practical value of maths and science to students prior to their high school years.

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

Forty-one NSW schools participated in the School's 2012 Maths Prize, and prizes were given to 114 students, of whom, pleasingly, nearly one quarter were girls. Our congratulations go to all the young winners. We hope to see them at UNSW one day.

Alexandria Park Community School
Cian Cameron-Gleeson
Ricky Li
Ben Snaea
Lucy Zheng

Avondale School of Higher Education
Cody Bailey
Hope Latu
Dominique McMahon
Nyah White

Balgowlah North Public School
India Rowe

Beecroft Public School
Alex Noh

Bellevue Hill Public School
Yianni Nicolaou
Ben Matsumoto

Belrose Public School
Ben Berry
Lachlan Clarke
Mitchell Cree
Skye Farquhar

Berowra Public School
Philip Meli
Aaron Munro
Natalie Storrie
Alodie Wheeler

Bilgola Plateau Public School
Tom Braund
Billy Ballico
Thomas Davies
Myles Pymble

Camdenville Public School
Ryan Li
Caillin Pauner

Cammeray Public School
Charlotte Beaumont
Leon Everett
Oscar Fevre
Robert Hunter

Campbelltown Public School
Agape Ah-Young
Sarah Al-Nakeeb
Maxim Bousargine
Iemaima Etuale
Visal Ken
Sorin Szabo
Shivanti Vinod

Carlton South Public School
Phillip Gorgijevski
Kane Qian

Chifley Public School
Andrew McCarthy

Cowra Public School
Ellis Hawker
Marcus O'Connor

Crescent Head Public School
Fergus Hanss
Blake Pietsch

Double Bay Public School
James Donato

Eastlakes Public School
Aris Ahmadi
Ubai Dahoud
Lillian Fletcher
Sanjida Islam

Harbord Public School
James Anthony
Allyson Campbell
Jesse Lilley
Hugo Pearson
Phoebe Tulk

Jasper Road Public School
Bob Chen
Kevin Lee
Hrishikesh Masurkar
Louise Wang

Kambora Public School
Kevin Carver
Breyton Chant
Jamieson Schramko
Jordan Stoddart

Kensington Public School
Joon Kim
Jack Lin
Kevin Tong
Phoebe Zeng

Loquat Valley Anglican Preparatory School
Juliette Di Bello
Matthew Hooker
Harrison Keys
Max Lo Certo

Manly West Public School
Casey Bolton
Jessica Luo
Oisin McMorrow-Dermody
Aidan Torpey

Mosman Public School
Anna Goodman

Mount Colah Public School
Corey Miller
Anderson Pendick
Errol Riezenkamp
Samantha Riezenkamp

Narrabeen North Public School
Robbie Caldwell
Daniel McKay

North Haven Public School
Jordan Mitchley
Luke Mudge

Northbridge Public School
Haeata Balfour-Ash
Alyssa Nogi

Northern Beaches Christian School
Ben Hutchison
Rhys Mackintosh
Joshua Yoe

Pennant Hills Public School
Ji-Yun Kim
Eleanor Lidbetter

Picnic Point Public School
Victoria Gao

Randwick Public School
Brandon Winsley

Roselea Public School
Jane Wang

St Joseph's Primary School
Joseph Atkins
Thomas Beauchamp

Tacking Point Public School
Byron Kipreotis
Diego Bovey Mendez

Toongabbie West Public School
Trishan Don Bernard

Turramurra Public School
Regan Fan
Callum Parsonage
Olivia Paton
Xiu Xiu Qi

West Pennant Hills Public School
Harrison Chudleigh
Nathan Ng
Thomas Rolinson
Seth Sweeney

Wheeler Heights Public School
Anna Dahlstrom
Jack Loadman
Carl Watson
Jenny Zeng

Wollondilly Anglican College
Noah Sarkis

Woollahra Public School
Kelvin Du
Ben Gurtala
Chen Zhang

Dear Professor Davies and Mr Allen,

Thank you very much for my UNSW Faculty of Engineering Primary School Prize in Mathematics. Although it was a huge surprise to receive this prize it was a great honour. My best friend's Dad was also very pleased. Firstly, because he studied civil Engineering but also because a girl won the award. He said when he was at University there weren't many girls doing Engineering. Hopefully awards like this one will encourage more girls in the future.

Thank you for making time to visit our school and I'm looking forward to spending my voucher at the ABC shop.

Yours sincerely

Emily

Emily van Dam
Year 6. Clovelly Public School.

It is exciting to hear of the wonderful opportunities open to girls nowadays. From from a personal perspective, the Primary Schools Maths Prize has been a very positive experience for my daughter by opening her eyes to alternative career options. It also let her fellow students know its 'okay for a girl to be good at and enjoy maths'!! The Maths Prize and Yr 10 Engineering Work Experience are fabulous initiatives- and always great to see girls involved in both.

Cheers
Steph

Stephanie van Dam

Thank you to our 2012 Industry Partners & Supporters:

AECOM
ANSTO
ARUP
Aurecon
Brookfield Multiplex Ltd
Cardno
Evans & Peck
Gary Johnston
GHD
Laing O'Rourke
Leighton Contractors
Leighton Holdings
Macmahon Contractors
NSW Water Solutions, NSW Public Works
Parsons Brinckerhoff
Pells Sullivan Meynink Pty Ltd
Permathene Australia
RMS
Sinclair Knight Merz Pty Ltd
SMEC Australia
State Water
Sydney Water
Taylor Thomson Whitting
URS Australia
Worley Parsons

Annual Report 2012 Industry Partners and Supporters

The School has strong active links with industry and is very committed to continuing and developing these strong ties. Our Industry Partnership Program (IPP) allows for the opportunity to further develop the productive relationship between the School, its staff, students and industry.

Money raised through the IPP is administered by the School's External Relations Committee and is used for the purpose of raising the profile of the School and the engineering profession - as well as developing ways for our current students to interact with industry partners.

The annual Industry Partners Careers Market is therefore an important School activity, where industry representatives meet with Year 3 and Year 4 students. This event has proved of major value to industry in identifying students for industrial training placements or graduate employment. We also host the Elite Student Breakfast at Botanic Gardens where our top students engage with industry representatives in a more relaxed setting.

Industry partners and supporters are also invited to the annual Year 4 dinner where many companies provide prizes for outstanding fourth year students. Other industry supporters provide scholarships for students. Industry Partners are also invited to the School to give technical lectures within various classes and to provide talks and information on various career opportunities for our students.

Acknowledgement of Industry Partners is made through the School website, and in the widely distributed Annual Report. For Industry Partners only, we can also directly email career information to all relevant undergraduate and postgraduate students.

Raising their profile with the staff and students of the School is just one beneficial aspect of industry partnership. Industry Partners and Supporters are also invited to School research seminars, honours thesis seminars and postgraduate research poster forums. This provides industry with the opportunity to get current with the frontier of engineering knowledge. In recent years some industry partners have actively invested in extending

Iain Scoular, Leighton Holdings General Manager, Project & Group Services, front and centre - group of Leighton and other CVEN student scholarship holders.

the reaches and uses of engineering and scientific knowledge and research. Several School academic positions are currently funded through the generosity of industry including:

The **Australian Nuclear Science and Technology Organisation** (ANSTO) - a public research organisation - provides funding support for a Senior Research Fellow (currently Dr Atsushi Ikeda) at the School's Water Research Centre whose work on trace element (metal, metalloid and actinide) environmental chemistry – aims for aquatic and soil remediation.

Evans & Peck - an international infrastructure-based advisory company –established a new Chair in 2010 - the Evans & Peck Professor for Transport Innovation. Professor Travis Waller now leads a new and expanding Faculty–wide Research Centre for Integrated Transport Innovation (RCITI) based in the School.

Gary Johnston provides funding support for the Gary Johnston Professor of Water Management, a joint Chair between the School of Civil and Environmental Engineering and the School of Biology, Earth and Environmental Sciences (BEES) in the Faculty of Science, which is held by the School's groundwater expert Professor Ian Acworth.

Pells Sullivan Meynink Pty Ltd, a high profile firm of specialist geotechnical consultants, provide funding support for the position of Pells Sullivan Meynink Senior Lecturer of Rock Mechanics, Dr Kurt Douglas.

New research with industry:

Industry Partners are always very welcome to discuss new research projects with us. In 2012 our industry and government-related research income totalled over $15.56m, involving over one hundred partnering organisations from private industry, public utilities, and all levels of government.

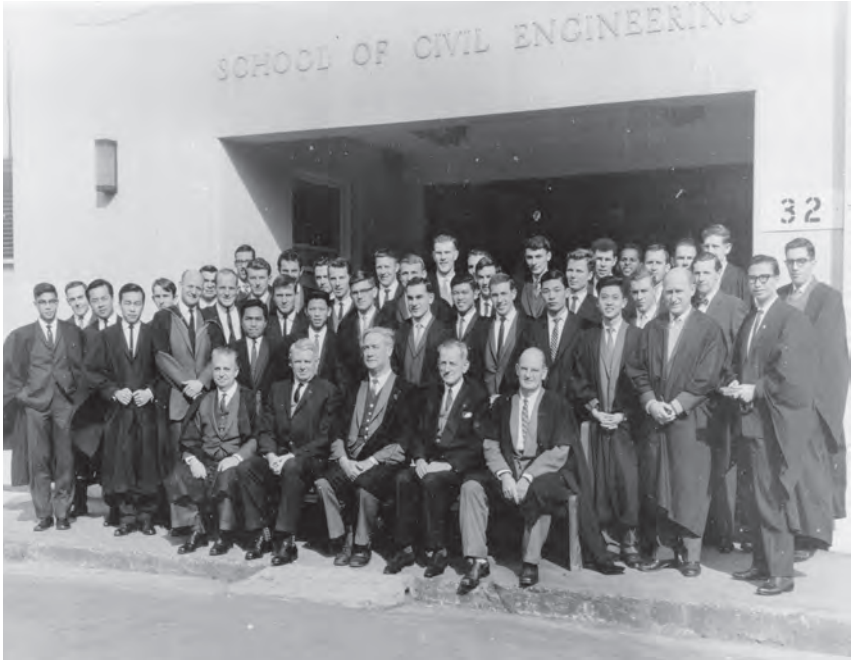
Golden Graduates

May saw a day of joyful reminiscing as the Faculty of Engineering graduates of 1962 celebrated 50 years since graduation.

Guests spent the day rekindling friendships and exploring the campus as they were welcomed back for the Golden Jubilee luncheon. The event began with a morning tea, followed by a campus tour and then a formal lunch where the attendees relived their graduation when Professor Wai-Fong Chua (Pro-Vice Chancellor of Students) presented them with a commemorative UNSW pen. Guests were also treated with a book on the history of the UNSW Faculty of Engineering, while civil engineering alumni scored twice – with a copy of their very own School history.

The campus tour was a highlight of the day and included a stop at the Council Chambers at the Chancellery and an exclusive insight, including roof access, into the newest development of the Faculty - the Tyree Energy Technologies Building.

Lunch followed the campus tour where guests enjoyed a two-course lunch in the Tyree Room at the John Niland Scientia Building. John Carrot Moran gave a speech – we wonder if that is the legendary Munro Cup he is wielding.



VALE

Dr Samia Guirguis (1948 – 2012) was the first woman to complete a PhD in Civil Engineering in Australia and she did it in the field of Concrete Technology at UNSW. She then went to work with the Cement and Concrete Association of Australia and was active on many code committees. Samia made a very significant contribution to the structural engineering profession throughout her career. She was awarded the 2011 John Connell Gold Medal in recognition of that fact.

Civil Treasures

The ERC maintains positive links with ex-School staff through organising regular annual functions for the 'Civil Treasures.' We aim to stay connected with our elders, and all those who have built the School into the powerhouse of research, teaching and engagement with community which it is today.

Industry & Technical Reports 2012

Badenhop, AM, Wasko, CD, & Timms, WA 2012, Namoi Groundwater Mapping and Transition Zones.

Blacka, MJ, & Flocard, F 2012, Coastal Adaptation and Protection Options for Port Sorrell and Shearwater.

Blacka, MJ, & Farrelly, B 2012, ICHTHYS LNG Plant Revetment Physical Modelling, Darwin Harbour.

Blacka, MJ, Davey, E K, & Carley, JT 2012, Investigation of Roches Beach Protection Works.

Coghlan, IR, Ruprecht, J, & Blacka, MJ 2012, Abbot Point MCF 2D and Q3D Baseline Modelling Study.

Collins, RN, Yvanes-Giuliani, Y, & Stroud, J 2012, Exploiting Natural Processes to Effectively Remediate Acidified Coastal Environments, ARC Linkage Project LP110100480, Annual Progress Report for 2011.

Flocard, F, Shand, TD, & Carley, JT 2012, Port Fairy Wave Power Resource Analysis.

Flocard, F, & Blacka, MJ 2012, Seawall Assessment Literature Review.

Glamore, W, Wasko, CD, & Smith, G 2012, Rehabilitation of Yarrahapinni Wetlands National Park: Hydrodynamic Modelling of Tidal Inundation.

Glamore, W, & Davey, E K 2012, Riverbank Vulnerability Assessment of the Seaham Weir Pool.

Maddock III, T, Baird, K, Hanson, RT, Schmid, W, & et al, 2012, RIP-ET: A Riparian Evapotranspiration Package for MODFLOW-2005. [201254149]

Mariani, A, Carley, JT, Lord, DB, & Shand, TD 2012, Identification of Coastal Hazard Risk Areas to Projected Sea Level Rise for the Manly Local Government Area.

Mariani, A, & Carley, JT 2012, Manly LGA Seawall Risk Assessment and Plan for Priority Upgrade/Replacement.

Mariani, A, & Coghlan, IR 2012, Seawall Structure Assessment at Bilgola and Clontarf, Sydney, NSW .

Miller, BM, & Tarrade, L 2012, Manning River Saline Dynamic Modelling.

Miller, BM, & Badenhop, AM 2012, Peer Review of Camden Gas Project Groundwater Investigations.

Ng, TS, Htut, TN, & Foster, SJ 2012, Fracture of steel fibre reinforced concrete the unified variable engagement model.

Rayner, D, Miller, BM, Flocard, F, Ruprecht, J, & et al, 2012, Brooklyn and Dangar Island Outfall Dilution Study: 3rd and 8th May 2012.

Rayner, D, Carley, JT, & Coghlan, IR 2012, New Brighton Beach Scraping Trial: Analysis of Dune and Beach Profile Data.

Ruprecht, J, & Blacka, MJ 2012, Gladstone Tug Berth Marina Physical Modelling.

Ruprecht, J, Shand, TD, & Miller, BM 2012, Melville Bay - Wind Hindcasting.

Shand, TD, Wasko, CD, Westra, SP, Smith, G, et al, 2012, Joint Probability Assessment of NSW Extreme Waves and Water Levels.

Shand, TD, Carley, JT, Smith, G, & Peirson, WL 2012, Review of Storm Surge and Coastal Inundation Modelling.

Smith, G, & Wasko, CD 2012, Throsby Creek Dredging: Flood Assessment.

Timms, WA, Ruprecht, J, & Greve, A K 2012, Hydraulic Conductivity Testing of Drill Core - Broken Hill MAR.

Timms, WA, Rahman, PF, & Hartland, A 2012, Hydraulic Conductivity Testing of Drill Core - Stuart Shale .

Timms, WA, Rahman, PF, McGeeney, DE, & Whelan, M 2012, Hydraulic Conductivity Testing of Drill Core - Surat Basin.

Wang, X, & Parcsi, GP 2012, Identification of Odorants from Leachate Dam and Leachate Pipe of Blaxland Landfill.

OUR RESEARCH CENTRES

Research at Civil and Environmental Engineering

UNSW AUSTRALIA

Never Stand Still | Faculty of Engineering | School of Civil and Environmental Engineering

CIES

Centre for Infrastructure, Engineering & Safety

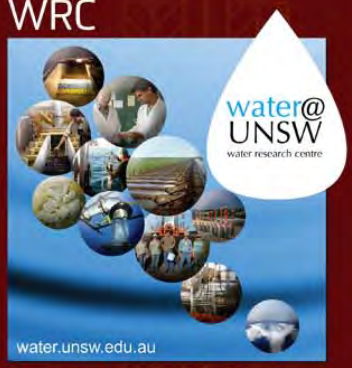
CWI

Connected Waters Initiative

rCITI

Research Centre for Integrated Transport Innovation

WRC



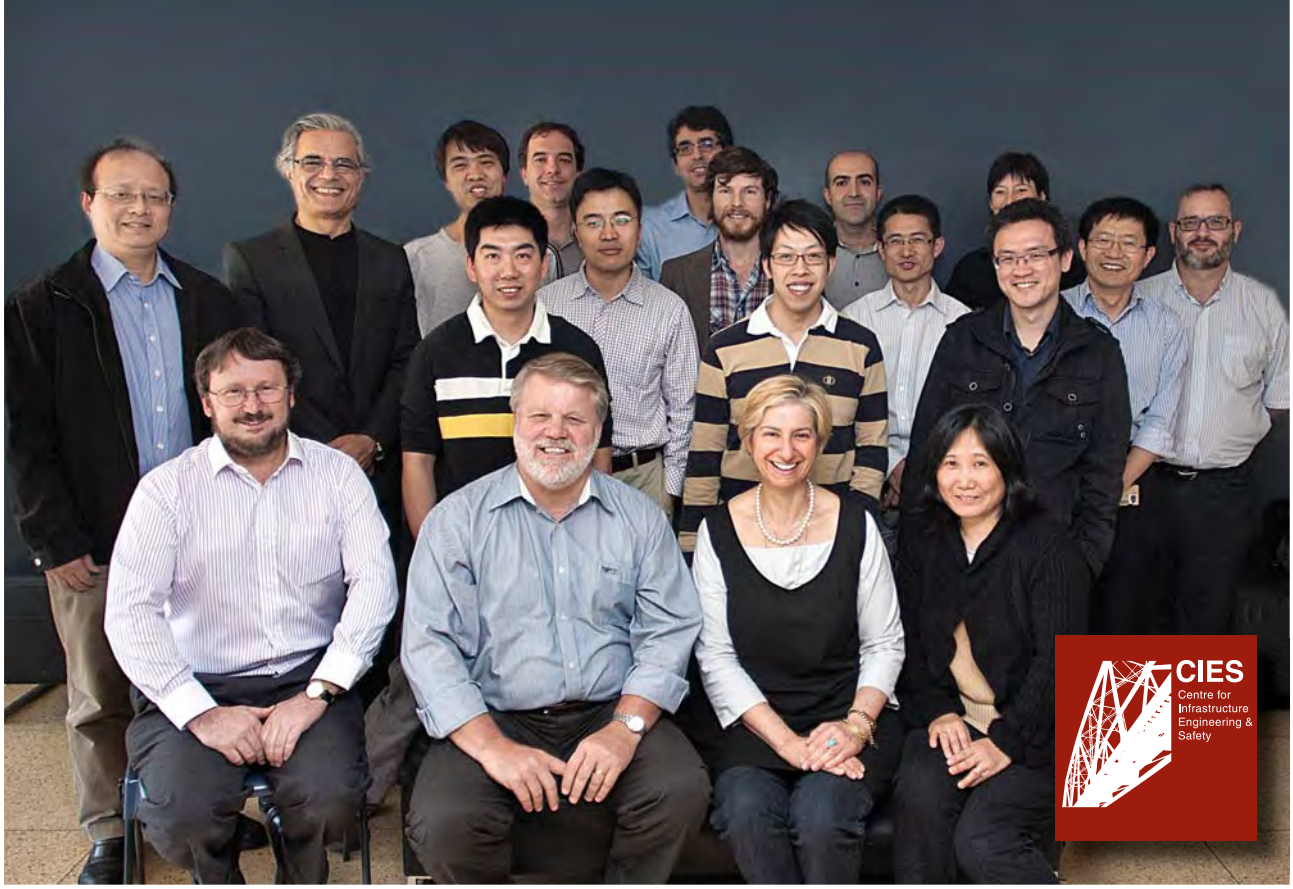
The Water Research Centre

ECM

Engineering Construction and Management

ACCARNSI

The Australian Climate Change Adaptation Research Network for Settlements and Infrastructure



CIES

Centre for Infrastructure Engineering and Safety

- Provides a forum for research engineers and scientists from various disciplines to exchange ideas and to develop and lead collaborative research programs.
- Provides a platform for the submission of nationally peer-assessed research grant funding and for the development of proposals for research funding from industry.
- Promotes the application of research outcomes and deliverables to industry.

Our Vision

As an internationally recognised research centre our vision is to provide outcomes that improve the design, construction and maintenance of economic, effective and safe civil engineering infrastructure that enhances the quality of human life in a sustainable way.

In 2012:

- The Centre managed over $2.0 million, with 1.5 million derived from competitive ARC Discovery and Linkage grants;
- Our researchers published 4 book chapters, 76 refereed journal papers and 51 refereed conference papers;
- We had 29 research staff and 42 PhD research students

Our Expertise

The Centre for Infrastructure Engineering and Safety is focused on high-level research in structural engineering, geotechnical engineering, engineering materials and computational mechanics. Specifically, we apply our skills to engineering and safety assessments and to the risk management of buildings, bridges, dams, roads and other infrastructure when subjected to both in-service conditions and overload (or limit) conditions, such as may occur in fire, earthquake, cyclone or blast situations, or when structures are exposed to hostile environments. In addition, CIES aims to promote multi-disciplinary collaboration and we actively collaborate with researchers in the fields of mechanical engineering, surveying and remote sensing, and the UNSW Faculties of Science and the Built Environment.

The Structural Engineering Research Group within CIES undertakes applied and fundamental research in all aspects of structural infrastructure engineering. It is the highest profile research group in the field nationally and the group's research drives changes to national and international Standards and design practice. It is supported by state-of-the-art equipment and the largest heavy structures laboratory in Australia.

The Geotechnical Engineering Group within CIES leads the profession in developing an understanding of the basic mechanics of soil behaviour under different moisture conditions and are modelling and developing practical applications that feed into design codes. The improved design procedures lead to less uncertainties, increased safety and more economical use of construction materials and space.

CIES Research Update

Innovative and advanced building systems

CIES Director of Research and Founding Director Scientia Professor Mark Bradford is leading research in the areas of innovative and advanced building systems. A research project entitled "An innovative and advanced systems approach for full life-cycle, low-emissions composite and hybrid building infrastructure" is funded by the Australian Research Council through a prestigious Laureate Fellowship awarded to Professor Bradford. For more details see p10 in the Big Picture section of this Report.

Building materials of the future - Reactive Powder Concrete (RPC) Columns.

CIES researchers have completed a series of tests in the Heavy Structures Laboratory at Randwick to improve our understanding of high-performance concrete columns that are subjected to impact loading - more particularly, that of high strength concrete (HSC) and reactive powder concrete (RPC) columns that are subjected to the combined effect of impact and axial forces.

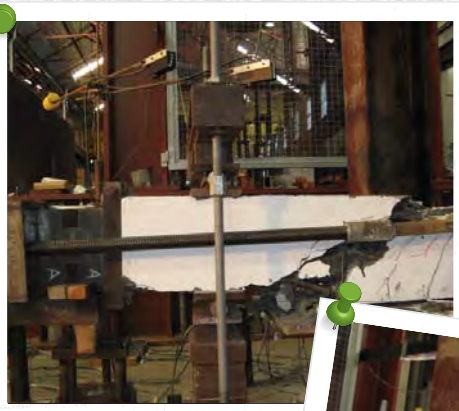
Reinforced concrete structures during their construction stage and service life may experience severe loadings such as impact and blast. The behaviour of reinforced concrete structures under such high rate loading is not thoroughly understood and the conventional design guidelines for these structures are mostly empirical.

In the first part of the research, an experimental program was conducted to consider the effect of axial force, loading eccentricity and the use of steel fibre reactive powder concrete, as a replacement for conventional strength concretes, on the impact performance of concrete members. The program included tests on 16 specimens with three types of columns and beams: HSC, RPC, and HSC core and RPC shell. In the second part of this research, the experimental tests were used to validate a numerical model based on the software LS-DYNA and the model then extended to consider the effect of higher axial forces in a parametric study.

Research outcomes: The experimental results showed that axial force and its eccentricity has a significant influence on both the impact performance and the failure mode. The degree of influence was dependent on the magnitude of the axial force and its eccentricity. The RPC specimens exhibited a better impact performance with smaller mid-span displacements and sustained a greater number of impacts to failure compared to the other types of columns tested.

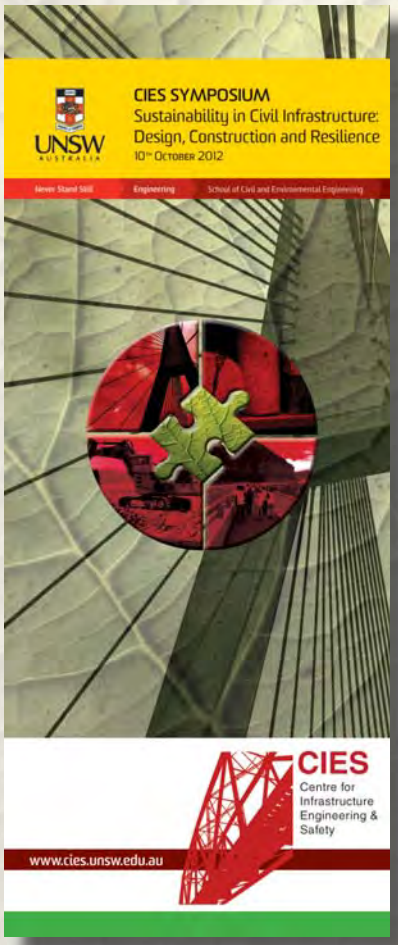
Numerical results showed that using reactive powder concrete provides significant enhancement for the impact resistance of members compared to the high strength concrete. They also show that axial force and its eccentricity cannot be ignored when assessing the impact resistance of a member as they influence both the resistance during the impact and the residual residual capacity of a member to withstand static axial loads after impact without collapse.

1. Test set up



2. Test results HSC column

2. Test results SFR column



2012 CIES Symposium

On 10th October 2012, CIES held its second Symposium. The revised format for the event and its underlying objective, was to enhance the research profile within the local construction industry and to showcase research activities of the Centre. It is planned that this will be the first in a series of such events to be held annually.

The theme for 2012 focussed on "Sustainability in Civil Infrastructure: Design, Construction and Resilience" with an impressive line up of international and national leaders in the field of Sustainable Infrastructure research and practice.

On offer to our industry participants as well as academic colleagues was the opportunity to review trends in infrastructure sustainability - to keep abreast of current and future developments and opportunities; to network with leading researchers and professionals, as well as providing inspiration and opportunities for collaboration on future research projects

The presenters included Professor David Nethercot (Imperial College London), Professor Jin-Guang Teng (The Hong Kong Polytechnic University), Professor John Wilson (Swinburne University of Technology Melbourne), Professor Robert Melchers (University of Newcastle), Professor Michael Neuman (UNSW), Professor Brian Uy (UWS), Professor S. Travis Waller (UNSW).

CIES Director Professor Steve Foster and Research Director Professor Mark Bradford were also speakers at the Symposium. Deputy Director Professor Ian Gilbert chaired a number of the sessions as well as a very stimulating panel discussion which involved all of the day's speakers and provided a very thought provoking conclusion to the day's proceedings

As part of promoting the Centre, this event provided an excellent opportunity to showcase our PhD students' research activities by way of poster display for each of their research projects.

CIES – Arnaud Castel - further "cementing" our expertise in concrete structures


Associate Professor Arnaud Castel

Associate Professor Arnaud Castel joined CIES from the University of Nice-Sophia Antipolis (UNS) in September 2012 bringing with him his internationally recognized expertise in the areas of concrete technology and concrete structures.

Arnaud is an expert in the durability of concrete structures in aggressive environments, life cycle assessment and sustainability of structures.

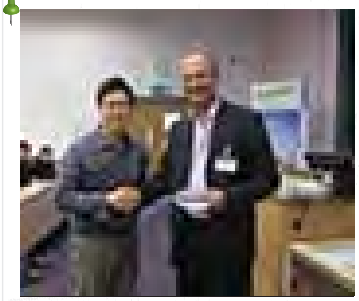
Prior to joining CIES as a full-time member of the academic staff, A/Prof Castel had spent a full year sabbatical at UNSW within CIES (2010-2011), collaborating on two existing research projects with CIES researchers. Arnaud's appointment will facilitate growth in both the breadth and depth of CIES research and will greatly enhance the capability of CIES in the development of solutions to the provision of durable and sustainable infrastructure in Australia.

The performance of modern structures is also influenced by problematic material attributes that can compromise the safety and appearance of structures, such as the low permeability of some concretes and the resulting chloride infusion that may lead to corrosion of reinforcement. A/Professor Castel is an internationally respected scholar in these areas. Assessing the ramifications of the impacts of extreme actions on structures and accounting for the problematic attributes of modern construction materials are relatively recent research areas that will be of increasing importance for structural engineering research over the coming decades.

L-R: Dr Rob Heywood - Deputy Chair of the Structural College & Professor Mark Bradford

John Connell Gold Medal awarded to Scientia Professor Mark Bradford

CIES Director of Research and Founding Director, Scientia Professor Mark Bradford, has been awarded the John Connell Gold Medal by Engineers Australia's Structural College for 2012. The John Connell Gold Medal is awarded to an eminent structural engineer who has made a significant contribution to the standing and prestige of the structural engineering profession. Professor Bradford's medal was presented by Richard Eckhaus, Chairman of the Structural College of Engineers Australia, at the Australasian Structural Engineering Conference in Perth. Professor Bradford was also one of the three keynote speakers at the Conference, his presentation was entitled 'Innovative applications and behaviour of composite slabs with deep trapezoidal sheeting', which was based on research work undertaken in two ARC Linkage Grants awarded to Professors Ian Gilbert, Stephen Foster and himself, and supported by BlueScope Lysaght, BOSFA, Fielders Australia and Prestressed Concrete Consultants Pty Limited.



Dr Michael Man (left) with Prof Carlo Sansour, President, ACME –UK.

Dr Michael Man awarded the prestigious Mike Crisfield Prize

Dr Michael Man, a Research Fellow in the Centre for Infrastructure Engineering and Safety (CIES) at the School of Civil and Environmental Engineering, was awarded the prestigious Mike Crisfield Prize at the 20th Annual Conference on Computational Mechanics (ACME) in Manchester, UK 2012.

Michael presented his paper titled "A Semi-Analytical Technique for Plate Bending Analysis with Pade Expansion" (The co-authors of the paper are Chongmin Song, Wei Gao and Francis Tin-Loi - all of CIES). The development of this new technique has so far led to two A* international journal publications. The continuous extension of this technique assures to bring a highly accurate and efficient numerical tool to the analysis and design of smart composite structures under static and dynamic actions.

CONNECTED WATERS

The Connected Waters Initiative Research Centre (CWI) is UNSW's Groundwater Research Centre. The CWI is a cross-faculty research grouping. At the start of 2012, staff were based in the Schools of Civil and Environmental Engineering and the Biological, Earth and Environmental Sciences. However, new appointments within the year saw the CWI extend its post-doctoral, professional and academic staffing to the School of Mining Engineering, the Mark Wainwright Analytical Centre, and UNSW Law. Groundwater research at UNSW now has a truly multi-disciplinary team.

Our research in 2012 focussed on our two largest and on-going research grants. Within the Australian Research Council and National Water Commission co-funded Centre for Excellence for Groundwater Research and Training (NCGRT), we reached and maintained full staffing capacity throughout 2012. The NCGRT provided approximately $6.9M funding for the training of Honours, PhD and post-doctoral researchers from 2009 to 2014. In 2012, $1.5M of funding was available and supported our post-doctoral, PhD and Honours team across the University. As well as supporting salaries and scholarships, the NCGRT team made numerous presentations of their research findings at the International Association of Hydrogeologists Congress in Canada and the American Geophysical Union Fall Meeting in San Francisco. The NCGRT also supported a workshop investigating 'Heat as a Groundwater Tracer' at UNSW, led by Martin Andersen, and the attendance of all NCGRT supported staff at the annual NCGRT Summer School, this year held at the Shine Dome in Canberra.

The second significant research grant managed by CWI throughout 2012 is the DIISRTE Groundwater Education Investment Fund (GEIF), supporting $15M of groundwater infrastructure over the period 2010 to 2013 for the establishment of long term monitoring sites for groundwater research. In 2012, $4M of investment was made at research sites within NSW, Victoria, South Australia, Queensland and the Northern Territories. Within NSW, research focussed on the completion of the major infrastructure program at the UNSW Wellington Field Station and the Namoi Valley and saw the commencement of a new infrastructure program at the UNSW Fowlers Gap Field Station.

2012 saw the successful completion of two major research projects: the Cotton CRC project: ***The impact of climate change on surface water groundwater resources: Maules Creek case study*** and the New South Wales Office of Water project: ***Anna Bay Coastal Groundwater***. One new research project commenced: Drs Gabriel Rau and Martin Andersen were successful co-applicants for an EU grant (BARDEX-II, headed up by Plymouth University, UK) together with Dr Ian Turner (WRL) which enabled them to visit the Deltares Flume in the Netherlands for 5 weeks in May-June to conduct heat and solute tracing experiments in a full-scale coastal sand barrier.

Several members of the CWI team moved on to new and exciting careers in 2012. We would like to congratulate Dr Wendy Timms who joined the School of Mining Engineering at UNSW, Dr Joshua Larsen who joined the School of Geography, Planning and Environmental Management at the University of Queensland, Dr Adam Hartland, who joined the Department of Chemistry at the University of Waikato, and Dr Anna Greve, who joined Xstrata Copper as a hydrogeologist.

In September 2012, Ian Acworth stood aside from his position as Director, after six years of leading groundwater research at UNSW, firstly setting up the Connected Waters Initiative group (2006-2009) and then the Connected Waters Initiative Research Centre (2009-2012). The new team of Andy Baker (Director) and Martin Andersen (Associate Director), with the support of Tony Woo (Manager), aim to continue to build the groundwater research portfolio at UNSW. Ian remains at the front of the Centre's infrastructure program, with exciting news at the end of 2012 that the CWI had been successful in obtaining extension funding for the Groundwater Education Investment Fund.

rCITI – Research Centre for Integrated Transport Innovation

The Research Centre for Integrated Transport Innovation (rCITI) represents a strategic effort with research and industry partners (including NICTA and Evans & Peck) that unites and substantially augments the wide range of transport research across campus.

Since its launch in November 2011, rCITI has continued to expand and strengthen its network across campus and with relevant government and industry. Key achievements for 2012 include the signing of an Umbrella Deed with the NSW Government Roads and Maritime Services (RMS), as well as a Memorandum of Understanding with GoGet, the car share company and Better Place, an electric car charge network; and the award of a 2013 Australian Research Council (ARC) Linkage Infrastructure, Equipment and Facilities (LIEF) Grant for a world-first driving simulation laboratory.

The NSW Minister for Transport, The Hon. Gladys Berejiklian visited the School of Civil and Environmental Engineering in March for a presentation about the Research Centre for Integrated Transport Innovation (rCITI). Professor Travis Waller's overview of rCITI was followed by discussion with the Minister. Attendees at the Minister's visit included delegates from UNSW such as Professor Graham Davies (Dean, Faculty of Engineering), Professor Les Field (Deputy Vice-Chancellor, Research), Professor T. David Waite (HoS, Civil and Environmental Engineering), and Professor Nasser Khalili (Associate Dean, Research), as well as representatives from Evans & Peck (Mr Ian McIntyre and Mr Paul Forward, Principals) and NICTA (Mr Rob Fitzpatrick, Director, Infrastructure, Transport & Logistics).

Ms Berejiklian was pleased with the university's efforts and the creation of a Transportation Research Centre and is looking forward to opportunities for cooperation. During her visit, Ms Berejiklian appointed Professor Waller an invited member to the Transport Specialist Advisory Group for Transport for NSW.

rCITI staff held numerous other governmental meetings in 2012, including with Mr Mike Mrdak, Secretary at the Department of Infrastructure, Transport, Regional Development & Local Government who invited Professor Waller for discussions with him and his team to Canberra.

Professor Waller and Dr Dixit from rCITI, Professor Dennis Del Favero, Director of the UNSW iCinema Research Centre for Interactive Cinema, jointly with Professor Bliemer from the University of Sydney, have been awarded a 2013 Australian Research Council (ARC) Linkage Infrastructure, Equipment and Facilities (LIEF) for a driving simulation laboratory, the Travel Choice Simulation Laboratory (TRACSLab). TRACSLab is a world-first facility to observe collective travel choice in a realistic lab environment. It is unique due to the focus on travel choice, networked interaction and strong teaming. The findings of the lab will support a new generation of transport analysis techniques for emerging issues such as sustainability, reliability, and ITS.

rCITI lead an international consortium (including Monash, IIT Delhi, IIT Madras, NICTA, DIMTS, CRRI and GoGet) for an expression-of-interest (EOI) submission on "Integrated Network Planning Methodologies for the Sustainable Convergence of Transport and Energy", to the Australian Government Department of Industry, Innovation Science, Research and Tertiary Education for the Australia-India Strategic Research Fund (AISRF) Grand Challenge. The EOI was successful in the pre-proposal stage and the team was invited to submit a full application. The outcome will be announced in 2013.

In October, Dr Taha Hossein Rashidi from the University of Toronto, Canada, joined the Centre's core academic team

Planning ITS Communications Infrastructu

Ms Sylvia Brohl (rCITI, Centre Officer), Mr Rob Fitzpatrick (Director, Infrastructure, Transport & Logistics at NICTA), Dr Upali Vandebona (Senior Lecturer), Dr Lauren Gardner (Lecturer), Professor S. Travis Waller (Director, rCITI), Dr Vinayak Dixit (Senior Lecturer), NSW Minister for Transport, The Hon. Gladys Berejiklian, Professor Graham Davies (Dean, Faculty of Engineering), Professor Les Field (Deputy Vice-Chancellor, Research), Mr Ian McIntyre (Principal at Evans & Peck), Professor T. David Waite (HoS, Civil and Environmental Engineering), Professor Nasser Khalili (Associate Dean, Research), Mr Paul Forward (Principal at Evans & Peck)

and was welcomed by Centre Director Professor S. Travis Waller, Senior Lecturer Dr Upali Vandebona, Senior Lecturer Dr Vinayak Dixit and Lecturer Dr Lauren Gardner. Dr Rashidi's research expertise compliments rCITI's research efforts in key areas, including land-use and vehicle ownership models, as well as goods movement data collection and modelling methods.

At the same time, Visiting Fellow Dr Hironobu Hasegawa joined the transportation group from the Akita National College of Technology. Dr Hasegawa will work with rCITI on a variety of research areas, including his key expertise in applications of machine learning and data mining algorithms in the field of transportation. In particular, he is currently collaborating on the development of a micro-simulation travel demand model for the City of Melbourne.

Professor Waller has attended and been invited to present at a variety of conferences this year. He participated in TRB (Transportation Research Board 91st Annual Meeting, Washington D.C), presenting research contributions and chairing several TRB Committee Meetings. In addition, he gave an invited talk at the Intelligent Transport Systems (ITS) Workshop at Beijing Jiaotong University in May and was a plenary speaker at the 17th International Conference of the Hong Kong Society for Transportation Studies (HKSTS) in Hong Kong in December.

The 4th International Symposium on Dynamic Traffic Assignment (DTA) took place on Martha's Vineyard in June and was co-organized by Professor Waller, who also presented new developments in the field of DTA including better methods for addressing day-to-day volatility in traffic flow within the transport planning process.

In December, Professor Waller was invited to Japan to participate in an exclusive meeting of the National Institute of Informatics (NII) on "Social Issues in Computational Transportation Science". The meeting consisted of research leaders spanning computer science, big data, transport engineering, and urban planning with the aim of identifying emerging themes and cutting-edge concepts which impact numerous adjacent domains.

Throughout the year, rCITI has also attracted and welcomed a variety of guest speakers to the School for relevant research seminars. Visitors and seminar topics included Associate Professor Karen Smilowitz of the Department of Industrial Engineering and Management Sciences at Northwestern University ("Transportation and logistics models in non-profit settings"), Professor Lisa Rutstrom from Georgia State University ("Experiments on Driving Under Uncertain Congestion Conditions"), Dr Majid Sarvi from the Civil Engineering Department at Monash University ("Crowd Safety under Panic Conditions: Linking Non-human Biological Organisms to the Development of a Crowd Dynamic Model"), Associate Professor Satish Ukkusuri from Purdue University ("Integrative Modeling Tools for Sustainable Transportation Systems" and "The Use of Large Scale Geo-Location Data for Traffic Analytics"), as well as Professor Sahotra Sarkar from the Section of Integrative Biology at the University of Texas at Austin ("Climate Change and the Risk of Vector-Borne Diseases").

It has been a successful year for rCITI in expanding and strengthening key relations and commencing new research projects. In fact, even though 2012 represents the first year of operation for the transport centre, rCITI has already developed multiple key relationships with industry, attracted global attention for research done at UNSW, worked on internationally funded projects, led global consortia, received substantial funding from the Australian Research Council and built a world-class staff of researchers and educators.

water@ UNSW

water research centre

The UNSW School of Civil and Environmental Engineering has a 60 year history of leading development of water technology in Australia. Apart from maintaining the largest postgraduate and undergraduate teaching programmes in water engineering in Australia, the School remains active in Australian fundamental water research:

- surface and groundwater hydrology – ongoing Australian leadership of the quantifying of rainfall, runoff and groundwater flows at catchment scales. (This history includes development of the lead Australian design document, Rainfall and Runoff, now published and developed by Engineers Australia).
- public health and water treatment – fundamental investigations of the chemistry and microbiology of water for urban use have been focussed within the Centre for Water and Waste Treatment over the last 20 years.
- civil and environmental hydraulics – practical Project-based and theoretical hydraulics research undertaken using the unique large-scale facilities of the Water Research Laboratory at Manly Vale.

There are two primary Centre nodes: at Kensington with staff and students accommodated within the Vallentine Annex; and, at the Water Research Laboratory at Manly Vale.

The Centre is co-supervised by Richard Stuetz and Bill Peirson, who are respectively responsible for each node.

The new centre activities are grouped around three dominant research themes:

1. Water Supply

Australia is a continent of low rainfall and its development and economic robustness is constrained by presently available and potential water supplies.

2. The Coast

Over 86% of the Australian community live in the coastal zone with consequent environmental impact and climate vulnerabilities.

3. Sustainability

To maintain Australia's current level of population and economic growth, water and contamination management need innovative solutions in terms of environmental, energy and social considerations.

Highlights at WRC Kensington include:

Dr Richard Collins was awarded a prestigious Fulbright scholarship in Nuclear Science and Technology, sponsored by the Australian Nuclear Science and Technology Organisation (ANSTO). Richard will undertake research in the United States at the US Department of Energy.

The 2012 NSW Young Tall Poppy Award went to Dr Rita Henderson for her research into water quality and treatment. This highly sought after award, presented by the Australian Institute of Policy and Science, recognizes early career researchers who excel in their field and are actively engaged in community outreach and education.

PhD student Eytan Rocheta has been awarded the 2012 Peter Cullen Postgraduate Scholarship at Parliament House by the Minister for Primary Industries, Katrina Hodgkinson and Peter's widow, Vicky Cullen.

We congratulate UNSW Water Research Centre (WRC) staff, Dr Richard Collins, Associate Professor Bellie Sivakumar, and Dr Shikha Garg for their success in securing Future Fellowships (FF) and Discovery Early Career Researcher Awards (DECRA). Each year the Australian Research Council (ARC) funds research and researchers under the National Competitive

manly vale

Grants Program (NCGP). The NCGP comprises two main elements – Discovery and Linkage – under which the ARC funds a range of complementary schemes such as FF and DECRA, to support researchers at different stages of their careers, build Australia's research capability, expand and enhance research networks and collaborations, and develop centres of research excellence.

WATER RESEARCH LABORATORY

During 2012, the Water Research Laboratory (WRL) celebrated its 53rd year as a leading international research laboratory in hydraulics, groundwater and coastal engineering. WRL academic and research staff continue to undertake fundamental research with WRL Projects staff providing specialist professional engineering advice on specific projects across the water engineering discipline.

A historical strength of WRL is the strong collaborative interaction between academic and project-based activities. With the unique large-scale physical facilities at the Manly Vale site, a track record for addressing computationally-demanding numerical modelling in water engineering and significant experience in undertaking field investigations, WRL continues to maintain an international reputation in the specific disciplines of:

1. Civil and Environmental Engineering Hydraulics;

Understanding the turbulent flow of water, air and sediment through pipes, turbomachines, open channels and across the landscape is one of the most challenging of technical disciplines. Engineering design must recognise the inherent uncertainties of measurement and modelling methods when providing practical solutions to industry need.

2. Coastal Engineering;

Approximately 86% of Australians live in the coastal fringe with consequent major development of urban areas, industry and supporting infrastructure. Many of the processes of wave formation and impact as well as shoreline and structural response remain poorly understood. Robust coastal engineering design techniques are essential for sustainable coastal development. Coastal engineering design must be undertaken in an ecological context containing interacting marine and freshwater ecosystems. Present concerns regarding greenhouse gas emissions are prompting a fresh look at the potential to harness energy in the coastal zone.

3. Groundwater;

In a country dominated by long droughts interspersed with floods, groundwater is a key water reserve: protected from evaporative loss but subject to contamination and potential overexploitation. Capturing key field information is critical to an adequate understanding of groundwater movement and its coupling to surface waters. The development of large-scale geophysical techniques to "see" beneath the ground surface is a key aspect of groundwater assessment.

kensington

4. Estuarine Engineering.

Estuaries are highly productive and complex ecosystems due to the high levels of nutrients available from catchment runoff and their large and diverse habitats. As coastal development occurs, engineering design is required to: mitigate adverse environmental effects and minimize impacts; find appropriate means of discharging treated wastewater; and, develop strategies for determining appropriate estuary fresh water flows to minimize ecosystem and threatened species impacts.

While continuing our efforts within Australia, 2012 will be remembered as a great year for international collaboration and interaction at WRL.

International Conferences

A large contingent of WRL staff and students, past and present, contributed to ICCE2012 (the International Conference on Coastal Engineering) in Santander, Spain in early July 2012. The conference brought together over 500 worldwide representatives from universities, industry and coastal administrations to showcase the latest advances in coastal engineering.

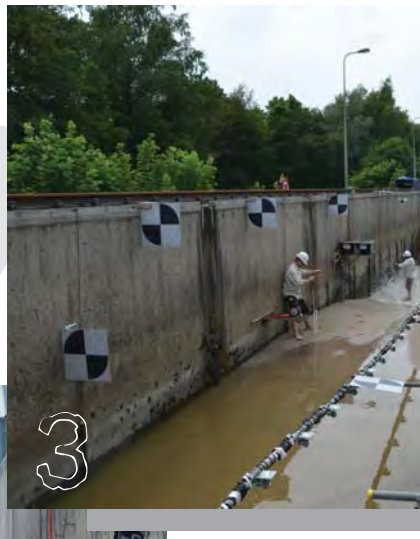
The rapid expansion of groundwater research at WRL in recent years, primarily through the Connected Waters Initiative, enabled 6 past and present staff/students to attend the 39th International Association of Hydrogeologists Congress at Niagara Falls in September. Nine hundred delegates from 62 countries around the world gathered to consider the theme "Confronting Global Change". Amongst the attendees was Doug Anderson a previous WRL staff member, who will be returning to WRL in February 2013. Internationally, WRL staff and students also presented at: 8th PIANC International Conference on Coastal and Port Engineering in Developing Countries (Chennai, February); 12th International Coastal Symposium (Plymouth, April); 9th International Symposium on Environmental Geochemistry (Portugal, July); 6th International Conference on Scour and Erosion (Paris, August); Association of Pacific Rim Universities (San Diego, September); American Geophysical Union Fall Meeting (San Francisco, December).

International Visitors

In 2012 WRL welcomed many international visitors including:

- Professor Herbert Huppert, Professor of Theoretical Geophysics and Director of the Institute of Theoretical Geophysics, University of Cambridge
- Dr Kate White, senior lead for global and climate change, US Army Corps of Engineers, Institute for Water Resources
- The U.S. National Ground Water Association 2012 Darcy Lecturer, Professor Seyed Majid Hassanizadeh of Utrecht University
- John Headland, Commissioner to PIANC USA and a Board Director for the American Society of Civil Engineer's Coasts, Oceans, Ports, and Rivers Institute
- Professor Mark Donelan of the Rosenstiel School of Marine and Atmospheric Science, University of Miami

Many of our visitors, including those from overseas, continue to contribute to our seminar series, in our recently renovated Lecture Room.



BARDEX2 Project
1 Professor Ian Turner and Dr Chris Blenkinsopp
2 Before experiment 3 Brave experimenters
4 MAT_1037
5 Turner experiment
6 After the experiment with shovels
(photos by Dr Martin Andersen)

Developing International Collaborations

During 2012 Associate Professor Ian Turner, Dr Chris Blenkinsopp, Dr Martin Andersen, Dr Gabriel Rau and Daniel Howe were all involved in a major European Union funded coastal engineering experiment at the Delta Flume in the Netherlands. The project, BARDEX2 (standing for BARrier Dynamics EXperiment), is a follow-up to a previous successful experiment and is a collaboration between leading coastal researchers from the Universities of Plymouth, Southampton, Delaware, UNSW, Utrecht, Algarve Bordeaux and New England. The experiment involved the construction of a sandy barrier-beach at prototype-scale in the Delta Flume facility with WRL providing specialist expertise on wave tracking and ground/surface water interactions.

Alessio Mariani is WRL's third Churchill Fellowship recipient. The focus of Alessio's 2012 fellowship was the mitigation of beach erosion. His fellowship included collaborative visits to the Port and Airport Research Institute (located at the entrance of Tokyo Bay, Japan); the Hazaki Oceanographic Research Station (on the Japanese east coast); the commercial beach drainage installation (Les Sables-d'Olonne, French Atlantic coast) and Deltares (Delft, the Netherlands).

In June, WRL Director Bill Peirson visited the North China Electric Power University in Beijing to discuss the future of wave power in China and Australia with senior staff within their School of Renewable Energy and Research Institute of Water Resources and Hydro-Electric Engineering. After presenting at ICCE in early July, Bill met in New York with representatives of the U.S. Army Corps of Engineers and the U.S. National Oceans and Atmospheric Administration to discuss on-going collaborative projects. Bill then visited the University of Valpariaso in Chile to discuss possible future collaborations in coastal engineering. Subsequently, Dr Chris Blenkinsopp has recently been invited to participate in field experiments along the coast of Chile.

WRL Projects Manager Grantley Smith was invited to deliver a keynote address at the DHI Modelling forum. He subsequently visited hydraulic laboratories at HR Wallingford, DHI in Copenhagen as well as those of NUS and NTU in Singapore. During these visits he discussed possible collaborations with these organisations and presented recent WRL work on people and vehicle stability as well as 2D Numerical modelling approaches to floodplain management and evacuation planning.

During 2012, WRL was commissioned to assess the coastal adaptation needs for extreme events and climate change of the Cook Islands. The focus of this investigation is Avarua in Rarotonga - the administrative, economic and tourism hub of the Cook Islands. Late in 2012, Project Engineers Matt Blacka and Duncan Rayner travelled to the Cook Islands to undertake a detailed topographic survey of the Avarua area, with a specific focus on the coast and the fringing lagoon system - regions that are difficult to capture using conventional or airborne techniques.

More details of the ongoing exciting activities of the Water Research Laboratory can be found at www.wrl.unsw.edu.au.

Acknowledgements

WRC staff and students would like to thank our many supporters and collaborators throughout industry, government and at Universities.

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NCCARF
National
Climate Change Adaptation
Research Facility
Adaptation Research Network
SETTLEMENTS AND INFRASTRUCTURE

ACCARNSI

Planning for the impacts of a changing climate has seen a concentrated effort by government, industry and the research community to prepare our settlements and infrastructure for more frequent climate extremes in the future. Climate change adaptation planning continues to be a high priority for all sectors, with collaboration across sectors essential for an effective and robust response. All levels of government are looking to the research community to help inform and support them in their climate change adaptation planning processes.

In NSW, the state government has been engaging with ACCARNSI and other research institutions in the development of its adaptation plan for Sydney. This approach is key to preparing a relevant well considered plan for implementation at all levels. ACCARNSI research based at UNSW concentrates on adapting the built environment and infrastructure to weather well in periods of future climate extremes. 2012 has seen ACCARNSI collaborating with VCCCAR (the Victorian Climate Change Centre for Adaptation Research) and the NCCARF Adaptation Research Network for Emergency Management based at RMIT Melbourne to further link and emphasise the importance of an integrated response around these areas.

ACCARNSI's goals for 2012 and into the future are to continue to lead research in the climate change adaptation space particularly around coastal processes, to strengthen its partnerships across sectors and to encourage a culture of sharing in order to identify, innovate and inform.

ACCARNSI SNAPSHOT

- Funded by the National Climate Change Adaptation Research Facility and the Commonwealth Department of Climate Change and Energy Efficiency
- Hosted at the School of Civil and Environmental Engineering, UNSW
- Partners include Griffith University, the University of Adelaide, the University of South Australia, Sydney Water, the NSW Department of Public Works and Engineers Australia
- Research areas and discussion papers span across Infrastructure, Coastal Settlements, Urban Management, Transport and Social Inclusion, and the Built Environment, Innovation and Institutional Reform
- Outreach events including fully subscribed early career researcher forums and workshops, honours and masters research grants, focussed streams on Climate Change Adaptation at national conferences and EIANZ/ACCARNSI 'Learning to Adapt' professional development breakfast seminar series
- Facilitating a network of close to one thousand established and emerging researchers, educators, local, state and federal government professionals, industry leaders and innovators, and NGO and community representatives across Australia

2012 FOCUS on strategies for local government climate change adaptation planning in collaboration with the Australian Local Government Association and the State and Territory Local Government Associations. This research initiative culminated in the release of a decision making guide to adaptation tools selection and has generated interest from IPWEA and local councils across NSW.

2012 PROJECTS including collaboration on regional chapter for IPCC Fifth Assessment Report (AR5), 'Sydney Adaptation Research Review' technical briefs on Infrastructure, Settlements and Communities, and Buildings and Neighbourhoods for the NSW Office of Environment and Heritage, and joint research on climate change adaptation and coastal processes with the US Army Corps of Engineers

2012 STANDOUT Dr Kate White's guest lecture to our early career researchers at ACCARNSI's 8th ECR Forum and Workshop in Melbourne. Kate is the Senior Lead, Global and Climate Change, US Army Corps of Engineers' Institute for Water Resources. Her presentation informed, inspired and affirmed the belief that engineers when faced with a problem know what needs to be done.

Thank you to our Industry Partners and Supporters:

Gary Johnston

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