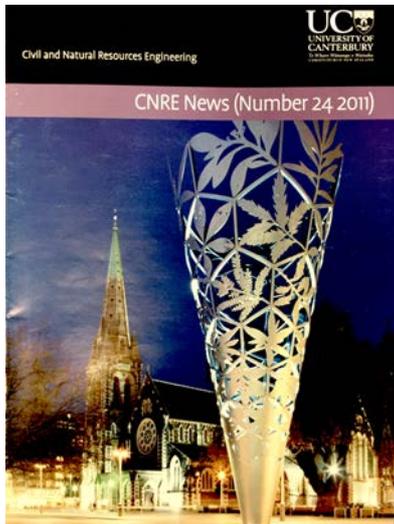


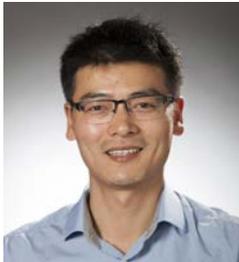
CNRE NEWS

2018/2019





CNRE News Issue 2011



FROM THE EDITOR

Dear colleagues, students, alumni, and friends,

Welcome to the 2018/2019 issue of CNRE News. It has been about 7 years since we issued the last CNRE News in 2011 (see the figure above). It is my great pleasure to bring this annual publication back to you. In this issue, you can see the Department's growth, academic excellence, teaching and research collaboration, student experience, and new facilities .

Editing the issue has been an inspiring and joyous journey. A huge thank you to those who contributed words, photos, and ideas. This issue is indeed a result of joint efforts.

I hope you enjoy this issue.

Dr Brian Guo
Editor

Cover images

Top: Engineering Core, College of Engineering, University of Canterbury

Bottom: The iconic "Mushroom" building, School of Engineering in the 1960s. The building was demolished due to the earthquakes.

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CNRE NEWS

2018/2019

Editor: Brian Guo
Design: Brian Guo
Proofread: Kim Parrent

Many thanks to all those who contributed articles and photos in the making of the CNRE Newsletter.

CNRE Newsletter is an annual publication by the University of Canterbury, Department of Civil & Natural Resources Engineering. It is for staff, students, alumni, friends and industry. Views expressed are those of the contributions, not necessarily the University.

Enquiries should be directed to:
University of Canterbury,
Department of Civil & Natural Resources
Engineering
69 Creyke Road
Christchurch, New Zealand

Head of Department's Message



Re-establishing CNRE News after of a period of approximately 7 years is an important milestone as we move to normalise the operations of the department after a long period of recovery from the 2010/2011 Canterbury earthquake sequence. During this time our primary focus has been to minimise the impacts on our students of the recovery process, and to continue to produce graduates at the undergraduate and postgraduate levels that will excel in their future careers. The effort of our staff in this context has been unparalleled and exemplary.

While the recovery period has presented some major challenges for our Department, it has also presented numerous opportunities and a period of substantial change. In 2013 the University faced severe financial challenges because of a significant drop in student enrolments following the Canterbury earthquake. Department technical and academic resources were under threat because of these financial challenges and the extreme workloads experienced by staff as they contributed in a professional capacity during the recovery process, while still maintaining their academic roles. In addition, many staff faced substantial challenges in their personal lives associated with the earthquake recovery process.

Now in 2019 the \$150+ million refurbishment of the College Engineering facilities is essentially complete. The Department is now on track for student numbers to exceed 800 EFTS (Equivalent Full-Time Students) and for staff numbers to exceed 95 FTE (Full-Time Equivalent). Technical and administrative support continues to increase as part of this growth process. Importantly the student to continuing academic staff ratio is dropping from a peak of 28:1 to 22:1 in 2018, with a further drop planned for 2019. In 2019 the Department is budgeted to generate \$29.2 million dollars of revenue. The Department of Civil and Natural Resources Engineering has become the largest academic unit within the University of Canterbury. Critical to this transformation has been the

implementation of undergraduate growth strategy, which was initially developed in 2014 following several departmental strategy meetings and finally approved in 2016. This strategy has been a major step forward for the department in two areas: (1) improved on-campus learning experiences for our students with reduced class sizes and increased access to field and laboratory learning activities and (2) a significant reduction in the student to staff ratio (as noted above), so that staff can gain a better balance of academic activities and an improved work-life balance.

It is important to acknowledge the continuity of support from senior management for CNRE's undergraduate growth strategy, which has been central to the Department's success. Growth on this scale requires a substantial investment in staff recruitment, in addition to that required for normal replacement activities associated with retirements and resignations. The value of this investment is evident in the quality of candidates recruited into these roles, which remains very high and provides an excellent foundation for the future of our department. It is worth noting that during this transformational period CNRE ranking under the QS international ranking system has fluctuated, but remains within the top 100 in the world. This ranking aids both staff and international student recruitment. Other major changes over the last 6 years include the establishment of the industry funded Quake Centre, which is hosted by CNRE, and the establishment of the Centre of Excellence for Earthquake Resilience (QuakeCoRE) at UC. Academic staff from CNRE are actively engaged in the management and development of research programs in both Centres. Quake Centre receives approximately \$1 million per year to support industry driven research and recently secured a MBIE partnership award totaling \$12 million over 7 years. The QuakeCoRE is funded by the New Zealand Tertiary Education Commission and will receive \$21.5 million over a 5 year period. Active engagement with these centres and other potential sources of external funding has increased the annual level of external funds supporting research activities in CNRE from less than \$2 million in 2013 to more than \$5 million in 2019.

The challenges students graduating from the Department will face in their professional careers over the next 4 decades will be substantial and unparalleled. These graduates join a profession that is uniquely placed, and therefore carries a substantial responsibility, for developing solutions to meet many of the challenges associated with sea level rise and a changing climate. CNRE is continuing to develop initiatives, initially discussed with its Professional Advisory Board in May 2017, to strengthen

future graduates in areas that are fundamental to developing these solutions. This includes a new compulsory course in the 2nd Professional Year (Sustainable Engineering in a Changing Climate), an increased focus on project-based learning for design and research in the final year, and new elective courses.

It is also worth noting that CNRE has recently launched taught masters programs in Architectural Engineering and Civil Engineering, so CNRE now has three primary taught masters offerings (Civil Engineering, Architectural Engineering and Fire Engineering). The launch of the Master of Architectural Engineering follows more than a decade of discussion about the possibility of providing qualifications in architecture at UC. The impetus to finally move this forward has in part been provided by relevant recommendations from the Canterbury Earthquakes Royal Commission, but also by the Department's ability to secure an endowed professorship in architectural engineering from the Ada Rutherford Trust and funding for an international architect-in-residence from The Warren Trust.

The Department has moved into a very strong position, with outstanding staff, excellent facilities and extraordinary students. While there is still much to be done, the foundations for future success are in place and the Department continues to focus on realising the full potential of its staff, students, and facilities. The collective strength of the Department has been crucial in grappling with the reality that we are not isolated from terrorism at home. Many of our students and staff were adversely affected by the terrorist attack in Christchurch, and the supportive culture within the Department, College, University and wider community has been critical to the healing process. We continue to work closely with our undergraduate and postgraduate students who were directly impacted by the heinous acts of the 15th of March 2019. The response from these students and the Muslim community in Christchurch has been extraordinary and inspirational.

Professor Mark Davidson
Head of Department of Civil and Natural
Resources Engineering

Department Staff

Administration Staff

Elizabeth Ackermann	<i>Department Administrator</i>
Emma Clark	<i>Administrator</i>
Jennifer Clayton-Smith	<i>Postgraduate Administrator</i>
Olive Dalton	<i>Systems Manager</i>
Alan Gordon	<i>Development and Operations Manager</i>
Veronika Letufug	<i>Administrator</i>
Catherine O'Shaughnessy	<i>Undergraduate Administrator</i>
Paul Strange	<i>Specialist System Support</i>

Academic Staff

Anthony Abu	<i>Senior Lecturer Fire Engineering</i>
Larry Bellamy	<i>Professor Architectural Engineering</i>
Ricardo Bello-Mendoza	<i>Senior Lecturer Environmental Engineering</i>
Brendon Bradley	<i>Professor Earthquake Engineering</i>
Des Bull	<i>Professor Structural Engineering</i>
Reagan Chandramohan	<i>Lecturer Structural Engineering</i>
Frances Charters	<i>Lecturer HydroEco Engineering</i>
Roger Chen	<i>Senior Tutor</i>
Gabriele Chiaro	<i>Senior Lecturer Geomechanics</i>
Tom Cochrane	<i>Professor HydroEco</i>
Misko Cubrinovski	<i>Professor Geomechanics</i>
Mark Davidson	<i>Professor Fluid Mechanics</i>
Roger Dawe	<i>Lecturer Surveying (Part-time)</i>
Tonny de Vries	<i>Senior Lecturer HydroEco</i>
Rajesh Dhakal	<i>Professor Structural Engineering</i>
Nick Dudley Ward	<i>Senior Lecturer Humanitarian Engineering</i>
Matthew Dudzik	<i>Architect in Residence</i>
Charles Fleischmann	<i>Professor Fire Engineering</i>
Gabriele Granello	<i>Lecturer Structural Engineering</i>
Brian Guo	<i>Lecturer Construction Management</i>
Matthew Hughes	<i>Senior Lecturer Geo-environmental Engineering</i>
Mehdi Keyvan-Ekbatani	<i>Lecturer Transportation Engineering</i>
Diana Kusumastuti	<i>Lecturer Transportation Engineering</i>
Simone Larcher	<i>Lecturer Environmental Engineering</i>
Pedro Lee	<i>Professor Fluid Mechanics</i>
Chin-Long Lee	<i>Senior Lecturer Structural Engineering</i>
Minghao Li	<i>Senior Lecturer Structural Engineering</i>
Giuseppe Loporcaro	<i>Lecturer Architectural Engineering</i>
Gregory MacRae	<i>Associate Professor Structural Engineering</i>
Ian Mason	<i>Lecturer Energy</i>
Craig McConnochie	<i>Lecturer Fluid Mechanics</i>
Christopher McGann	<i>Senior Lecturer Geomechanics</i>
Mark Milke	<i>Professor Environmental Engineering</i>

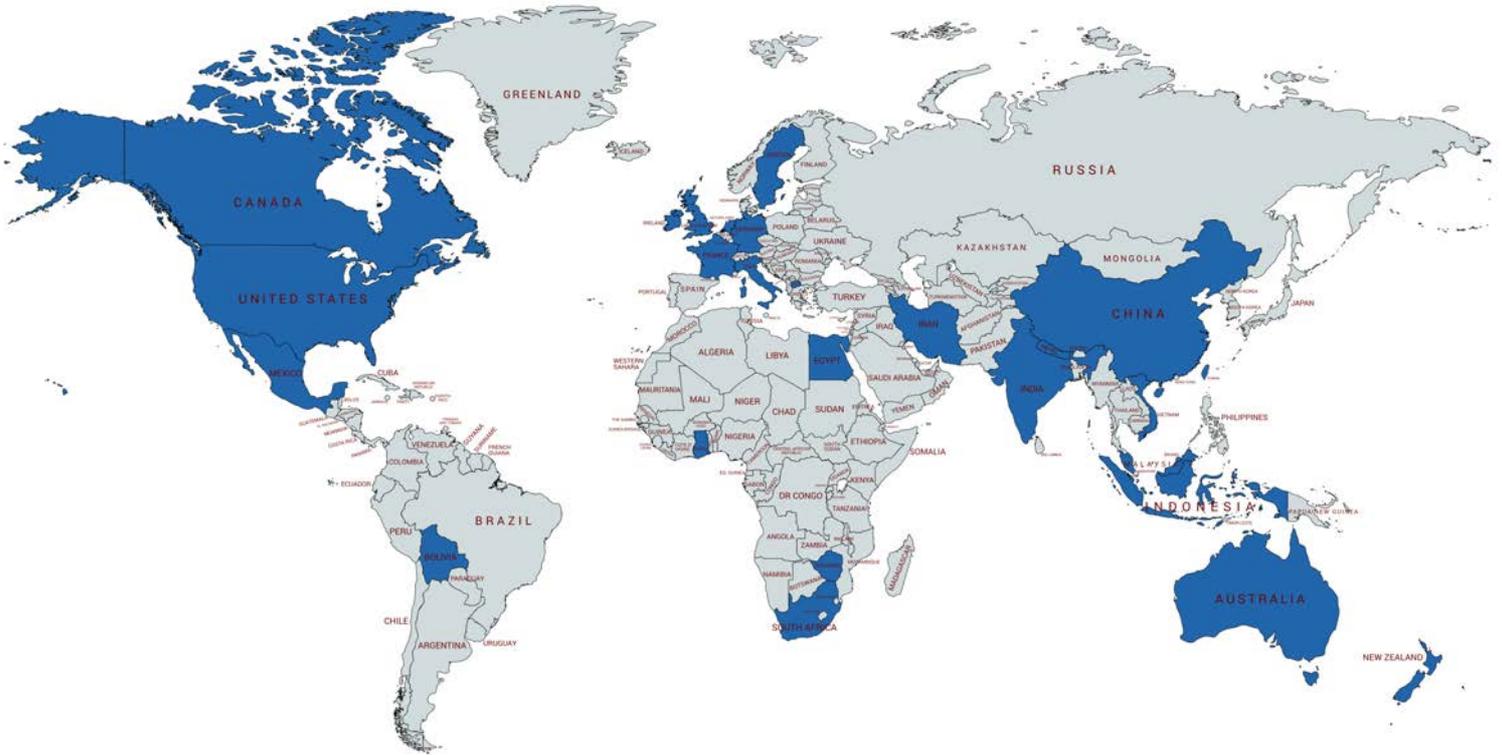
Academic Staff

Dong Ngoduy	<i>Associate Professor Transportation Engineering</i>
Daniel Nilsson	<i>Professor Fire Engineering</i>
Roger Nokes	<i>Professor Fluid Mechanics</i>
Jack Nugent	<i>Assistant Lecturer Humanitarian Engineering</i>
Aisling O'Sullivan	<i>Senior Lecturer HydroEco</i>
Markus Pahlow	<i>Senior Lecturer Water Resources</i>
Alessandro Palermo	<i>Professor Structural Engineering</i>
Stefano Pampanin	<i>Professor Structural Engineering</i>
Kim Parrent	<i>Senior Tutor Communication Portfolio</i>
Mofreh Saleh	<i>Associate Professor Pavement Engineering</i>
Eric Scheephouwer	<i>Senior Lecturer Construction Management</i>
Allan Scott	<i>Associate Professor Materials</i>
Mark Stringer	<i>Lecturer Geomechanics</i>
Tim Sullivan	<i>Associate Professor Structural Engineering</i>
Daniel van der Walt	<i>Lecturer Construction Management</i>
David Wareham	<i>Associate Professor Environmental Engineering</i>
Chao Wu	<i>Senior Lecturer Structural Engineering</i>
Kun Xie	<i>Lecturer Transportation Engineering</i>

Technical staff

Patrick Branje	<i>Fluid Mechanics Lab Technician</i>
Phillippe Bruneau	<i>Fluid Mechanics Lab Manager</i>
Logan Cooper	<i>Fire Lab Technician</i>
Peter Coursey	<i>Computer Technician</i>
Grant Dunlop	<i>Fire Engineering Lab Technician</i>
Siale Faitotonu	<i>Geomechanics laboratory Technician</i>
Mosese Fifita	<i>Technician - Structures Lab</i>
Gavin Keats	<i>Technician - Structures Lab</i>
John Kooloos	<i>Technician - Transportation laboratory</i>
Alex John Lowings	<i>Electronics and Software Design Technician</i>
Anne Mackenzie	<i>Structures Lab Engineering Manager</i>
David MacPherson	<i>Technical Services Manager</i>
Russell McConchie	<i>Structural Engineering Laboratory Manager</i>
Peter McGuigan	<i>Technician</i>
John Maley	<i>Structural Engineering Laboratory Manager</i>
Timothy Perigo	<i>Technician - Structures Lab</i>
Alan Poynter	<i>Technician - Model structures lab</i>
Aude Thierry	<i>Environmental Laboratory & Field Support Technician</i>
Alan Thirlwell	<i>Structural Engineering Technician</i>
Michael Weavers	<i>Senior Technician - Electronics Workshop</i>
Kevin Wines	<i>Machinshop Technician</i>

Unity in diversity



CNRE is a multicultural and diverse department with our staff coming from all over the world. The countries/ regions where staff were born:

- Australia
- Bolivia
- Brunei
- Canada
- China
- Egypt
- France
- Germany
- Ghana
- India
- Indonesia
- Iran
- Ireland
- Macedonia
- Malaysia
- Mexico
- Nepal
- Netherlands
- New Zealand
- South Africa
- Sweden
- Tonga
- Taiwan
- UK
- USA
- Vietnam
- Zimbabwe

Professional Advisory Board



Craig Price
Chief Technical Officer, BECA



Karen Boyt
Acting Highway Manager Waikato, NZTA



Peter Christensen
Director of CTN Consulting Ltd.



Helen Trappitt
Director
Lewis Bradford Consulting Engineers



Clive Anderson
Principal Geotechnical Engineer,
Golder Associates (NZ) Ltd.



Colin Crampton
Chief Executive Wellington Water



Graeme Johnson
Chief Executive Officer, Fulton Hogan



Amber Murphy
Associate - Environmental Engineering
BECA



Cathy Forrest
Christchurch Civil Infrastructure
Manager
AECOM

The formal industry advisory structure for CNRE is its Professional Advisory Board (PAB). This board is composed of leaders in the Civil and Natural Resources Engineering profession and includes representatives from consulting, contracting and government. Membership currently includes Craig Price (Chief Technical Officer, Beca and recent president of Engineering New Zealand), Colin Crampton (Chief Executive, Wellington Water and current vice-president of Engineering New Zealand), Karen Boyt (Highway Manager, NZTA), Helen Trappit (Senior Structural Engineer, Lewis Bradford Consulting Engineers), Peter Christensen (Senior, Water Resources Engineer, Director, CNT Consulting), Clive Anderson (Principal Geotechnical Engineer, Golder Associates), Graeme Johnson (CEO, NZ Fulton Hogan), and Amber Murphy (Associate, Environmental Engineering, Beca). Meetings with the PAB occur twice a year, typically May and November.

A provisional agenda is set ahead of the meeting based on feedback from Board members and issues to be raised by the department for consultation. The meetings are normally scheduled for 3.5 hours and the first hour is spent having an informal lunch with academic staff in the Department. This lunch is an opportunity for members of the PAB to interact broadly with academic staff in the Department and for those staff to raise issues directly with the members of the Board. At the subsequent 2.5 hour meeting, CNRE is represented by the HoD, deputy HoD and Development and Operations Manager. Academic staff are also invited to join the meeting to address specific agenda items. The report from the HoD generally sets the tone for the meeting and often raises issues for discussion (in addition to specific agenda items). Members of the Board are also proactively engaged with the leadership of the department between the more formal meetings as issues arise and similarly the department consults the Board between meetings as necessary. The balanced perspective the Board provides in advising the department on a range of issues is an essential input to the department's ongoing engagement with improving outcomes for students and external stakeholders. This balanced view is essential in filtering feedback associated with academic engagement with specific industry groups, which have a more narrowly focused view of what the "improved outcomes" should be.

A recent example of the Board's engagement with curriculum and program development in the department is detailed as follows: during the PAB meeting held in May 2017, concepts for the introduction of a capstone (final year) design course and a Master of Civil Engineering (to replace the existing Master of Engineering Studies) were discussed. Engagement with the Board on these issues was a precursor to the concepts being discussed more broadly with the department, so that the Board was engaged and able to provide feedback at the inception of the proposed changes. Following PAB input these concepts were discussed within the specialist groups in CNRE (Structures and Architecture, Geotechnical, Water, Fire, Transportation and Construction

Management). Feedback from these groups was collated and presented to the Departmental Teaching Committee, which recommended that we proceed to develop detailed proposals. Note the Chair of PAB is a member of the Departmental Teaching Committee. Three representative working groups were formed to focus on different aspects of the proposed changes. The more detailed proposals were approved (subject to further changes associated with consultation processes) at a departmental meeting in February 2018. This approval was followed by consultation with various internal and external stakeholders. The detailed proposals and associated feedback were then discussed with the PAB at the May 2018 meeting, before moving forward with the final approval processes necessary at University and national levels.

It is also worth noting that specialist postgraduate programs in Fire, Transportation and Construction Management also operate specialist professional advisory boards.

Functions of PAB

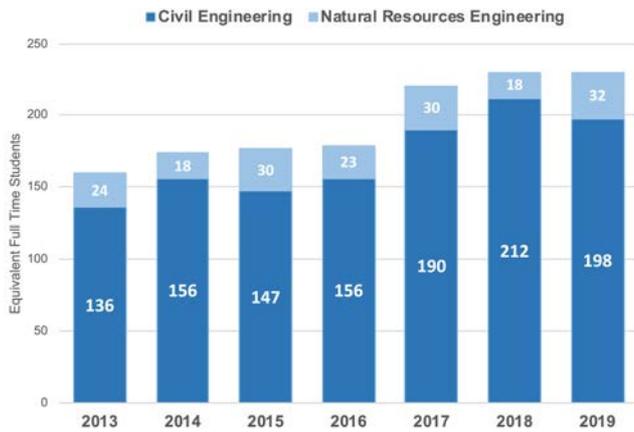
The principal function of the Board is to interact with the staff and students of the Department in an advisory capacity, with particular emphasis on the educational and research mission of the Department. It is expected that Board members' experience in diverse engineering practice will help the Department to achieve its goals more effectively.

The Board's role will be to address strategic issues and will include, but not be limited to, the following activities of the Department:

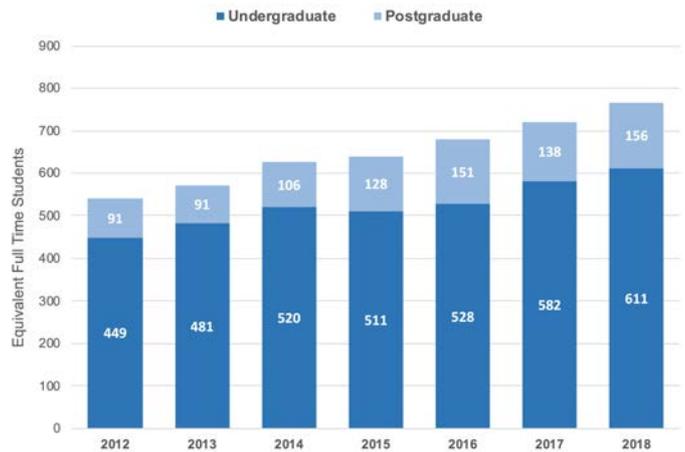
- strengthen links between the Department, the Profession nationally and internationally (including IPENZ), and Industry;
- advise the Department on effective ways to generate external financial and other support to carry out its mission;
- assist the Department with plans for capital expenditure on facilities and equipment;
- assist the Department to enhance its position within the College and University;
- assist in representing the interests of the Department to IPENZ and the profession, including preparing independent comments on IPENZ accreditation reviews;
- advise the Department on developing curricula that reflect the current and foreseeable needs of the Profession and Industry, as well as society overall;
- advise the Department on current and foreseeable research needs and opportunities;
- receive and consider reports from Advisory Committees established for the various teaching and research programmes within the Department, and to advise the Department accordingly.

Key Facts & Figures

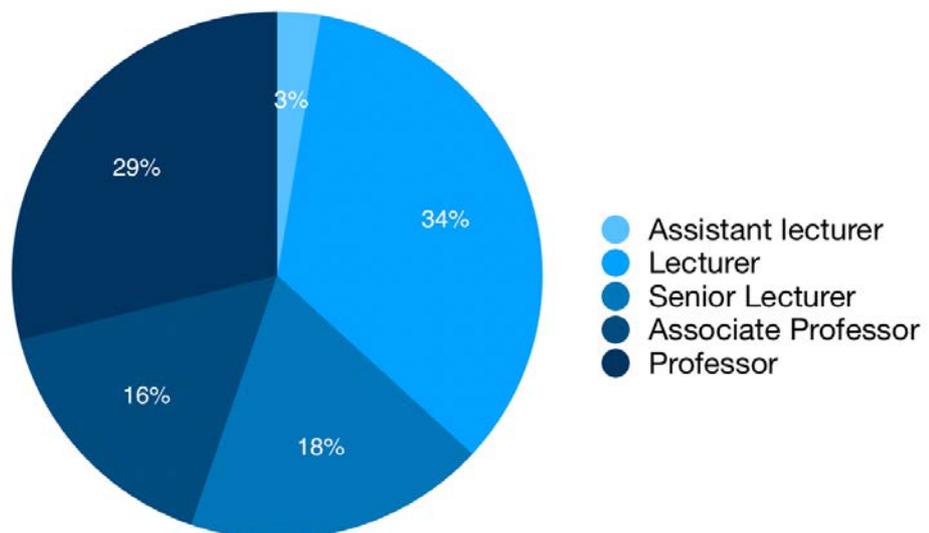
Student intakes to 1st Professional Civil and Natural Resources



Undergraduate and Postgraduate FTE Enrolments



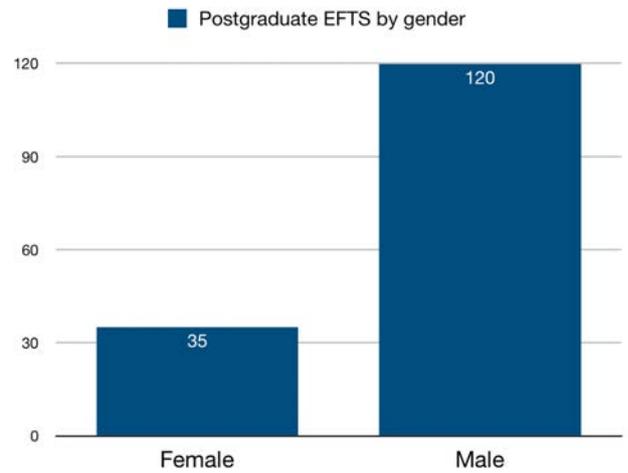
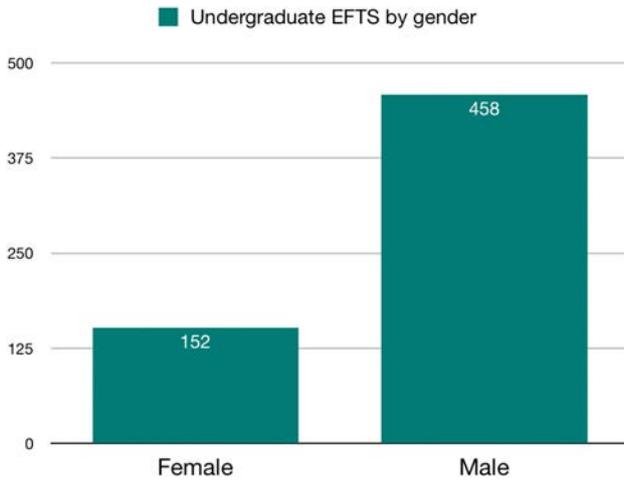
Academic staff by position (FTE)(in 2018)



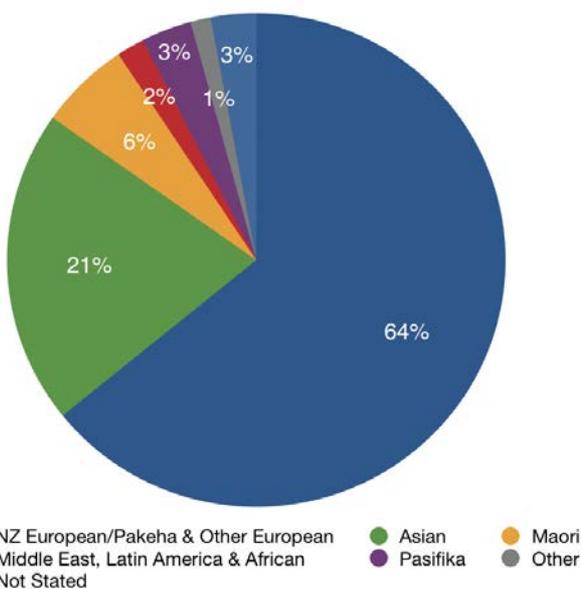
Student:Academic staff ratio

22 Equivalent Full Time Students (EFTS)

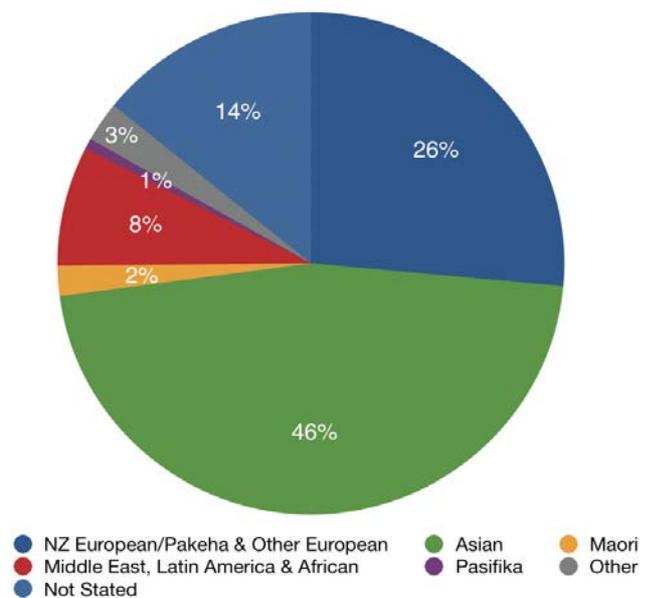
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Continuing Academic Staff



Undergraduate by Ethnicity



Postgraduate by Ethnicity



CNRE researchers gained \$1 million

to create eco-friendly seismic-resilient foundation systems

IA UC CNRE Smart Ideas proposal that aims to create 'Eco-rubber seismic-isolation foundation systems' that will improve the seismic resilience of low-rise buildings was approved for funding of \$1 million by the Ministry of Business Innovation and Employment.

Annually in New Zealand over 3.5 million end-of-life tyres are destined for landfills or illegally disposed, giving rise to stockpiles of tyres that do not readily degrade and disintegrate. With the ever-growing volume of waste tyres, environmental and socio-economic concerns have urged the search for reuse of waste tyres through large-scale recycling engineering applications.

Waste tyres are a great source of environmentally-friendly and sustainable building materials that can be made affordable and readily available through technological innovations. Also, they may provide novel and effective engineering solutions to attain buildings with enhanced seismic resilience. This makes them ideal materials for developing affordable, medium-density, low-rise buildings that are in high demand in NZ.

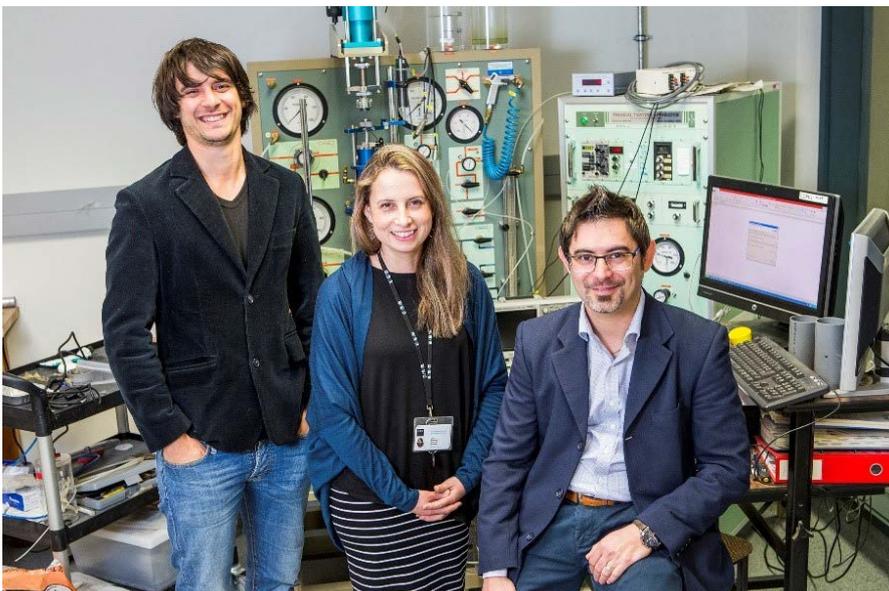
By reusing and recycling waste tyres, the research team (Dr Gabriele Chiaro, Science Leader; Professor Alessandro Palermo, Co-Leader; Dr Laura Banasiak, Research Leader, ESR; Dr Gabriele Granello, Key Researcher) have proposed to develop innovative eco-friendly seismic-isolation foundation systems to enhance the seismic performance of medium-density low-rise buildings that are in high demand across New Zealand. These new systems are composed of two critical elements:

- a seismic-dissipative filter made of rubber-gravel mixtures placed underneath the foundation structure, and
- a flexible raft foundation made of steel fibre-reinforced rubberised concrete.

To achieve the goal the multi-disciplinary research team is using a combination of:

- geotechnical and environmental engineering investigations to identify optimum rubber-gravel mixtures, having excellent mechanical properties and minimal leaching attributes,
- structural engineering tests to design flexible, fibre-reinforced, rubberised-concrete raft foundations with satisfactory structural performance, and
- numerical and physical models to prove the concept, evaluate the seismic performance of the entire foundation system, and quantify the level of reduction in the seismic response of prototype buildings.

The successful completion of this research will result in a sustainable engineering solution to increase the seismic resilience of low-rise buildings while reusing/recycling waste tyres with great environmental and socio-economic benefits (new jobs, improved products, increased revenues) for New Zealand.



Gabriele Granello, Laura Banasiak, Gabriele Chiaro (from left to right)

Storminator™

Professor Tom Cochrane, Dr Aisling (Ash) O’Sullivan and Dr Frances Charters have filed a patent application for their invention the Storminator™, which could be exactly the weapon that our waterways need. The three inventors are tackling the issue that waterways throughout Aotearoa New Zealand are increasingly degraded by stormwater, which occurs when rainfall falls onto impermeable surfaces such as roofs, roads and carparks. Stormwater runoff is the largest polluter of urban waterways globally. The Storminator™ was designed to remove more than 80% of metals directly from roofs by treating the stormwater runoff as it drains through the building downpipes.

According to Professor Cochrane, “This stormwater runoff contains heavy metals, mainly zinc and copper, which are toxic to the urban rivers because they are frequently untreated. In Christchurch, roofs contribute 65% of stormwater zinc that damages rivers. New, renewed and future consents now require stormwater to be treated before leaving the property.”

“The Storminator™ is an easy solution to a difficult problem. It’s designed so it can be easily retrofitted to existing downpipes, is quick to install, sits in line with the existing downpipe, has a minimal footprint and uses a waste product to treat the stormwater,” Dr O’Sullivan says.

“Because of these design features, it is the easiest and most efficient way to treat metals from large roof areas before the polluting stormwater enters a nearby river. Theoretically, this means more insects, koura and fish can survive and thrive in the nearby waterway.”

Dr O’Sullivan states that “the coolest thing about the Storminator™ is that it was designed to solve a ubiquitous problem using a simple but eco-logical solution. The recent OECD Environmental Performance Review highlighted that freshwater management is a topic where ‘New Zealand can offer peer-learning to other countries’. Our invention contributes to this.”

The inventors’ research has been supported by ECan and KiwiNet through funding for the R&D stage and commercialisation process, and their invention has received in-principle support by the Ministry for the Environment. They are also in discussions with the largest developer of stormwater products in New Zealand about product development.

Professor Cochrane, points out that “our invention follows an ecological approach to engineering which is to design sustainable solutions in partnership with nature for the benefit of both society and ecosystems.”

This requires a deep understanding of how nature works (environmental science) along with creative problem-solving (engineering) to develop the innovative solutions. It also aligns with

Māori cultural values of environmental stewardship by rehabilitating our urban waterways, he says.

Multiple scientific experiments were conducted since 2016 to find the optimal substrate and hydraulic retention times of The Storminator™. This research was supported by numerous CNRE students including Nekelia Gregoire, Forrest Bilek, and several undergraduate students, in addition to technical support from Peter McGuigan.



EQC funding for research

Two department researchers have won funding to examine critical questions about earthquakes in New Zealand.

- Using the latest simulation techniques to understand the strong shaking in Wellington city during the 2016 Kaikōura earthquake – and implications for future earthquakes (Advancing physics-based ground motion modelling of the 2016 Kaikōura earthquake: Modelling basin-edge effects in Wellington and proposed implications for seismic design) (\$65,000) led by Earthquake Engineering Professor Brendon Bradley, UC Civil and Natural Resources Engineering.
- How do earthquakes liquefy gravelly soil – and how can we minimise the risk? (Site characterisation and liquefaction potential of Blenheim gravelly sandy deposits) (\$66,900) Senior Lecturer Dr Gabriele Chiaro, UC Civil and Natural Resources Engineering.

Seismic performance of heavy timber frames with buckling restrained braces



Russel McConchie, Minghao Li, Wenchen Dong and Alan Thirlwell, from left to right

With more availability of high performance engineered timber products, multi-storey engineered timber buildings are gaining popularity in New Zealand and overseas. This research project is to develop a timber-steel hybrid frame system that combines heavy timber frames with buckling restrained braces (BRBs) to achieve enhanced seismic performance compared with conventional heavy timber frame structures. Experimental testing and numerical modeling will be used to investigate lateral performance of the hybrid system under cyclic loading. Two full-scale prototype glulam-BRB frames (8m wide and 3.6m high) are assembled and tested in the Structural Engineering Laboratory (SEL). The first specimen adopts dowelled connections to connect glulam members and BRBs while the second one adopts long self-tapping screws for the connections. The system strength, stiffness, ductility, energy dissipation and its overall resilience will be investigated. This hybrid structure is designed as a low-damage system with glulam members and connections protected by capacity design and replaceable BRB components after testing. Numerical models will be established and verified by the experimental data. With the verified model, parametric analysis will be conducted to study the influence of various design factors on

the overall hybrid system performance. In this project, all glulam components and steel plates are manufactured in New Zealand and the BRB components are imported from China.

Natural Hazards Research Platform, College of Engineering PhD scholarship and QuakeCore Flagship 4 are acknowledged for supporting this PhD research project by Wenchen Dong under primary supervision of Minghao Li. The supervisory team also includes Chin-Long Lee, Gregory MacRae and Anthony Abu. Technical support team includes Russell McConchie, Alan Thirlwell, Peter Coursey and Michael Weavers.



Professor Misko Cubrinovski's liquefaction work wins top US award

"Soil liquefaction is a very complex phenomenon and fascinating research topic. A large number of factors are always in play that result in complex interactions and difficult to predict outcomes. Unweaving this complexity and identifying key factors and mechanisms that govern the liquefaction response and associated damage have been the principal goals in my research on liquefaction."

Professor Misko Cubrinovski

Prof. Misko Cubrinovski's work on liquefaction-induced land damage following the Canterbury earthquakes has been awarded a prestigious international engineering award. His prolific research output has been recognised by the American Society of Civil Engineers (ASCE), which presented him with the 2019 Ralph B. Peck Award for "outstanding contributions to the geotechnical engineering profession through the publication of several insightful field case histories" on 27 March 2019. He is the second recipient from outside of North America to receive the ASCE Peck award in its 21-year history. The Ralph B. Peck ASCE award is the latest international recognition. Professor Cubrinovski was part of the teams whose research papers on liquefaction-induced land damage assessment in residential Christchurch won the 2016 Earthquake Engineering Research Institute (EERI) Outstanding Paper Award in San Francisco in 2015, the American Society of Civil Engineers (ASCE) Norman Medal in Portland in 2016, the society's highest

honour for a technical paper, the lead author of paper on liquefaction-induced damage to bridges that won the Outstanding Paper Award from ASCE in Miami in 2014, and he also received the 2018 NZGS Geomechanics Lecture Award, the Ivan Skinner Award, and ANZ Joint Societies Award. Prof. Misko Cubrinovski stated that "It was immediately obvious that we needed to capture evidence and learn as much as we can from this unfortunate, but exceptionally rich event for scientific data and information. Our analyses and interpretations of the Christchurch case histories have resulted in key findings and major contributions to the liquefaction research and its application to engineering practice internationally. I am delighted that our work has been recognised with the Ralph B. Peck Award (ASCE), one of the most prestigious awards in the field." Professor Cubrinovski's career in geotechnical earthquake engineering began in the 1980s when he was involved in the seismic design of nuclear power plants in Europe, with soil liquefaction a principal concern. He then spent 15 years in Japan, from 1990, working with pioneering liquefaction researcher Professor Kenji Ishihara at the University of Tokyo. In 2005 Professor Cubrinovski moved to New Zealand and joined UC, little knowing that six years later he would be at the centre of an earthquake event that produced unparalleled soil liquefaction, which is when a material that is usually a solid behaves like a liquid.

The 1st NZ-Japan Joint Symposium on Structural and Geotechnical Earthquake Engineering

Dr Gabriele Chiaro successfully organised the 1st NZ-Japan SGEE Symposium that was held at the University of Canterbury on November 27, 2018.

The symposium was co-hosted by the Japanese Society of Civil Engineers and the American Society of Civil Engineers, and brought together leading academics, researchers and practicing engineers from across New Zealand and Japan to share their experiences and research results on key aspects of Earthquake Engineering resulting from lessons learned from recent major earthquakes in New Zealand and Japan.

The program consisted of three technical sessions and three discussion sessions covering a broad range of topics in Earthquake Engineering. Prof. Brendon Bradley, Prof. Alessandro Palermo and Associate Prof. Timothy Sullivan were among the 10 invited speakers contributing to the success of the symposium. More than 120 people attended the event, including 30 participants from the CNRE department.

Following this successful inaugural symposium, the 2nd Japan-NZ Joint Symposium on Structural and Geotechnical Earthquake Engineering will be held in Osaka, Japan, in 2021.

The symposium proceedings are available at the following website:
<https://sites.google.com/view/1st-nz-japan-symposium-on-sgee/home>



Photo: Gabriele Chiaro (Symposium Chairman) with John Berrill (CNRE Emeritus Professor)

Symposium Group Photo





STESSA 18

“STESSA '18 successfully showcased NZ designs and construction. The research that was presented inspired practical discussions, enabled valuable information to be shared and facilitated the development of important connections amongst specialists; all of which will help us as we seek to make better seismic systems made of steel in New Zealand.”

Associate Professor Greg MacRae

The ninth triennial STESSA '18 Conference on the Behaviour of Steel Structures in Seismic Areas was hosted by the University of Canterbury on 14-17 February 2018, with partners SCNZ, the University of Naples and the University of Auckland. The event successfully attracted the top tier of specialists from around the world who are working in steel and structures; and inspired local as well as international participants. Approximately 150 delegates from across 20 countries descended on the Garden City to gain exposure to the latest research and seismic applications, just one week ahead of the seven-year anniversary of the February 22 earthquake that shook Christchurch in 2011. A total of 118 papers authored by local and international structural engineering experts in seismic design and performance were presented and several keynote presentations focused on learnings from the performance of structures following the Canterbury earthquakes. In addition, SCNZ's Senior Structural Engineer (Technical Development), Kevin Cowie, chaired a special session on BRBs. To cover the diverse range of papers from

around the world, three streams were run simultaneously on topics from performance-based design through to behaviour of connections, numerical modelling, passive control, and more.

SCNZ Manager Darren O'Riley said the conference provided a valuable opportunity for structural engineering academics and practitioners to present and assess the results from recent research on seismic retrofit, the minimisation of earthquake damage and the collapse behaviour of steel structures. Darren commented: "Structural steel's seismic-resisting qualities have allowed a new Christchurch to emerge from the devastating earthquake of 2011. Due to structural steel's proven seismic performance, its market share is currently over 80 percent in Christchurch, up from virtually nil before the earthquakes. It is vital that we learn from the Christchurch experience and share our insights with other similarly developed cities worldwide."

Experimental testing of timber core-wall systems

Reinforced concrete core-wall systems are well researched and commonly used in practice. This research project is to experimentally test and numerically study seismic performance of timber core-wall systems with the objective to provide practicing engineers with guidelines on design of timber core-wall systems for tall timber buildings. The core-wall specimen is assembled and tested in the Structural Engineering Laboratory (SEL) and subjected to quasi-static bi-directional loading at the corner space of the strong floor and reaction walls. The wall specimen is 8.6m tall and replicates a 2/3 scale four-storey Cross-laminated Timber (CLT) core-wall system. New Zealand Douglas-Fir is used to make the wall panels that are 1.9m wide, and 175mm thick. The testing programme in the SEL has three phases: Phase I – single wall testing, Phase II – coupled wall testing, Phase III – core-wall testing. Phase I and Phase II have been completed and Phase III is ongoing. Currently, the CLT walls are low-damage post-tensioned rocking walls, which is continuing the innovative research of post-tensioned timber technology, also called Pres-Lam, that was started here at UC in 2005. Once the post-tensioned core-wall testing is complete, a conventional core-wall system with standard timber connections without post-tensioning will be tested as well. This project has required an immense amount of support and collaboration. SWP Research Partnership, New Zealand Douglas-fir Association, ARC Future Timber Hub, NZ Commonwealth PhD scholarship, SPAX Pacific are acknowledged for providing financial support. UC technical staff, Russell McConchie, Alan Thirlwell, Gavin Keats, Peter Coursey and Michael Weavers are also acknowledged for their efforts. This research is carried out by PhD candidate Justin Brown under primary supervision of Minghao Li. The supervisor team also includes Alessandro Palermo, Stefano Pampanin and Francesco Sarti.



The 2019 Pacific Conference on Earthquake



The 2019 Pacific Conference on Earthquake Engineering (PCEE, held every four years) and The New Zealand Society for Earthquake Engineering Conference (NZSEE, held annually) took place in Auckland last week. The discussion was around Turning Hazard Awareness into Risk Mitigation. It was an excellent opportunity for a group photo of past and current CNRE graduates and staff. Photo cred and thanks to Shalu Dhakal.

Awards



Teaching Awards 2018

Associate Professor Allan Scott and Dr Chris McGann, who respectively won the College of Engineering Teaching Awards 2018. Chris received the Early Career Award and Allan the Established Career Award UC Engineering.



NZ Geomechanics Award

Dr Chris McGann, Senior Lecturer in CNRE who along with his co-authors Profs Brendan Bradley and Misko Cubrinovski, received the NZ Geomechanics Award in Christchurch from the NZ Geotech Society.



An innovative team of University of Canterbury engineers has won the National Stormwater Innovation Award 2019 for an instantly practical and applicable stormwater treatment invention that stops zinc from galvanised roofs entering our precious waterways. The winning team comprises UC Civil and Natural Resources Engineering academics Professor Tom Cochrane, Dr Aisling (Ash) O'Sullivan, and Dr Frances Charters, with research support from various HydroEco students and Peter McGuigan..

Photos: Aisling accepting the National Stormwater Innovation Award for 2019 (above).

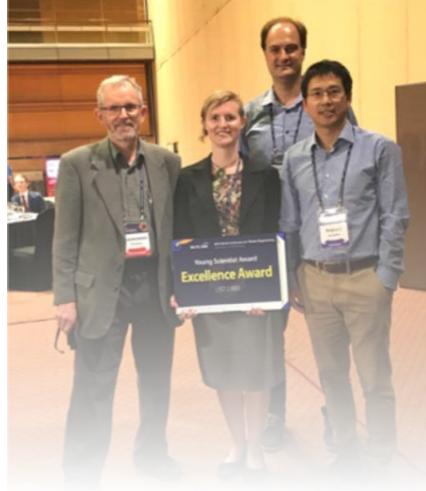
Tom, Ash, and Frances holding the award in front of the UC research raingardens (left).

Awards



AOSFST2018

Charley and Dennis attended the 11th Asia-Oceania Symposium on Fire Science and Technology (AOSFST) from 21-25 October. The symposium was held at the National Taiwan University Hospital (NTUH) Convention Centre, and consisted of an one-day workshops, 3-day poster and paper presentations and 1-day tour of firefighting training facilities. This conference covered a wide range of fire related topics, including fire physics and chemistry, fire statistics and risk assessment, fire detection and suppression, fire protection of high-rise buildings, fire safety design and codes, tunnel fires, human behavior in fire, structural behavior in fire, urban interface and forest fires, and fire safety of green buildings etc. Dennis' paper (the latter) was also one of six papers which received the Best Paper Award.



Young Scientist Award at WCTE2018

Congratulations to CNRE PhD candidate Lisa-Mareike Ottenhaus who received a Young Scientist Award on 22nd August at the 2018 World Conference on Timber Engineering in Seoul, South Korea. The conference attracted 750 participants from 39 countries. Lisa was one of the four award winners and presented her paper "Application of particle tracking in large scale timber connection testing" co-authored by Dr Minghao Li (primary supervisor) and Prof Roger Nokes. In the photo with Lisa are the other UC participants Dr Minghao Li, Emeritus Prof Andy Buchanan, and Prof Stefano Pampanin.



NZSEE2018

The New Zealand Society of Earthquake Engineering held their annual technical conference, "From Inangahua to Kaikoura and Beyond", in Auckland on 13 to 15 April.

A large number of UC graduates past and present, plus academic staff attended.

Ana Sarkis Fernandez, PhD Candidate won the 2018 NZSEE Research Scholarship. Also, the Bridge Research Group led by Prof Alessandro Palermo won the NZSEE Bulletin Special Issue regarding the Kaikoura Earthquake. (Alessandro Palermo and Rajesh Dhakal, were editors of the special issue) Associate Professor Tim Sullivan (with Rick Henry from UoA) received the EQC/NZSEE Ivan Skinner award.



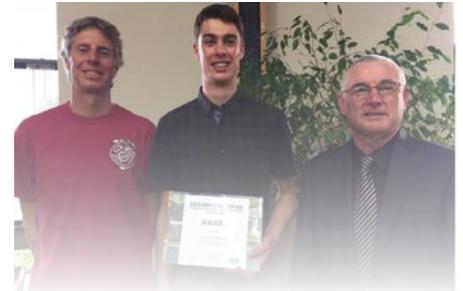
Best Paper at ISTSS Conference

Former PhD Ivy Wang received best paper (co- authored by her supervisors at UC, Prof Charley Fleischmann and Dr Mike Spearpoint) at the 8th International Symposium on Tunnel Safety and Security in Borås, Sweden. The title was “Applying the FDS pyrolysis model to predict HRR in small-scale forced ventilation tunnel experiments”. Ivy is currently working in Melbourne as a Structural Engineer at ARUP.



Eng NZ Transportation Group Conference Award

Congratulations to PhD Candidate Dana Abudayyeh who received two awards at the ENG NZ Trp Group Conference in Queenstown, March 2018. She received the Best Student Paper and the Transportation Group NZ Tertiary Study Grant 2018. Her paper is entitled “Modelling disrupted urban networks: A review of the modelling simulators” . In the photo with Dana is Don McKenzie who is the Institute of Transportation Engineers (ITE) District 8 Director (which includes NZ and Australia). He is the director of the TDG in NZ.



Waikato Regional Council scholarship

Former Matamata College student Russell Wenzlick recently won a Waikato Regional Council scholarship to help with his university studies. The scholarship, which was established in 1995, is valued at \$6000. It is presented annually to students whose families live in the Waihou Valley Scheme area, and who are studying engineering or resource management, especially in river and catchment management.



Final Year Research Project



On the 24th of October, 2018, the department of Civil and Natural Resources Engineering (CNRE) held a research conference showcasing 82 research projects undertaken by 162 third-professional year students. The projects were for the most part done in pairs, and at the conference, students presented the results of their research via both oral and poster presentations which academic staff assessed. The conference attracted many industry partners including Calibre Group, Pattle Delamore Partners Ltd, Structex, UC Library, and Warren and Mahoney Technologies Ltd.

The papers presented at the conference covered a wide range of topics, which reflects the broad research undertaken by the academics within the department of CNRE. These included fields as diverse as studies of

augmented reality, pedestrian bridges, floods, low energy building, volcanic ash, car park fire, smoke, transparent soil, flytipping, concrete canoes, system damping, and even electric cars. The disciplines covered include architectural engineering, earthquake engineering, ecological/hydrological engineering, energy engineering, environmental engineering, fire engineering, fluid mechanics, geomechanics, engineering management, materials engineering, structural engineering, and transportation engineering. Many projects were not only academically-oriented, but they were also relevant to the engineering industry in New Zealand. Industry partners involved included ARUP Fire Engineering, Base Isolation manufacturers, BMC, Douglas-Fir Association, Environmental Science and Research Institute, Fulton Hogan, Lyttelton Community Group, McMillan Drilling

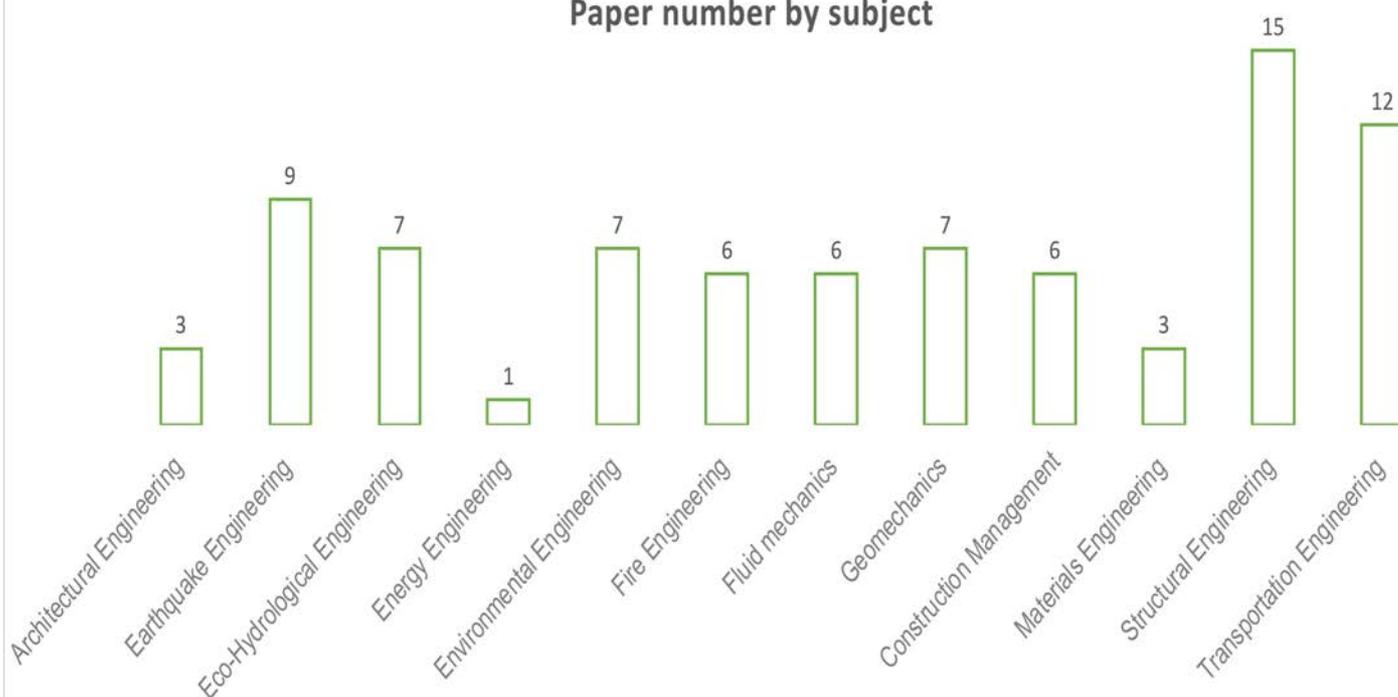
Group, NIWA, OPUS International, Structex, and Trimble and Warren and Mahoney.

While conducting the projects, students acquired a unique set of research skills aimed to complement those learned in the more structured lecture and laboratory environments. These skills included independent thinking, self-motivation, time management, and communication skills. The effort made by the students towards the projects was about 300 hours in total for each student with many students devoting much more time than that. With such effort, the quality of their research work was usually fabulous, and the outcomes and results of the projects were in some cases novel. Indeed, some projects will be able to lead to publications in national and

international conferences and journals, as has been the case from a number of projects in previous years.

This research conference is particularly memorable since it was held for the second time in the new Engineering Core Block. The old Core had been closed for a number of years due to the 2011 Christchurch earthquakes and had only been opened since February of 2017 after being completely rebuilt. The modern teaching and learning facilities in this block have greatly improved the delegates experience in attending the conference. The Recharge Lounge on Level 2 also provided a great space for students, staff and industry partners to interact socially while viewing posters during lunch and coffee/tea breaks.

Paper number by subject



Christchurch BIM Event 2018

Facilitating automation and digitalisation in the Architecture Engineering and Construction (AEC) industry



The use of Building Information Modelling (BIM) has increased in the global architecture, engineering, and construction (AEC) industries. BIMinNZ recognises it as a game-changer which has the potential to significantly improve the performance of

NZ's building, construction, and asset operation sectors. More and more universities are adopting BIM into their curriculum.

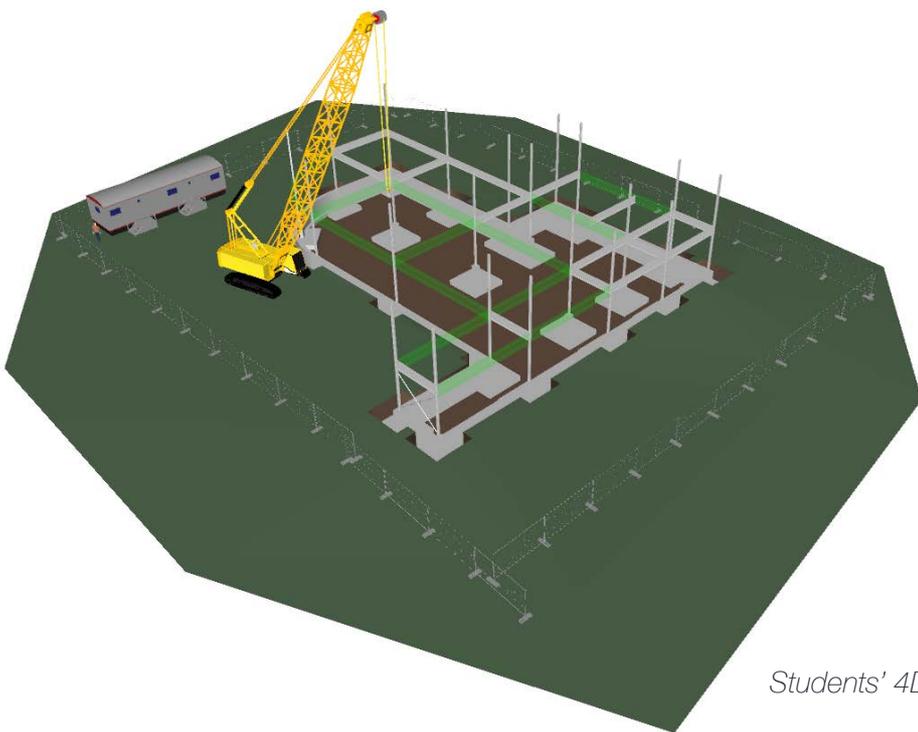
CNRE started to teach BIM from 2017. It is being delivered as an underlying module in the ENCI371 Project and Infrastructure Management at the undergraduate level. In 2018, a group-based BIM assignment was designed to

facilitate learning. Students play five different roles in a group, including Project Manager, Architect, Structural and MEP Engineer, Quantity Surveyor, and Construction Manager. Each group was required to complete four tasks: (1) a report of BIM meaning and impacts, (2) clash detection, (3) quantity takeoff, and (4) 4D schedule simulation. In addition, each group submitted a Youtube video to capture their reflections on their learning journey.

BIM lecturer Dr Brian Guo organised a BIM event to link BIM education and practice. Glenn Jowett (Senior Associate, BIM Delivery Lead, Beca), Jay Vaai (Digital Engineering Manager, Fulton Hogan), and Angelica Sarmiento (BIM Manager, CPB Contractors) delivered inspirational speeches. In addition, best-performing groups were awarded with a certificate.



*from left to right:
Dr Giuseppe Loporcaro (Lecturer of Architectural Engineering),
Glenn Jowett (BIM Delivery Lead at Beca),
Dr Daniel van der Walt (Lecturer of Construction Engineering and Management),
Jay Vaai (Digital Engineering Manager at Fulton Hogan)
Dr Brian Guo (BIM Lecturer)*



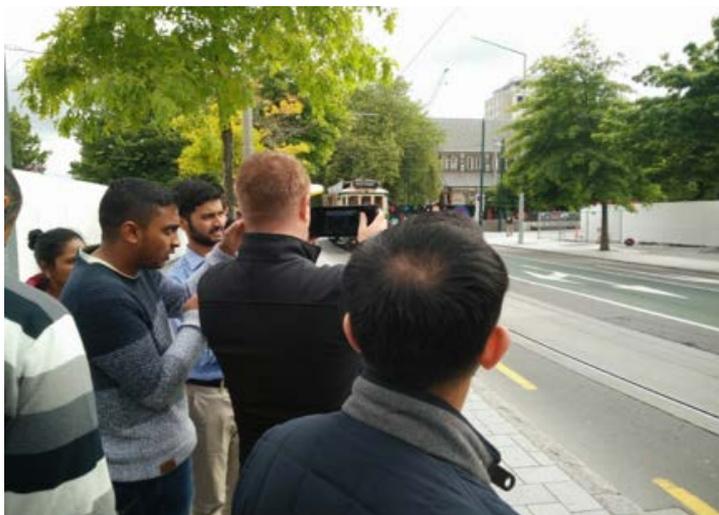
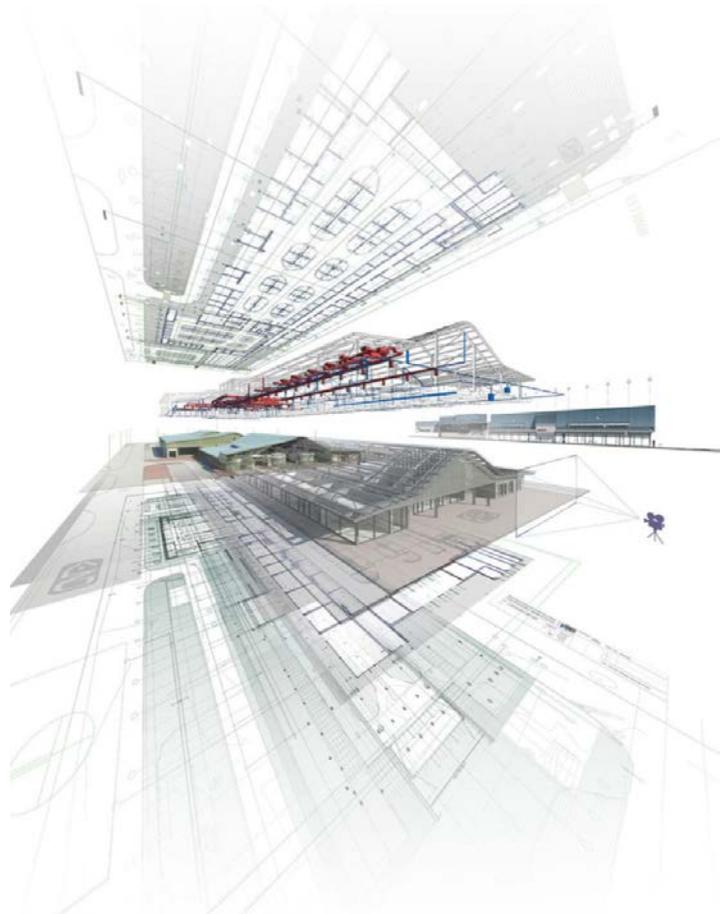
Students' 4D simulation work based on Navisworks

BIM-based collaborative design project



The Master of Architectural Engineering has been offering a course in Building Information Modelling (BIM), collaborative and integrated design since 2017 (Course code ENAE606). The course is coordinated by Dr Giuseppe Loporcaro, and has received

contributions from BIM industry leaders including Glenn Jowett (BIM design manager at Beca), Cyrille Pennavaire (BIM construction manager, previously at Fletcher Building), and Simon Yorke (Advance Technology Specialist at Aurecon). Students work on a collaborative design project where they develop design, software and collaboration skills. They have access to the most advanced digital technologies such as Microsoft HoloLens and the laser scanning Leica BLK 360. For a recent project, students have designed a showroom in the Christchurch CBD, considering different aspects of the design (architectural, structural, energy, thermal, fire, coordination, etc.). As concept design phase terminated, students, assisted by Stuart Ralston from Trimble, performed a Augmented Reality experiment. The virtual project was visualised in the design location. From 2018, the Master of Architectural Engineering offers a workshop in architectural computational design and parametric modelling, in collaboration with Maria Mingallon (Advanced Computational Design Lead at Mott Macdonald). During the workshop and the project, students develop skills in architectural visual programming using the plug-in for Rhino, Grasshopper.



Cyclone Gita, Tonga fieldtrip



After Cyclone Gita hit Tonga with devastating effects in February 2018, the Humanitarian Degree group Jack Nugent and Director, Dr Nick Dudley Ward travelled to Tonga to follow up on work they started late 2017 with the Tongan Communities.

Pictured are people from the Vaini community with the College donated generators that will drive water pumps in their community.

Geotech Lab manager, Siale Faitotonu is from Vaini, one of the worst hit villages (see photos) and provided this about Vaini. Siale also travelled to Tonga with the group in 2017. "Vaini is the third largest village on Tongatapu Island with a population of 3000 plus (figures from last election, plus children). The school rolled is 545 plus from Year 1 - to Form 1 and 2.

The damage to the school building is huge. The roof of the main building has been blown off as on the picture and two buildings which catered for about 100 students have been destroyed and disappeared.

This building on the photo where I spend my Primary School Education in the early and middle 60's. Water is the problem both well and rain water catchment." - Siale

*Malo e lelei,
It's been a very interesting few days in Tonga. Cyclone Gita has certainly had a marked impact on each and every person we spent time with over the past week but the resilience and positive attitudes to response and recovery are truly remarkable. 3.5 weeks down the track and power, water, shelter and waste management are all well on the way to returning to normal as the clusters start to plan their longer term recovery efforts. Pics 1- Vaini school is one of many with the roof completely blown away, classes are now located in tents. 2 - WASH cluster meeting with all emergency response stakeholders to ensure sufficient coordination and eliminate duplication. 3 - Returning to life as normal, harvesting yams for tomorrow's annual yam growing competition held in Vaini. Also, a massive appreciation to our Humanitarian Engineering student **Georgia Crisp** for her work in Tonga volunteering with the Ministry of Lands Survey and Natural Resource at the moment. She has spent the past week assessing water quality on 'Eua island and now she has returned to Tongatapu she has her plate full with geophysical surveying of salinity monitoring bores and distribution system modelling for community water supplies.*

Malo 'aupito,

Jack

Christmas door decoration competition



Photos: Door decoration winners Justin and Wenchen (with Paul their office mate sharing the glory), Tom Wallace with Bruce the Shark (Secret Santa gift and newest member of CNRE)

Soccer game Postgrad vs Staff



Pink Shirt Day



On Friday 18th May Pink Shirt Day was celebrated across Aotearoa/New Zealand – a day to reject bullying and to embrace inclusivity and diversity. Staff and students from CNRE wore pink and congregated over lunchtime pizza. Prizes were awarded for best pink, and all joined in singing Tūtira mai ngā iwi (Stand together people) with guitar accompaniment! Warm fuzzies all round. For further information on anti-bullying and diversity initiatives, please contact Matthew Hughes (CNRE representative on the College of Engineering Equity & Diversity).

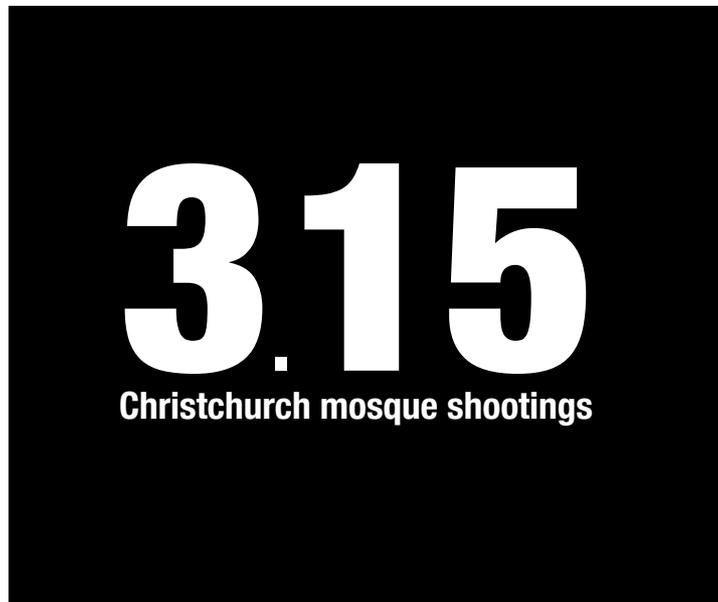


What is Pink Shirt Day?

Pink Shirt Day is a national campaign which aims to raise awareness about the power to prevent bullying. It endeavors to celebrate diversity and create a New Zealand where all people feel safe, valued and respected.

Pink Shirt day began in Nova Scotia, Canada in 2007 when a group of students defended a kid being bullied for wearing a pink shirt. To show solidarity and support the students chose to wear pink shirts.

Ko tātou, tātou
we are one



We lost 51, but found 5 Million.



Band Together

Kia kaha, kia māia, kia manawanui | Be strong, be brave, be steadfast.



*A stand of solidarity and inclusiveness to support our Muslim students and staff.
The University of Canterbury community held a vigil on Monday 18 March. As a university community we came together to extend our solidarity and support and to condemn the attacks on Mosques in Christchurch on 15 March.*



CNRE Togetherness Memorial Lunch for Mosque Tragedy

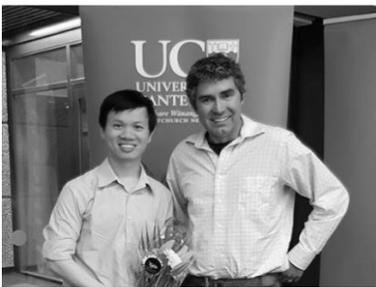


Department get together to connect with each other and show support to those affected, and in particular express our sympathy to the Muslim community.

Giant flower wall remembering Christchurch mosque terror victims photo (taken by Brian Guo)



PhD graduates



Dr Helmy Tjahjanto

Topic: Bidirectional performance of square concrete-filled steel tubular column connections

*Senior supervisor: Greg MacRae
Co-supervisor: Anthony Abu*

Dr Tushar Chaudhari

Topic: Seismic performance evaluation of steel frame buildings with different composite slab configurations

Senior supervisor: Greg MacRae

Dr Obinna Akaa

Topic: Balancing stakeholder goals in structural fire design of steel-framed buildings

Senior supervisor: Anthony Abu

Dr Nikoo Hazaveh

Topic: Improving the seismic performance of structures with direction and displacement dependent viscous dampers

*Senior supervisor: Stefano Pampanin
Co-supervisor: Geoff Rodgers; Geoff Chase*

Dr Amirasoud Malekbeygomghaleh

Topic: Post-earthquake damage assessment and residual capacity of concrete and RC beams

*Senior supervisor: Allan Scott
Co-supervisor: Stefano Pampanin and Greg MacRae*

Dr Atefeh Pourali

Topic: Seismic performance of suspended ceilings

*Senior supervisor: Rajesh Dhakal
Co-supervisor: Greg MacRae*

Dr Dang Duc Thanh

Topic: The effect of water infrastructure development on flow regimes and sedimentation in the Mekong River floodplains

*Senior supervisor: Tom Cochrane
Co-supervisor: Tonny de Vries*

Dr Simona Giorgini

Topic: Towards performance-based design of integrated foundation-superstructure systems

Senior supervisor: Misko Cubrinovski

Dr Miquel Arnaiz Gonzalez

Topic: Development of a MHP pre-feasibility assessment tool for developing countries

*Senior supervisor: Tom Cochrane
Co-supervisor: Nick Dudley Ward*

Dr Daniel van der Walt

Topic: Development of a stochastic based multidimensional matrix for the analysis of pavement performance data

Senior supervisor: Eric Scheepbouwer

Dr Abdulla Thasleem Abdul Hakeem

Topic: A decision support framework for selecting feasible coastal protection measures in the Republic of Maldives

*Senior supervisor: Rajesh Dhakal
Co-supervisor: Tom Cochrane*

Dr Ali Rad

Topic: Seismic ratcheting of steel low-damage buildings

Senior supervisor: Greg MacRae

Dr Gabriele Granello

Topic: Long-term performance of post-tensioned timber structures

Senior supervisor: Alessandro Palermo

Dr Zeinab Chegini

Topic: Low-damage seismic design of bridge superstructures

Senior supervisor: Alessandro Palermo

Dr Arun Mankavu Puthanpurayil

Topic: Multi-objective seismic loss optimisation framework for viscous dampers using advanced inherent damping models

Senior supervisor: Rajesh Dhakal



*Congratulations to all our PhDs who received their Doctorates in April 2019.
Dr Nor Hayati Abd Ghafar, Dr Gabriele Granello, Dr Simona Giorgini and Dr Royce Liu.
 In Absentia Doctorates were awarded to Atefeh Pourali and Alberto Cuevas Ramirez.*



New PhD Students

Tom Cameron Francis

PhD topic: Seismic Isolation of Light Timber-Framed Buildings in New Zealand
Main supervisor: Associate Professor Tim Sullivan

Riwaj Dhakal

PhD topic: Liquefaction Assessment Methodologies for Reclaimed Land
Main supervisor: Prof. Misko Cubrinovski

Paul Daniel Horne

PhD topic: The performance of post-tensioned timber frames in fire
Main supervisor: Dr. Anthony Abu

Sundeep Daggubati

PhD topic: BIM-based construction safety management system
Main supervisor: Dr. Brian Guo

Fatma Abdelaal

PhD topic: BIM-based green building design and assessment
Main supervisor: Dr. Brian Guo

Farideh Jamalibehnam

Main supervisor: Dr. Ricardo Bello Mendoza

Xuan Sy Trinh

PhD topic: Real-time traffic monitoring using multiple data sources in urban networks
Main supervisor: Associate Professor Dong Nguduy

Sarah Jane Neill

PhD topic: The Effects of Kinematic Rupture Uncertainty on Simulated Ground Motions in New Zealand
Main supervisor: Prof. Bredon Bradley

Anna Sara Ulrika Nilsson

PhD topic: Biogas and phosphorous recovery
Main supervisor: Dr. Ricardo Bello Mendoza

Milap Dhakal

PhD topic: Development and Evaluation of Methods for the Construction of Martian Habitats using In-situ Resources
Main supervisor: Associate Professor Allan Scott

Thuy Thi Nguyen

Main supervisor: Dr. Markus Pahlow

Forrest Zach Bilek

PhD topic: Variables affecting the removal efficiencies of stormwater treatment devices
Main supervisor: Dr. Frances Charters/Prof. Tom Cochrane

Shaurya Sood

PhD topic: Geotechnical characterization of Auckland volcanic soils for land reclamation purposes
Main supervisor: Dr. Gabriele Chiaro

New Staff



Prof. Daniel Nilsson, Fire Engineering

Professor Daniel Nilsson joined the department in August 2018. Daniel is working in the Fire Engineering group and he is teaching in the Masters of Engineering Studies (MEngSt) in Fire Engineering. He was previously Associate Professor at the Division of Fire Safety Engineering at Lund University, where he worked as a teacher for 16 years. Daniel was an exchange student at the University of Canterbury in 2000, and he now returns to teach and do research about Fire Engineering.

Daniel's main research interest is evacuation. Much of his research has focused on the interaction between people and evacuation systems, e.g., way-finding systems and fire alarms. Recent studies have involved evaluation of both visual and auditory way-finding systems in smoke filled tunnels, as well as studies on the design of fire alarms and way-finding systems in high-rise buildings. In the last couple of years, Daniel has explored the use of Virtual Reality experiments, i.e., experiments performed in virtual environments instead of built physical environments. He is currently in charge of setting up a Virtual Reality evacuation laboratory at the department.



Matthew Dudzik, Architect-in-Residence

I am so excited to have the opportunity to join all of you at University of Canterbury! As the International Architect in Residence I will be traveling back and forth between Christchurch and the United States, with my next visit being the 19th of February through the 25th of March. For the previous eleven years I was a Professor of Architecture at Savannah College of Art and Design (SCAD), where my research focused on cultural adaptations of modernism, national identity, and socio-spatial justice. As an architect I am especially interested in environmental psychology, the cultural coding of design, and experiential progression through space. In addition to teaching I manage the architecture firm DUDZIK Studios which is currently working on a mixed use development in Guadalajara, a lake house in northern Michigan, and is consulting on a hospital in Cameroon. I also have a passion for art and artefacts, especially pre-Columbian (the Chimu period is a favourite), Oceania, and Egyptian antiquities. This has been a year of exciting change for me. I married my wife Audrey in Harbor Springs, Michigan on August the 11th. We moved north from Georgia, where I had been living for eleven years and she for five, to the Green Mountains of Vermont. Audrey stated her new job as a General Surgeon in the beginning of September. We closed on our house the 28th of September and I left three days later on the 31st to come to Christchurch. As we are completely remodelling the house, demolition is currently underway, I plan to return to a construction site in November (It will be such a relief to arrive back in Christchurch in February). Once we're done with construction, should you find yourself in that part of world, please let me know! We have an eight year old rescue golden retriever named Remy who won't retrieve and hates water. He obviously missed the memo on how to dog. Even with all of this upheaval we are both thrilled for this exciting new chapter in our lives. It is such a pleasure and privilege to get to know so many new people.

Dr Daniel van der Walt, Construction Engineering and Management



I was incredibly honoured to join the department in 2018. I work in the fields of construction engineering and management. I have research interests in pavement engineering, asset management, infrastructure systems, procurement, and engineering finance. While I am a new staff member, I am not new to UC. This department has provided me with a BE, PhD and a lovely wife. Outside of work, my hobbies include downhill mountain biking, snowboarding, rock climbing and sailing. Throughout my experiences thus far I have had the opportunity to work with some amazing people and look forward to continued mutual success as a part of this team.

Dr Craig McConnochie, Fluid Mechanics



Kia ora koutou. It's great to be returning to UC as a lecturer in the fluids area. I finished my Natural Resources Engineering degree here in 2012 and then moved to Canberra where I did a PhD at the Australian National University. More recently I have been working as a postdoc at Woods Hole Oceanographic Institution in the US. Both my PhD and postdoc research was focused on understanding the melting of icebergs and glaciers around Antarctica and Greenland. Although I'm continuing to work on some ice melting projects, I'm also excited to think about some new fluid mechanics problems with more of a civil engineering flavour. In particular, I'm interested in the efficient ventilation of buildings, mixing process in jets and plumes, and the impact of sediment on turbulent flow. Outside of work I enjoy trail running and tramping so am looking forward to rediscovering the New Zealand bush after a few years overseas!

Dr Simone Larcher, Environmental Engineering



I arrived in Christchurch at the end of June 2018 from Toronto Canada with my husband, Julius; daughter, Estelle (who just turned 2 years old in March); and dog Joey (a female who we adopted from an animal shelter when she was 10 weeks old and 5 kg; she will be 4 years old in July and is now 30 kg, but she still acts like a puppy!). I am a true Torontonian (born and raised in various parts of the city) and spent more years than I ever anticipated studying at the University of Toronto (BASc, MASc, and Post-Doc); but I have also lived and worked in the U.K, and I lived for many years in Montreal while pursuing my PhD at McGill University. Since having our daughter we have not been as active as we would like, but when we had free time Julius and I used to spend it playing volleyball and tennis, cycling, and snowboarding. We also enjoy cooking and baking, and enjoying the results with a glass of wine or a cup of tea/coffee. We also enjoy music and look forward to finding the time to learn/practice more (we brought a fairly large piano over with us), playing vinyl on our decks, and going to see good acts (we were sad to miss Radiohead in Toronto last July; they are amazing live). I have never considered myself stereotypically Canadian (I don't think I say "eh" at the end of every sentence), but since living here I have realised how important good maple syrup is to me!

Dr Gabriele Granello, Structural Engineering



Hi everyone, my name is Gabriele Granello, currently Lecturer in Structural Engineering. I came to the University of Canterbury from Italy in March 2015 to start a PhD in Structural Earthquake Engineering, which I finished in early 2018. Currently, I am carrying out research in the space of low damage timber structures, eco-rubber soil foundations and structural health monitoring. Outside work, I love outdoors (tramping, kayaking, surfing..) and sports in general, especially football and tennis. I also enjoy playing music, passion that I have been cultivating since the primary school. Feel free to drop me an email for a chat in front of a coffee, either you wanna discuss about work, music, or the last ATP tournament. Cheers!



Dr Chao Wu, Structural Engineering

I received PhD degree in Structure Engineering from Monash University, Australia. My bachelor degree in Bridge Engineering was from Tongji University, China. I worked as a postdoctoral research fellow in University of Michigan Ann Arbor in US and École polytechnique fédérale de Lausanne, Switzerland. My research focuses on the applications of advanced materials for sustainable building constructions. These materials include but are not limited to Fiber Reinforced Polymer (FRP), Engineered Cementitious Composite (ECC), and Glued Laminated Timber (Glulam or GLT). These materials possess desirable advantages over conventional construction materials, and are helpful for the reduction of the carbon footprint and the enhancement of the structural resilience. I have published over 70 research works since 2011, including 30 peer-reviewed conference papers, and 40 articles in top ISI international journals. I am serving in the Editorial Boards of ASCE Journal of Composites for Construction, and Acta Material Composite Sinica (EI indexed journal). I also received Outstanding Reviewer Awards from JCR Q1 journals of Engineering Structures, Composites Part B: Engineering, Construction and Building Materials and ASCE Journal of Composites for Construction.



Dr Derek Li, Research Fellow

Dr. Derek Li, a new research fellow, joined CNRE by Feb. 12 2019 on a 5 year contract. Prior to this position, he worked in the Department of Electronic and Computer Engineering, the Hong Kong University of Science and Technology as a postdoctoral fellow within a large international collaboration project on Smart Water technology (NZ\$ 7.3 million) for two and a half years. Since then he has cooperated with Prof. Pedro Lee (Principal Investigator in the Smart Water project) to develop advanced technology to detect the abnormalities, such as leakages and blockages, in the urban water pipeline systems. Derek's research interests include nondestructive testing, inverse analysis, optimisation, wave propagation modelling and acoustic signal processing. Derek will be expanding his current research into a new and potentially high profile collaboration to detect poisonous lead piping in the city of Flint, Michigan U.S. Besides his current research interests, he is keen to develop teaching in the hydropower, renewable energy area within the department and provide electrical expertise in these cross disciplinary areas.



Senior Tutor, Roger Chen

Roger Chen joined our department on Monday, 12 March 2018 as a Senior Tutor. He will be working alongside Dr Kim Parrent and other academic staff, including Dr Markus Pahlow, Dr Tonny de Vries and Professor Mark Milke in developing Design Studio 2, Communications Portfolio and Project and Infrastructure Management. He will be involved in ENGR200, ENCN201, ENCN301, ENCI313, and ENNR313. Roger believes that bridging the gap between the work force and university is vital to the success of future engineers. He holds a degree in Bachelor of Engineering with Honours from the University of Canterbury (2013).



Administrator, Emma Clark

My name is Emma and I was born and raised here in New Zealand. I moved around a bit as a child with my family but have been in Christchurch since 2001. I'm a bit of a geek and love reading and writing, terrible puns, animals, biking, walking, travelling, gaming, watching movies and TV shows, and hanging out with friends and family. My parents own the cutest chocolate Labrador in the world (I may be slightly biased) and I occasionally dog-nap her for long walks around the Port Hills and further afield. I've been with the university for three and a half years now, but was previously a student here too. Thank you for having me, and I'm looking forward to getting to know everyone!



Administrator, Jeni Clayton-Smith

Please welcome the new Postgraduate Administrator, Jeni Clayton-Smith to our team. Jeni started at CNRE at the beginning of August.

Hey guys, I've met some of you already but for those I haven't, I've been with UC for 4½ years and have come over from the College of Education where I also worked with the Post Grads but this is a whole new ballgame and it's early days, so go easy!

As for me, I'm originally from Manchester, UK, been in Chch 6yrs this year and can't live without my 7 year old son, music, Gin and chocolate – I'm not that interesting really but I am looking forward to working with you all.

See you around, Jeni



Administrator, Veronika Letufuga

*Hi everyone,
I'm Veronika – Nika for short – and I'm one of the new faces to UC. My previous roles over the past twenty years have been focussed around customer service in varying forms of hospitality, manufacturing, sales and retail management and I'm looking forward to being able to bring some of those skills to help in my role here.
On a personal level, I moved to Christchurch at the beginning of the year so I'm still working my way around town. I have two boys, aged 11 and 16 and am partial to cups of tea, chocolate biscuits and getting outside my comfort zone. I'm really looking forward to getting to know everyone and working alongside you all.*

See you soon

Nika

Dr Sean Rees, New Geotechnical Laboratory Research Engineering



Hi everyone! I'm very excited to be back at UC and joining the department as a Research Engineer within the Geotechnical Laboratory. After finishing at UC as a student in 2010, I moved to the UK to work for a geotechnical equipment manufacturer (GDS Instruments), which saw me residing just outside of London until early 2016. While it was an awesome experience to live and travel overseas, I decided to return to NZ with my partner (Hayley) in 2016 to have a go at starting a family. Since getting back to NZ I have worked for a geotechnical consultancy (Tonkin & Taylor) as a geotechnical engineer, and we were lucky enough to welcome the arrival of our daughter, Pippa, in early 2017. Now that I'm back at UC I really look forward to saying "Hi!" to you all in person, and hope that everyone has a fantastic weekend planned! -

Sean

Promotions



Tom Cochrane promoted to Professor



Allan Scott promoted to Associate Professor



Tony Abu promoted to Senior Lecturer
Above the Bar



Matthew Hughes promoted to Senior Lecturer



Tonny de Vries promoted to
Senior Lecturer



Chris McGann promoted to Senior Lecturer

Erskine Visitors

Michael Delichatsios, Professor of Ulster (UK) and Northeastern University (USA), was invited here as an Erskine Fellow in Fire Safety Science to work with Professor Charles Fleischmann.

"I am here with my wife Mary and we intend to enjoy our stay by visiting several places in South Island including Queenstown. We enjoy long walks, swimming and yoga. Also we like theater and concerts where we have found many in this area. Prof Delichatsios will be teaching ENFE614, Special Topic, Risk Assessment in Fire Safety Engineering block course and lectures in ENFE602 and helping with a 3rd Pro Project in ENCN493."



Erskine Fellows

2018

Simon Eveson

Phillip Yen

Bruce Kutter

Susan Masten

Giuseppe Modoni

Michael Griffith

Michael Delichatsios

2019

David Baska

David Hill

Kendra Sharp

James Mihelcic

Michael Delichatsios

Steven Kramer

The John Angus Erskine Bequest

Each year, some 70 distinguished, international academic visitors who are already advanced in the learning of any subject predominately taught in Colleges of Business, Engineering and Science are invited to the University of Canterbury ('UC') for durations of, normally, one to three months for the purpose of giving lectures in such subjects to UC students. Each Visiting Erskine Fellow receives a grant-in-aid which takes account of up to two economy class return air fares and a daily allowance towards living expenses. A visitor must be nominated by an 'Erskine eligible' School or Department and only academics who are distinguished in their fields are approved for a visiting Erskine fellowship. The Erskine Bequest also funds some 25 outgoing Erskine Fellowships each year which enable UC academic staff members predominately from the Colleges of Business, Engineering and Science to increase their knowledge in such subjects so as to better enable them to teach those subjects to UC students. The Erskine Bequest has funded these Programmes since 1963.

New Facilities

Structural Engineering Laboratory (SEL)



The new Structural Engineering Laboratory (SEL) was officially opened by the Minister for Tertiary Education, Hon Steven Joyce, on 15 April 2016.

The build was a first for the New Zealand construction industry. Highly complex technically and logistically, it required considerable collaboration between a range of companies with specialist expertise, the project team, designers, constructors, Engineering College staff and suppliers - all working together to ensure an outcome that would meet the University's needs, now and in the future.

UC students will now be exposed to modern testing techniques that provide first-hand experience of seismic loadings on structures and soils in real-time and at a realistic scale.





Department of Civil & Natural Resources Engineering

69 Creyke Road
Christchurch
New Zealand

enquiries@civil.canterbury.ac.nz

Phone +64 3 369 3113

<https://www.canterbury.ac.nz/engineering/schools/cnre/>

