

Civil and Natural Resources Engineering

CNRE News (Number 24 2011)



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Welcome to the 2011 edition of the Civil and Natural Resources Engineering magazine. The University of Canterbury, and the Department, has been through what is probably the most challenging twelve months in its relatively long history. And those challenges, in some ways, have only just begun. Soon after I wrote my Head of Department message for the 2010 edition, on 4 September, Christchurch was struck by a severe 7.1 magnitude earthquake that shut the campus for a few days and caused significant damage around the city. While somewhat disrupting our second semester of teaching the impact on the University was not great.

Five months later, on 22 February 2011, a major aftershock struck the region with an epicentre very close to the city itself. Those of you with strong connections to Christchurch will already know this quake brought down two multiple-storey buildings in the Christchurch CBD resulting in well over 100 deaths and leaving our city in mourning. Two further aftershocks on 13 June, while not as destructive, continued to disrupt life in our city and university.

These earthquakes have caused unprecedented disruption to our academic programmes. Following the 22 February earthquake, occurring as it did only a day after the start of the teaching year, the University of Canterbury campus closed indefinitely until careful inspections of buildings and their safety systems could be undertaken. The Department responded rapidly to these circumstances and sought out an alternative venue for delivering lectures and tutorials. Four weeks after the earthquake lectures were once again being delivered to our first and second professional students on a makeshift campus in the Avonhead Baptist Church facilities a couple of kilometers from the Ilam campus. And a week later our third professional and graduate students joined us. The success of these adventure, which lasted a month, can be credited to our students, who graciously accepted unconventional teaching spaces and an unusual timetable (8am starts, 6pm finishes and lectures on Saturday mornings), our staff, who quickly adapted their teaching resources and approaches to match our constrained environment, and the staff and management of the Church, whose generosity in welcoming us could not have been more

appreciated. Even so the first semester was "badly damaged" and it was necessary to cancel final exams and to teach right to end of the semester in order to ensure our students received a robust programme.

The earthquake on the 13 June, which closed the campus for a further week, interrupted the end of semester teaching and testing period and a number of final tests were pushed into the first week of semester 2 in order to relieve some of the pressure on our students and staff. At the time of writing we are four weeks into semester two teaching. Perversely the campus has closed for another three and a half days due to two unusually heavy snow falls, but otherwise our programmes are on track and our hope is that the remainder of the year will pass uneventfully.

The earthquakes of 2011 have no doubt brought with them personal and communal loss on an unprecedented scale in our city. Even our fellow New Zealanders seem unable to grasp the true extent to which the physical and social landscape of Christchurch has changed in a few short months. However, for me there have also been bright spots amongst these calamitous events. Community strength and generosity have been evident everywhere, from the student army that dug uncountable shovelfuls of silt and sand from properties around the city to our friends at the Avonhead Baptist Church, to the individuals who have helped their neighbours get by without running water or a working toilet. Members of the Department, staff and students, have also made their not insignificant contribution in the aftermath of the quakes, undertaking building inspections in hazardous conditions in the CBD and on campus, and instigating a major survey of the occurrence of liquefaction around the whole city. I pay tribute to these members of the Department who make us proud.

Our staff have also been playing a major role in the education of our community at large. A number of our structural and geotechnical staff have written articles for the Press newspaper, contributed answers to readers' questions in the same periodical, and participated in a highly successful series of lectures, sponsored by the University of Canterbury, that have tried to explain the engineering and geological aspects of the quakes in terms that the general public can understand and appreciate. In my view all of these activities have been important components in helping to stabilize our community by reducing the fear and uncertainty of its citizens.

To those outside Christchurch the earthquakes that have rocked the city are probably old news. A few snippets on the television news or in local newspapers probably remind them now and then that things in Christchurch are still not normal. The fact is that Christchurch and many of its institutions, the University of Canterbury amongst them, will never be the same again. The University, and by implication the Department of Civil and Natural Resources Engineering, faces serious short term, medium term and long term challenges. In the short term student enrolments are down around 10% with the attendant loss of income. Insurance premiums have sky rocketed and the fates of a number of buildings on campus are still unknown.

Teaching spaces have been lost, laboratories shutdown, libraries made inaccessible and social and recreation spaces off limits. The University is taking bold steps to confront these challenges including increasing scholarships, particularly for undergraduate students, hosting social events on campus, managing some of its resources, such as lecture space, in a more efficient way, and building two temporary villages of prefabricated buildings on its Ilam and Dovedale campuses. Don't be mistaken. The University is open for business as usual, and despite the impact on its resources it continues to provide the quality education for which it is renowned, albeit, sometimes in a different way.

Perhaps surprisingly life goes on despite the overpowering effects of the earthquakes. Curriculum change continues unabated. 2011 has seen the introduction of our new 15 point courses in the first professional year. Our initiation of a portfolio approach to teaching communication skills to our students is well underway with Dr Creon Upton, who has a PhD in English, employed on contract to assist the department in developing writing guides and other resources to support students in this traditionally challenging area.

A key initiative for the department at present is the establishment of a Seismic Engineering Centre that will focus our expertise in earthquake engineering, both geotechnical and structural, and provide the department with a vehicle for providing education, research and consulting/testing capability to the community. The Christchurch earthquakes have provided the impetus for this strategic development and we are looking outward to the profession, the community and local and national government to engage with the Centre.

We have had our opportunities to celebrate this year with Associate Professors Charley Fleischmann and Mark Davidson receiving teaching awards, Charley at the university level and Mark at the college level. Professor Andy Buchanan has been elected a Distinguished Fellow of IPENZ for his outstanding contribution to the profession over many years, and Associate Professor Stefano Pampanin was invited onto the panel of inquiry into the collapse of the buildings in the CBD.

Our graduating classes of 2011, 2012 and 2013 will be different from those of the past. Each of these cohorts will have experienced adversity in their studies that have caused them to find extra resources within themselves in order to succeed. While they may look back on the last 12 months as a time in their lives that they would have preferred not to experience, in the long term I believe that these students will be some of our very best graduates. They will be more mature, more thoughtful, more aware of their place in society and the responsibilities that brings, they will be 16()110 -1.675 Tl. t

Celebrating Teaching Awards

Charley Fleischmann wins UC Teaching Award

Charley Fleischmann, Associate Professor in Fire Engineering, was recently awarded the UC Teaching Award for 2010. The award recognises



his excellence in teaching (including thesis supervision) in both undergraduate and graduate programmes.

Charley's Teaching Philosophy

For me, receiving a university teaching award has been a highlight of my career at Canterbury. Having been hired here to teach into the highly specialized fire engineering masters program, I have always been very comfortable with small groups of students, teaching fire engineering where I personally know many of the "founding fathers" of fire engineering. So when I was asked to get involved in ENGR102 where there has been little new material since Isaac Newton's Principia was published created some interesting challenges for me. Walking into a class of more than 200 students can be a bit unsettling at times, and trying to engage with them has its own challenges. Yet I soon realized that most of the students we have at Canterbury are interested in engineering and it is up to me to make the material both interesting and relevant for them.

As engineers we solve practical problems for the betterment of society. As a teacher it is my responsibility to inspire and motivate students to learn how they can solve these problems. From engineering intermediate mechanics through to my postgraduate fire engineering courses my goal is to provide the best student focused learning experience to help students develop and extend their problem solving skills. As a teacher I strive to provide the students with problem based learning that is both relevant and interesting so that they are inspired and passionate about solving engineering problems. I am always looking for new things to make the lectures more interesting, whether it is a new structural photo for the intermediate lecture or talking about our recent research or consulting with the postgraduates, for me it is all about making my teaching interesting and relevant.

However, teaching is not simply about performing in the lecture theatre it is about providing a multifaceted experience that will reach as many students as possible. Catering for different learning styles, presenting relevant examples and online practice quizzes are some of the ways to create an environment where the students successfully learn the fundamental knowledge about engineering problem solving. With our ever evolving information age, student's skill sets and expectations are constantly changing which means we must constantly evolve our teaching styles and methods to adapt to their needs. Although there is an ever increasing demand for these digital resources I don't think academics will soon be replaced by these digital alternatives. I believe students still crave the human interaction with teachers to help guide their learning.

Lis Bowman wins UCSA Teaching Award

Lis Bowman, Senior Lecturer in Geotechnical Engineering, was awarded the



Postgraduate Supervisor of the Year Award at the recent UCSA Lecturer of the Year ceremony 2011.

Mark Davidson wins College Teaching Award



Mark Davidson, Associate Professor in Environmental Fluid Mechanics, was awarded the College Teaching Award for 2010.

New Post-docs

D Nadi e R h



Dr Nadine Roth arrived from Germany in January 2011. She got her first degree in Logistics from the University of Applied Sciences in Friedberg, Germany, in 2003.

Nadine continued her studies with a Master in Traffic and Transport at the Technical University Darmstadt. Afterwards, she stayed in Darmstadt for another five years, working as a research associate at the chair of transport planning and traffic engineering. Nadine worked on different research topics including the preparation of a project on the dynamic and seamless integration of production, logistics and traffic, and transport, as well as on other projects, like the opening of a research centre in Vietnam in 2010, and gained her doctoral degree in this time. During her stay at the University of Canterbury, she is doing research in Intermodal Aspects of Mobility Pricing, a project scheduled for two years and working with Professor Alan Nicholson.

D She g-Li Li



Dr. Sheng-Lin Lin is originally from an earthquake-prone area, Taiwan. A graduate of National Taiwan University, Sheng-Lin obtained his Ph.D. from the University of Illinois

at Urbana-Champaign in Civil Engineering (Structural focus) in 2010. Prior to his Ph.D. study, He worked as an Assistant Research Fellow at the National Center for Research on Earthquake Engineering (NCEE) Taiwan; and a Teaching Assistant at the Department of Civil Engineering at National Taiwan University.

Sheng-Lin's research interests and experience include seismic risk assessment, geotechnical earthquake engineering, numerical simulation and experimental testing, fragility analysis, structural analysis and design, and information technology applications in earthquake engineering.

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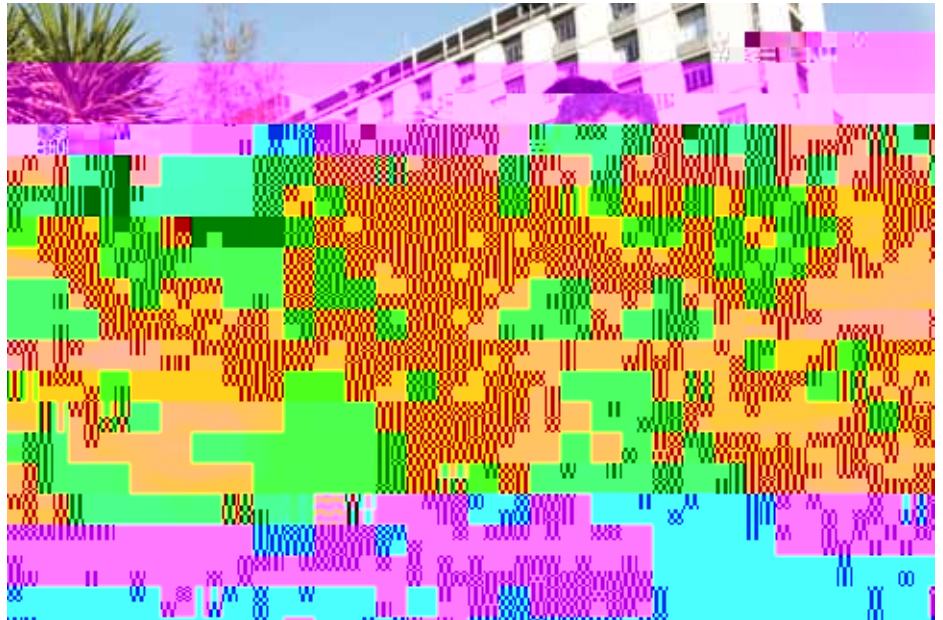
Water / Environmental / Hydro-Eco / Fluids

Water Research Workshop and Discussion Forum

On 1 July 2011, the Department hosted the first New Zealand Water Postgraduate Research Workshop. A total of 40 academic staff, post-graduate students, young water professionals, and leading figures in the water industry gathered to examine water research. A total of 11 students gave research presentations in the morning sessions. The afternoon session had presentations focused on water pollution issues by Garry Macdonald (Beca Infrastructure Ltd. and outgoing IPENZ President), Stephen Esposito (Solid Energy New Zealand), John Russell (Fonterra), and Mike Freeman (Freeman Environmental).

The workshop provided professional development support for the post-graduate students and the young professionals, while an emerging needs session developed suggested actions to address emerging needs in water pollution control. The participants at this session noted that large amounts of water quality data are collected for various reasons (e.g., consent compliance), but these data are too often not used in assessments of environmental effects. The result is a situation where water quality assessments are much less informed than they could be, which, in turn, increases the risk of poor decision-making with regards to water pollution control requirements.

The workshop was initiated and organized by Senior Lecturer Dr Daniel Tsang, Associate Professor Mark Milke, and Associate Professor Naresh Singhal (University of Auckland). It was sponsored by the Centre for Advanced Engineering New Zealand and the Waterways Centre for Freshwater Management, along with the Universities of Auckland and Canterbury. The mix of research, invited speakers, future-gazing, and professional development for young professionals proved a winning combination.



Book a Mix of Science and Anecdote about the Amazon

A book that is the culmination of 50 years of passionate research on the Amazon has been published by Dr Tom A Cochrane (Natural Resources and Civil Engineering) and his father, Dr Tom T Cochrane.

The book, *Amazon Forest and Savanna Lands*, is a guide to the climates, vegetation, landscapes and soils of central tropical South America.

As a young boy, Dr Tom A Cochrane was taken through the Amazon by his father who worked there in a variety of roles as a soil scientist. "I grew up with Dad being passionate about the Amazon region. He would sometimes take us on trips through the area which were very fascinating for a boy."

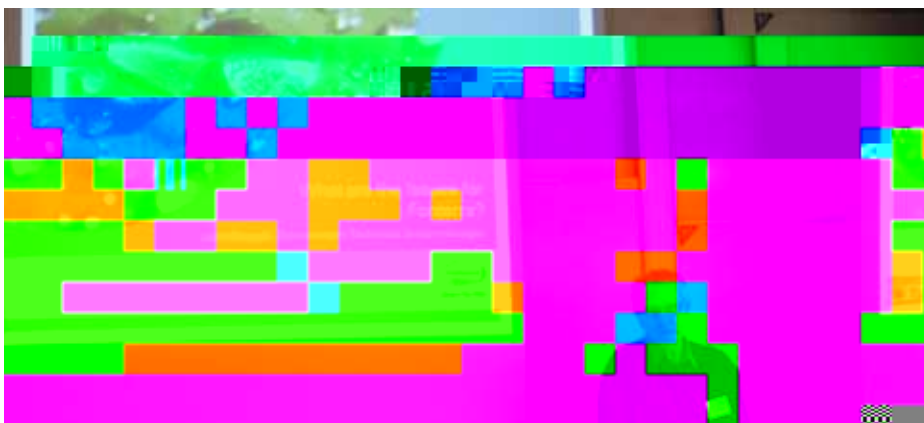
Dr Cochrane has followed in his father's footsteps, although his research focus is agricultural land use, soil and water conservation, and the conservation of natural resources world-wide. Dr Cochrane the elder is currently supervising Agrotecnologica Amazonica's forest-savanna ecological conservation reserve in the Bolivian Amazon.

"Dad was contracted to Bolivia in 1963 by the British Tropical Agricultural Mission to study some of the least-understood lands of the Amazon. He loved the area and has stayed working in the Amazon region for more than 50 years," Dr Cochrane said.

"We have gathered all this information over the years — people ask us for information all the time — so we thought why not put it all together in a book. It has been really nice getting together, working with Dad again, and has brought up some really nice memories," said Dr Cochrane.

The book is a result of their research in the region and is intended to increase people's understanding of it. It also includes technical information for better understanding tropical lands in general, and more specifically statistical prediction of fertiliser needs, calculations of osmotic potential and the development of a theory of solution flow through soils and plants, which Dr Cochrane said should be of interest to all soil scientists.

"The book is an overview of the land resources of the Amazon in terms of its complex of climates, landscapes, vegetation and soils found throughout this vast, often misunderstood region," he said.



“The Amazon is a very special place and deforestation is a big concern. The soil is very poor, so although people cut down trees with the intention of turning it into agricultural land, it will not be good for that purpose. The book is a resource so that people can look at the region and use the information to better use and protect it.

“I feel very strongly about the Amazon — it is the last large natural resource left in the world. Losing this is shameful and a huge concern.”

Amazon Forest and Savanna Lands is also a personal book for Dr Cochrane and his father and contains anecdotes about their time in such a special place.

“Once we were living for three weeks on a boat in the Amazon. One day we took a canoe out to get some soil samples, but where the river branches into flood plain tributaries we got lost. It started to get dark, the mosquitoes were biting badly so we put these big black plastic bags over our heads with small holes to see and breathe. We tried to sleep on this canoe, but luckily we were woken by a small light that was moving towards us. It turned out to be an Indian fishing in the river. He was able to navigate us back to the boat in the morning. Why wasn't he scared of us with black bags on our heads? We must have looked funny. We have included some of these stories to make the book more interesting.”

Pedro Lee wins Inaugural Research Award

Three University of Canterbury projects have been recognised at the inaugural Tech Jumpstart awards, each receiving \$20,000 to help the flow of ideas out of the lab and into the community.

The projects include a new colour model for digital movie cameras, a new algorithm that enables the flow of fluids to be measured in pressurised pipes, and the development of a novel prototype probiotic to improve animal health and wellbeing.

The awards, hosted by UC's Research & Innovation, attracted 18 new ideas from UC.

Speaking at the awards function on 12 October, Research & Innovation Director Nigel Johnson said funding for the Tech Jumpstart competition came from the Pre-seed Accelerator Fund (PSAF), funding intended to “take an idea with commercial potential, that already has established proof of principle and proof of

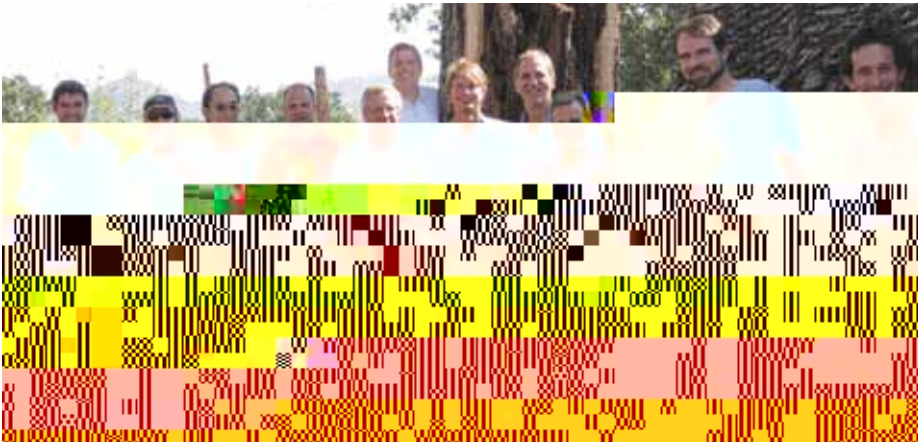
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Tsunami Research

Colin Whittaker (PhD student) is working with Associate Professor Roger Nokes to investigate the generation and propagation of landslide-generated tsunamis.

Tsunami events represent a significant hazard to coastal communities. This has been highlighted by the tragedy in Japan earlier this year and the Boxing Day tsunami of 2004. An increased understanding of tsunami events will enable these communities to be better prepared for their occurrence. Landslide-generated tsunamis are particularly dangerous to adjacent coastal communities due to their large-amplitude waves and short warning times.

Colin Whittaker is undertaking his PhD research project on the generation and propagation of submarine landslide-generated tsunamis. He has recently begun a series of two-dimensional experiments using the 15m flume located in the Fluid Mechanics Laboratory. These tests use a mechanically-controlled rigid block landslide to determine the effects of landslide motion and submergence depth on tsunami wave properties. The use of a mechanical system to control the landslide motion allows a broader range of motion to be tested than in previous work, as well as improving experimental repeatability. The mechanical system itself uses a stepper motor and belt to drive a semi-elliptical aluminium block along a horizontal bottom boundary, and is controlled using software developed by the department's electronics technicians. Data will



Mekong Hydrology and Foodweb Meeting

Dr Tom Cochrane and PhD Mauricio Arias were invited to a meeting on Mekong river hydrology and foodwebs held at the University of California, Santa Barbara Sedgwick Reserve field station.

Scientists and engineers from universities around the world got together to boost research collaboration and seek additional joint funding to study the link between hydrology and ecosystem productivity in the Mekong river and the Tonle Sap (South East Asia's Great Lake), the world's most productive inland fishery which sustains over 60 million people.

The Mekong river is currently undergoing rapid development (dams, irrigation schemes), which together with climatic change may alter natural flows and impact food security in the region. After very productive discussions and work, the meeting ended with a bang as the tree used for pre-meeting photograph collapsed (presumably an indication of the heavy burden of ecological problems they are dealing with!). Some of the more avid environmentalists are seen trying keep the tree from falling completely.

More about UoC's Mekong project can be found at www.mekongflows.org

Rain Garden Treatment

Joe Good (ME student) attended the International Water Association (IWA) - Cities of the Future Conference in Stockholm, Sweden (22-25 May 2011) where he presented a paper entitled *Appreciating drainage assets in New Zealand Cities: Rain garden treatment and hydraulic efficiencies*.

The conference focused on sustainable urban planning and water management and was attended by approximately 350 urban planners, engineers, regulators, and academics alike,

representing more than 65 countries. The diverse group of water professionals provided excellent networking opportunities and in-depth conversations representative of practical real-world situations where different disciplines are tasked to work together to solve the same problems. Conference highlights included a keynote presentation by Rob Skinner, a professorial fellow at the Centre for Water Sensitive Cities at Monash University and world leader in water sensitive urban design and conference dinner at the Stockholm City Hall, home to the Nobel Prize banquet.

Green Roof Technology

Green roofs are emerging internationally as a Low Impact Design (LID) for stormwater management in dense urban centres. Rooftops comprise a large proportion of the total impervious area in urban settings and also contribute substantial contaminant loads to drainage systems.

Significant opportunity exists to reduce runoff and contaminant volume and peak flow by retrofit of existing and in newer buildings with green roof systems. A particular benefit is that these can be constructed on an otherwise unusable space (rather than valuable ground space).



Green roofs have been successfully operating in other parts of New Zealand, especially Auckland, for a number of years but have not yet been trialled in Christchurch. It recently emerged from the Christchurch Expo that residents strongly expect Christchurch to be rebuilt as a more sustainable and ecologically connected city – something that is afforded by including green roof systems.

In late 2011, Christchurch's first green roofs will be trialled at the University of Canterbury campus on the newly constructed 'Oval pods'. The research will investigate the best technical designs and preliminary performance of pilot Testrostruces.

Earthquake Engineering a Priority for UC Engineers

Canterbury's recent earthquake reinforces the importance of research projects being undertaken in UC's College of Engineering.

Academic staff members within the Department of Civil and Natural Resources Engineering have recently succeeded in securing two interim grants for major research projects as part of the Foundation for Research, Science and Technology's (FRST) Natural Hazards Research Platform, which was launched last year.

The platform is hosted by GNS Science, with NIWA and GNS Science acting jointly as "anchor" organisations. They have partnered with the University of Canterbury, as well as with Auckland and Massey universities, and Opus International Consultants. The platform brings together leading researchers to examine how natural hazards occur, their effects, and how we deal with them. It involves scientists and engineers from a range of fields, and provides long-term funding to projects focusing on geological hazards, weather hazards, engineering, including structural and geotechnical engineering, risk analysis and social aspects of natural hazards research.

The University of Canterbury is leading the world in damage-free or damage-resistant systems with applications to concrete buildings and bridges, steel and timber.

One of the projects currently being funded is on low damage structure technology, with a focus on long-term durability of structures. The technology is being applied to both steel and concrete structures but applicable to structures of other materials. The project is being led by Associate Professor Greg MacRae (Civil and Natural Resources Engineering) and Professor Geoff Chase (Mechanical Engineering).

The second grant is funding a research project on non-structural elements, which includes ceilings, facades, windows – the skin of a building – and internal partitions. Professor Greg MacRae and Associate Professor Stefano Pampanin together head this project.

"In a moderate level of earthquake, like the one we had in Christchurch, structural engineers provide buildings with strength so there is no structural damage, but some damage to cladding and ceilings is possible," Professor MacRae said.

Engineer Calls for New Approach to Engineering Infrastructure

The President of the Institution of Civil Engineers made a case for a 21st century engineering renaissance in the 2010 Hopkins Lecture held on campus recently.

Professor Paul Jowitt, who is also Professor of Civil Engineering Systems and Executive Director of the Scottish Institute of Sustainable Technology at Heriot-Watt University, delivered the annual lecture with a presentation titled "Now is the time" in the Ngaio Marsh Theatre.

Professor Jowitt discussed the need for a renaissance that would see the world's infrastructure built and rebuilt to ensure it could meet the challenges posed by climate change, environmental disasters, a burgeoning world and economic crises.

Head of Department Associate Professor Roger Nokes said Professor Jowitt's lecture provided a global perspective on the challenges facing

UC Research Offers Solution to Strengthen Vulnerable Buildings

An innovative solution for strengthening multi-storey concrete buildings was put to the test on the University of Canterbury's shake table earlier this month.

As part of a seven-year Foundation for Research, Science and Technology-funded project on "Seismic Retrofit Solutions for NZ multi-storey buildings" started in 2004, a three-storey reinforced concrete (RC) model building was put through two simulated earthquakes before an audience of staff, students and local television crews.

The particular research being tested – part of PhD student Patricio Quintana Gallo's thesis project but related to a much wider body of research being carried out by a team from the Civil and Natural Resources Engineering Department led by Associate Professor Stefano Pampanin – was an investigation of the seismic response of non-ductile pre-1970 RC frame buildings, before and after a rehabilitation or retrofit intervention. The objective was to upgrade the performance of such a structure when it is subjected to strong earthquake ground motions.

The model had been retrofitted with GFRP (Glass Fibre Reinforced Polymer) laminates, which are like bandages that can be wrapped around a building's damaged or vulnerable spots, a solution neither too invasive nor expensive and one that could provide a solution to strengthen this country's older RC buildings, as well as repair and strengthen the damaged ones, and make them far safer.

The use of advanced composite materials for seismic retrofit prior and after earthquake events is becoming, at an international level, a highly regarded solution as proven by the seismic repair and rehabilitation of many public schools after the L'Aquila earthquake in Italy in 2009.

The first simulation was based on the ground motions recorded in the CBD during last September's 7.1 magnitude Darfield Earthquake and the second shake test subjected the structure to the same ground motions of Chile's 8.8 magnitude quake in February 2010, which researchers believe would be relatively similar, in duration and intensity, to what we could expect in Christchurch from major seismic activity on the Alpine Fault.

Patricio said the testing proved that researchers had been able to reverse the "hierarchy of strengths" in the beam column joint region using the GFRP laminates, thus protecting the structure from a soft-storey or "pancake" collapse mechanism, and therefore proved the efficiency of their design for upgrading the performance of these older reinforced concrete buildings.

Park and Paulay Fund

A fund to commemorate the achievement well as r and(en by a

Fire / Transportation / Management



IPENZ Life Membership: Alan Nicholson

This citation records the award of Life Membership of the IPENZ Transportation Group to Alan John Nicholson in March 2011. It recognises his significant contribution and continuing service to the development and growth of the Group, the wider transport profession and to society.

After completing his BE(Civil) at the University of Canterbury in 1969, Alan commenced postgraduate study under a New Zealand Government Graduate Study Award, completing his ME(Civil) in 1971 and PhD in 1974. He joined the Ministry of Works and Development (MWD) in Christchurch working on bridges, dams and buildings. Between 1975 and 1976, Alan undertook a second Masters degree at the University of Birmingham under a Rotary Scholarship. He returned to Wellington to undertake organising and supervising research in the MWD head office from 1977.

In 1981, he was appointed to a Senior Lectureship in Civil Engineering at the University of Canterbury. Here he began a distinguished academic career, becoming an Associate Professor in 1998 and a full Professor in 2009. From 2005 to 2009 Alan was Head of the Department of Civil and Natural Resources Engineering, overseeing nearly 60 staff and teaching and supervising over 500 students each year. In 2010 he was appointed Director of the Construction Management programme, which commenced in Canterbury.

Alan has made a major contribution to the education and training of a large number of transportation practitioners. He has mentored and assisted many students, including over 50 Masters and PhDs. In 1991 he developed, in collaboration with the University of Auckland,

the very successful five-day Fundamentals of Traffic Engineering industry course that, still to this day, provides a key stepping stone for new members of the profession. Alan was also appointed Director of Transportation Engineering at Canterbury in 2002 as he spearheaded the very successful industry-funded postgraduate programme in transportation engineering.

Alan has always had a strong interest in road safety, and pioneered statistical methods to assess hazardous locations and safety treatments. He has also contributed greatly to our understanding of transport network reliability, travel demand management and sustainable transport policies, long before they became “fashionable”.

Since 1981, Alan has been a research advisor and peer reviewer to various national road and transport agencies in New Zealand. He has also been a reviewer for many top international journals, including *Transportation Research and Accident Analysis & Prevention*. He has authored over 130 published conference and journal papers and book chapters in New Zealand and overseas. During his career, he has given numerous presentations and lectures in his specialty areas at conferences and universities worldwide.

Alan has taken a major role in the Transportation Group's growth and development, including serving on the National Committee from 1994 to 1996 and chairing the Group from 2003 to 2006. His expertise and contributions to the profession were previously recognised in 2000 when he was elected a Fellow of IPENZ.

It is in recognition of Alan's sustained commitment to the IPENZ Transportation Group, the engineering profession and society that we, his colleagues, make this award.

UC Academic Recognised by IBM

A proposed course, developed by a University of Canterbury academic and aimed at providing future engineers with the skills to manage modern transportation engineering problems, has received backing from one of the world's largest technology companies.

Dr Kenneth Kuhn (Civil and Natural Resources Engineering) has been awarded a Smarter Planet Faculty Innovation Award by IBM. He is one of only 50 academics worldwide from 40 universities to receive the award.



The awards, worth US\$10,000, were set up by IBM to help universities develop innovative curricula that address the global challenges of transportation, health care, water, energy and other systems.

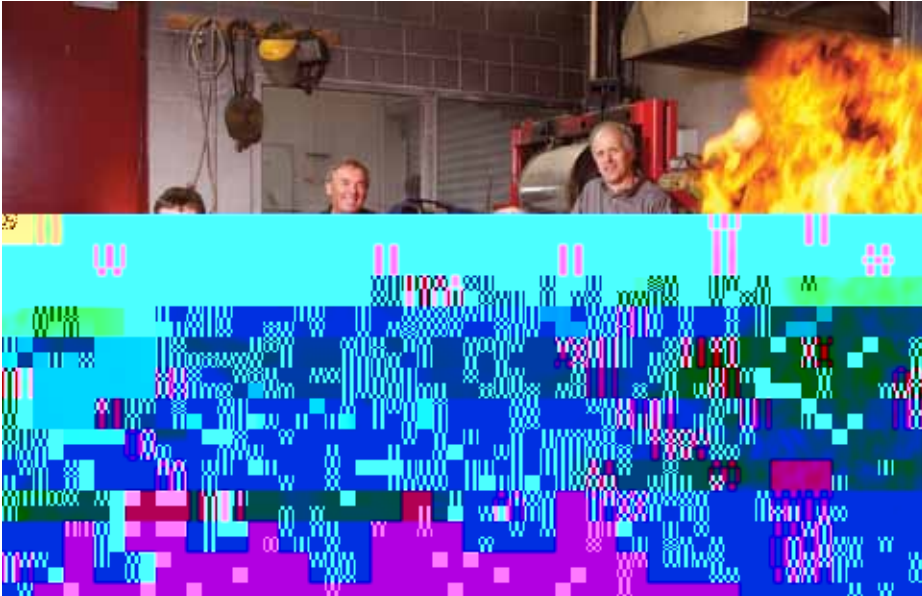
Dr Kuhn's award was for a proposed course he had developed called “Improving Transportation System Efficiency and Safety through Asset Optimisation”. IBM will make Dr Kuhn's course notes and materials publicly available through its Academic Initiative.

“The idea behind the course was that a lot of the challenges associated with managing transportation systems today require balancing competing objectives and also require data analysis,” said Dr Kuhn.

“One of my favourite examples is when an airline pilot chooses a route to fly in an area where there is bad weather. The pilot and airline want to minimise how much fuel they use, but also the risk of making passengers uncomfortable. An air traffic controller has to ensure that the decisions of different pilots don't lead to conflicting flight paths. Decisions might be influenced by passengers' flight connections. The problem can be as simple or as complicated as you like. Another example would be figuring out when to change traffic signals. This sounds like quite a different problem, but again you need to trade-off safety and efficiency to some degree.”

Dr Kuhn said decisions should be based on data describing what happens in different situations.

“Transportation domain knowledge is the most important but expertise in areas like probability and statistics, mathematical programming, economics and computer programming is very



Fire Engineering Update

Fire Industry Advisory Committee

The annual meeting of major local and international employers in the fire engineering industry took place in November 2010. The committee used this year's meeting to assess the impact of the changes in University funding and the new 15-point course structures on the Fire Engineering programme, among other general educational matters. Committee members in 2010: Chairman – David Barber (Arup Fire, Australia), Paula Beever (NZFS), Michael Dixon (SFPE NZ Chapter), Darin Millar (Holmes Fire &

Safety), Nick Saunders (Department of Building and Housing), Bob Taylor (FPANZ) and Greg Baker (BRANZ). Among others, the committee concluded that:

- Incentives need to be devised to encourage more student completions
- From 2012, the Fire Engineering programme goes into a 15-point structure, with some rigid prerequisites on entry into the Master of Engineering in Fire Engineering (MEFE) program.
- The university should look into offering CPD courses for engineers, especially in numerical modelling

Erskine Visitors 2010-2011

Visitors	Institution	Interests	Date of Visit
Prof. Fabio Biondini	Technical University of Milan, Italy	Geotechnical/Earthquake	15 Jul – 15 Sep 2011
Prof. Jonathan Fannin	University of BrrTeM C. Jonathan Fannin	15 Jul – 15 Sep 2011	

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