



Head of Department's message



Welcome to the Department's 22nd annual newsletter, which was renamed last year to reflect the change in the name of the Department in late 2007, to reflect the fact that since 2004 we have been responsible for two undergraduate degrees, the BE (Hons) in Civil Engineering and the BE (Hons) in Natural Resources Engineering. The Department has reviewed and adjusted both degree programmes, which overlap substantially, to ensure efficient use of our teaching resources. The Department has also merged the two Advisory Boards (one for each degree), to create the Civil and Natural Resources Engineering Advisory Board. The role and membership of the CNREAB are described on page 7.

Since the last newsletter, we have continued to face a strong demand for entry to the Department. This year we admitted 135 students to the 1st Professional year of the BE (Civil), compared with 110 in 2004, 117 in 2005, 127 in 2006, and 136 in 2007 and 135 in 2008. We also admitted 25 students to the 1st Professional year of the BE (Natural Resources), compared with 20 in 2004, 25 in 2005, 29 in 2006, 29 in 2007 and 25 in 2008. It is estimated that another 30 or so students were originally seeking entry to the Department, but went elsewhere (including other Engineering departments) due to their grades in Intermediate being too low for admission to our programmes.

The large number of students in the Department means that academic and general staff have to work hard to maintain the quality of our degrees. During the last 12 months, we have had two academics resign. Firstly, Dr James Mackechnie (Materials) left after seven years to work in industry, but remains involved as a part-time Research Fellow. Secondly, Neil Allan (Engineering Management) decided to return to the UK after six months for family reasons, but he continues to contribute to our Engineering Management programme, via short visits to teach block-courses.

We have made a total of seven academic appointments. These include Dr Daniel Tsang (Environmental Engineering), Dr Tonny de Vries (Bioresources and Irrigation), Dr Kenneth Kuhn (Transportation), Dr Alessandro Palermo (Structures), Dr Allan Scott (Engineering Materials), Dr Brian Caruso (Water Resources) and Dr Cedric Lambert (Geotechnics). These appointments are helping considerably with dealing with the increased workload resulting from the increase in our admissions to 1st Professional. We currently have two vacancies, one in Structures and one in Fire Engineering, and expect to make appointments to these positions later this year.

The Department has also appointed four Postdoctoral Fellows and one Research Fellow, who will work in the following areas: water resources management, environmental engineering, geotechnical engineering, fire engineering, and transport network reliability. These appointments are intended to increase the research momentum in these areas, and to off-set the effect of the increase in teaching and administration loads associated with the increase in undergraduate students over recent years. The goal is to retain our position as the top-ranked 'Civil Engineering' Department in the next Tertiary Education Commission review of the research prowess of NZ academics.

A notable initiative has been the appointment of an Administrative Services Manager in the Department, to assist the Head of Department, other senior academics with major management roles, and the Technical Services Manager. We are the first department in the University to appoint such a high-level administrator/manager. The appointee (Alan Jolliffe) has brought a wealth of experience in organisational management, and is making a substantial contribution to the Department.

Another notable initiative has been the Tertiary Education Commission award of almost \$1 million for the establishment of a Centre for Water Resource Management. This will be a Joint University of Canterbury and Lincoln University Centre. The Department is expected to play a major role in the Joint Centre, as we will shortly have ten academics doing water-related teaching and research and covering both quantity and quality aspects of water resource management (see page 6 for more information).

While being a research-led Department in a research-led University, we regard teaching as being of crucial importance and a very close second to research. Excellent teaching provides the foundation students need to pursue postgraduate research or become professional engineers. The Department has some excellent teachers, with one (Associate Professor Roger Nokes) being awarded the University of Canterbury Teaching Medal in 2008 (see page 8 for more information).

An important part of teaching is designing a coherent programme of courses, with no major gaps or overlaps, so that students are as well prepared as possible for postgraduate research or professional engineering practice. The University has recently decided to move to standard 15-point courses and this, along with requirement of the Committee for University Academic Programmes that an Honours degree include a 30-point project in the fourth year, has necessitated a major review of our undergraduate teaching programmes. There is considerable evidence of an international trend to require a 5-year qualification (a Masters degree) for Chartered Professional Engineer status, and the Department, as part of the curriculum review, is planning for this by establishing a comprehensive suite of postgraduate programmes.

Finally, if you have any suggestions for improvement of our degree programmes, or wish to comment upon the above-mentioned developments, please do not hesitate to contact me. I would appreciate hearing from you.

*Professor Alan Nicholson
Head of Department of Civil Engineering*

Emeritus Professor Tom Paulay



On Friday 26th June New Zealand lost one of its most eminent structural engineers with the death of Professor Tom Paulay. During his 28 years with the Department of Civil Engineering Tom had a profound world-wide influence on the design of engineering structures to resist earthquake excitation. His work has also been a major contributor to the international standing of the Department of Civil Engineering in the field of earthquake engineering.

Tom was born in Sopron, Hungary, on the 26th May 1923 and he was initially destined for a life in the Royal Hungarian Army. After attending a boarding school for military cadets in Sopron he entered the Royal Hungarian Military Academy in Budapest. On graduation he was posted as a second lieutenant to the same cavalry regiment in which his father served for many years. In 1944 he faced the advancing Russian army in the Prypet Marshes in what was then known as Eastern Poland. At the age of 21, after mounting casualties, he found himself in command of 278 men and 308 horses. Much action and wounds received in Poland, and later in Hungary, resulted in many months spent in various military

hospitals and left him somewhat deaf. This partial deafness is remembered by both students and colleagues.

After he was discharged from the army in 1946 he, with many other returned servicemen, joined the 300 students in the first year of civil engineering at the Technical University of Budapest. Tom described lectures in the bombed out ruins of the university with the lecturers writing on the blackboards whilst wearing knitted gloves and two raincoats to keep out the cold. The student accommodation was no warmer. The harsh economic conditions, and the reduced immediate demand for engineers, resulted in a 75% failure rate in the first year. In 1948, after Stalin and the Red Army imposed total control over Hungarian society, Tom was one of the few students to escape from Hungary to Austria and West Germany.

In West Germany he enrolled at the Technical University of Munich, which, after the allied bombing during the war, was in an even worse state than the Technical University of Budapest. The lack of financial resources soon terminated his attempt to continue his studies in civil engineering. In November 1948 Tom returned to Austria to see the girl that he had met on his

initial escape from Hungary. One year later Tom and Herta were married. Tom spent 3 years in Germany as a stateless refugee working with a charitable organization.

In 1951 Tom, Herta and daughter Dorothy were granted a scholarship by a group of Catholic students at Victoria University in Wellington to come to New Zealand. On September 11 1951 Tom started working as a maintenance labourer in Oamaru. Tom described his job as a labourer as a wonderful educational experience. Although he was already learning English, this was where he was first exposed to the rich Kiwi vocabulary of His Majesty's English, as practised by the railway labourers. Fifty years to the day they went back to Oamaru to celebrate but the event was somewhat overtaken by other happenings in New York.

Tom resumed his studies in civil engineering as a third year student in 1952 at the University of Canterbury under the guidance of Professor Harry Hopkins. Structural engineering, and particularly design, interested him most in his studies. It was noted that the final 14 day examination project chosen by Tom was to design a reinforced concrete shell roof, a subject not covered in the

Emeritus Professor Tom Paulay

syllabus for civil engineering. On completing his studies in 1954 Tom joined the consulting engineering practice of Don Bruce-Smith where he worked for the next eight years designing many reinforced concrete buildings.

In 1961 he was invited by Harry Hopkins to apply for a lecturer position in the Department of Civil Engineering to teach structural design. Tom initially told his classes that the courses would be taught in Hungarian but with a very strong New Zealand accent. Tom's afternoon 3 hour design classes started with a one to one and half hour lecture, followed by time in the drawing office. The lectures were intense; 4 sheets of finely written foolscap notes could be taken during that time. The afternoons were usually an hour to an hour and a half longer than scheduled and sometimes rolled over to Saturdays as well. Tom is remembered for his enthusiasm and practical knowledge of structural design, his interest in the welfare of the students and the injection of recent research findings and ideas. This helped build up an interest in seismic engineering and it had a major influence on design practice in New Zealand. Even 20 years after he retired some of the final year design afternoons are still referred to as 'the Tom Paulay afternoons'.

Tom quickly picked up the research aspects of structural engineering and during his time he supervised and co-supervised 16 PhD students

and 26 M.E students. In 1969 Tom completed his own PhD on the Coupling of Shear-Walls under the supervision of Harry Hopkins. His interest in the behaviour of structural walls continued for many years and his concept of diagonally reinforced coupling beams has become a standard solution for obtaining a good ductile structure.

He also became interested in the concepts of Capacity Design and his work in using the analogy of a chain where the designer chose the selected weak ductile link, usually the beams in a multi-storey frames, where the ductile behaviour would take place in a major earthquake and all other links, the columns, joints and foundations, would be sufficiently strong that only the chosen members would yield. The designer would tell the building how to deform. This concept of the weak beam-strong column became the design norm for buildings in New Zealand and many other earthquake prone countries. His 1975 book with Professor Bob Park "Reinforced Concrete Structures" became the seminal work on capacity design. Tom also recognised the power of modern computer analysis to extend the work in the laboratory and many M.E. students over the next few years carried out a large amount of research to determine the over-strength factors required to ensure that undesirable soft-storey failures would not occur in a major earthquake.

His work on structural walls resulted in the book "Design of Reinforced Concrete and Masonry Buildings" in 1992 with Professor Nigel Priestley again brought the latest research findings into the design world. Tom was promoted with a Personal Chair in Civil Engineering in 1975 as recognition of his contribution to research and teaching.

Tom retired from the Department of Civil Engineering in January 1989 and became an Emeritus Professor. He continued his research interests and to help supervise post-graduate students, being present in the department for most afternoons until about 2006. Herta's declining health meant that he spent more time at home. Herta's death in 2007 hit Tom very hard. However, he still kept in touch with his former colleagues in the department and always had that cheerful outlook that was part of Tom.

Tom was involved with the New Zealand Society for Earthquake Engineering and was President from 1979 to 1981. He served on many New Zealand Building Code committees and also on many American Concrete Institute committees. He was elected a Fellow of the Royal Society and served as President of the International Association for Earthquake Engineering from 1992 to 1996. He received an OBE in 1986 and he has Honorary Doctorates from the Swiss Federal Institute of Technology, Zurich in 1988, the Technical University of Bucharest in 1996 and the National University of Cuyo, Mendoza, Argentina in 1999. He has received too many awards and honours to list here. At the 14th World Conference on Earthquake Engineering in Beijing in October 2008 Tom was named as one of the Legends in Earthquake Engineering. Being included as one of the greatest names in earthquake engineering was a great honour for Tom and earthquake engineering in New Zealand.

Tom is survived by his daughters Dorothy and Esther and son Gregory, and six grand-children. He will be very much missed by the many thousand civil engineers in New Zealand and overseas who have benefited from his great teaching. The effects of his work in design approaches in earthquake engineering will continue long into the future. His colleagues in the Department of Civil and Natural Resources Engineering will also miss his cheery smile and that sense of humour which seemed to infect all around him.

Athol Carr

Fire Awards at International Symposium

Two of the Department's fire engineers received awards that the Ninth International Symposium on Fire Safety Science held in Karlsruhe, Germany 21-26 September 2008.

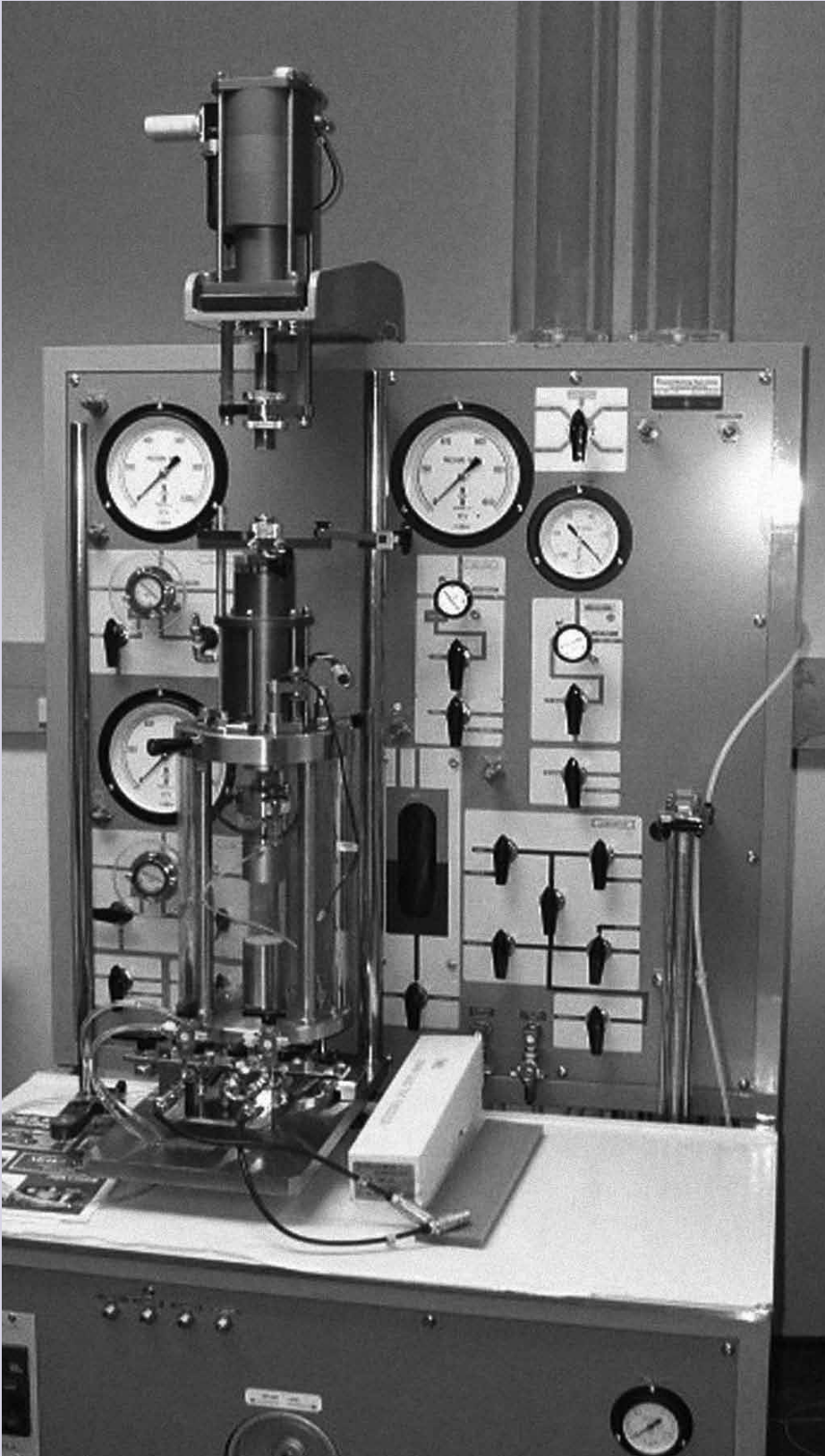
Professor Andy Buchanan was awarded the Sjölin Award for his "outstanding contribution in moving research into practice" and Roger Harrison (a PhD student in Fire Engineering) won 'Best Student Poster' at the symposium.

In addition MEF graduate Johannes Dimyadi was awarded the Asia/Oceania region IAFSS Thesis Award 2008 for his work on "Generating FDS Fire Simulation Input using IFC-based Building Information Model". The award helped Johannes travel to the conference and present a paper.

Andy Buchanan gave a key-note paper on "The Challenges of Predicting Structural Performance in Fires" and research papers were presented by Roger Harrison on his work on balcony spill plumes and by Charley Fleischmann on design fires for deliberately lit fire scenarios.

Charley Fleischmann is part of the IAFSS Executive and was heavily involved in the organising of the conference poster session. Although it is not quite the same as getting the rugby world cup or the Olympics, a successful bid by the University has secured the 2014 conference for New Zealand so mark this in your diary (if you have one that already reaches 2014!).

Geotechnical engineering update



The Geotech group has several ongoing research projects (on behaviour of piles in liquefying soils, seismic performance of geosynthetic reinforced walls, effects of fines on liquefaction resistance of sands, debris flow, soils-structure interaction, loss assessment of pile foundations) involving a dozen of researchers (8 PG students, 2 researchers, 2 academics) and external funding from Marsden, EQC and Environment Canterbury.

The group has purchased from Japan a sophisticated Dynamic Triaxial Apparatus, DTC – 367, for testing soils in the laboratory. The setup has been completed and the first verification tests are being conducted by our PhD student Jawad Arefi, and our new postdoc Mizanur Rahman (who has arrived from Australia at the end of April, and is specialist on laboratory testing of soils). The apparatus will be used to investigate cyclic behaviour and liquefaction resistance of sandy soils, and will provide a long-term support to our Characterization of Christchurch soils project and definition of earthquake-related hazards in this region.

Academic staff from the Geotech group worked on a number of projects including the development of Geotechnical Earthquake Engineering Guidelines for the New Zealand Geotechnical Society, presenting professional seminars on seminar on Assessment of Liquefaction and its Consequences (attended by over 150 people) and even managed to spend time abroad, on Erskine fellowships and working with ETH Zurich on centrifuge test of debris flow.

Joint Centre for Water Resource Management

In late 2008, the University of Canterbury & Lincoln University jointly sought & obtained Tertiary Education Commission 'Encouraging & Supporting Innovation' funding of \$950,300 over three years, for the establishment of a Joint Centre.

The proposal to TEC was supported by Christchurch Polytechnic Institute of Technology, the Canterbury Water Cluster (comprising Environment Canterbury, Canterbury Development Corporation, NIWA, ESR, Aqualinc and Lincoln Ventures), the Labour Department's Water Industry Skills Steering Group & the Primary Sector Water Partnership (comprising Fonterra, Dairy NZ, Foundation for Arable Research, Horticulture NZ, Meat & Wool NZ, NZ Forest Owners' Association, NZ Farm Forestry Association, Fertiliser Manufacturers Research Association, Irrigation NZ and Federated Farmers NZ).

Project Rationale

The management of water resources is expected to be a top priority in the years to come & is becoming a growing pre-occupation for regulatory authorities & business, both of which are calling for specific training & capability development.

Particular employment needs exist in regional councils, major industries and consultancies. In particular they need graduates at undergraduate and postgraduate levels, with surface and underground water quality and quantity modelling and related statistical skills, and with the ability to connect these attributes more broadly with other aspects of water resources management.



Project Outline

1. Establish a Joint Water Resource Management Centre, to serve as a catalyst for co-operation between teaching, research, regulatory, public interest & water user organisations.
2. Appoint a Joint Chair/Director of Water Resource Management, to provide integrated leadership, to coordinate the existing disparate resources at the two Universities, & to identify current teaching & research gaps.
3. Contribute to the Canterbury Water Cluster & the Labour Department's Water Industries Skills Steering Group.
4. Work within the sector to identify specific knowledge & skill shortages.
5. Engage in community education & Continuing Professional Development.
6. Develop undergraduate career pathways & viable postgraduate education in water resource management.
7. Enhance & coordinate scholarship in water resource management.

Expected Outcome

1. An expanded & better qualified workforce of water resource management professionals.
2. An augmented teaching capability that can:
 - address issues of sustainable water resource management;
 - provide a solid footing for NZ to maximise its sustainable use of water resources;
 - contribute greater benefit to the national economy.

3. A high level of engagement of the Universities with the industry, profession & community.
4. A water sector with a stronger ability to innovate, coordinate, adapt & manage future water resource management problems.

Progress to Date

The project is being managed by an Interim Management Committee, which includes both Professor Alan Nicholson and Associate Professor Mark Milke.

An Advisory Board has been established & has met once. The Advisory Board comprises:

- Dr Bryan Jenkins (Environment Canterbury CEO);
- Dr John Bright (Aqualinc CEO);
- Dr Clive Howard-Williams (NIWA Regional Manager);
- Claire Bryant (Labour Dept Regional Manager);
- David O'Connell (Co-Manager Environment, Te Rūnanga o Ngāi Tahu);
- Hugh Ritchie (Federated Farmers Board & Irrigation NZ Board);
- Professor Ian Town (University of Canterbury Deputy VC);
- Dr Chris Kirk (Lincoln University Deputy VC).

The appointment of a Chair/Director of the Joint Centre is pending. In the meantime, the Interim Management Committee has made considerable progress, including:

- identifying water-resource management related courses taught by the two Universities;
- identifying Canterbury and Lincoln academics with teaching and/or research interests relevant to water resource management.

It is intended that the Canterbury and Lincoln academics will meet all together regularly, with additional meetings at the individual Universities as required.

A website, with an independent domain name (www.waterresource.ac.nz) has been established. This will contain up to date information on the Centre's activities, including the teaching & research programme, and the research profiles of academics involved in research related to water resource management.

It is expected that Environment Canterbury will support development of the Joint Centre, via financial & logistical support of postgraduate research projects, with staff contributing to the teaching programme, especially at the postgraduate level.

The Joint Centre is looking to establish itself as a national & international centre of excellence.

Timber update

STIC contract

The Department of Civil and Natural Resources Engineering has signed a major research contract with the Structural Timber Innovation Company Ltd (STIC) for development of multi storey timber building systems. STIC was established in 2008 as a FRST Research Consortium, co-funded by government and industry for five years.

Associate Professor Stefano Pampanin is the Principal Investigator. Other UC staff are Dr Bruce Deam, Dr David Carradine, Stephen John and Professor Andy Buchanan who is also part-time Research Director of STIC.

STIC envisions the development of innovative large-span timber buildings for a wide range of uses in New Zealand, Australia and other markets. Primary applications will include commercial, educational, industrial, recreational and residential buildings. These buildings will have their main structural members manufactured from high quality engineered

timber components including glulam (glued laminated timber) and LVL (laminated veneer lumber). The buildings will be from single storey to 6 storeys or more.

Best paper award

The paper by Michael Newcombe and Wouter Van Beerschoten on in-plane testing of composite floor systems was judged the 2009 Best Student Paper at the NZ Society of Earthquake Engineering Conference held in Christchurch in April 2009.

Seminar

A one-day seminar on Seismic Design of Timber Structures was held in Christchurch in May 2009, organized by the Timber Design Society and IPENZ. The main speakers were Stefano Pampanin, Michael Newcombe and Bruce Deam.

TV commercial

A TV commercial for NZ Wood has been filmed in the UC Structural Laboratory promoting the use of timber for strength, seismic resilience, and fire resistance. The 30 second ad is viewable at www.nzwood.co.nz. UC technician Grant Dunlop is the film star in the background.



Alan Nicholson (HOD), Kevin Thompson - Chair (Opus), John Hare (Holmes), Andrew Robertson (MWH), Lindsay Crossen (Fulton Hogan), Rob Bell (Niwa), Bryan Jenkins (CCC), Kaye Clarke (NZTA)

Civil and Natural Resources Engineering Advisory Board

The Department has an Advisory Board to advise us on strategic issues related to:

- strengthening links between the Department, the Profession and Industry;
- effective ways to generate external financial and other support;
- planning capital expenditure on facilities and equipment;
- developing curricula that reflect the current and foreseeable needs of the Profession and Industry, as well as society overall;
- current and foreseeable research needs and opportunities.

The current members of the Advisory Board are:

- Dr Kevin Thompson (CEO, Opus International Consultants);
- Dr Bryan Jenkins (CEO, Environment Canterbury);
- Lindsay Crossen (Group Civil Engineer, Fulton Hogan);
- Kaye Clark (Manager State Highways, NZ Transport Agency, Hamilton);
- John Buchan (Building Control Manager, Christchurch CC);

- John Hare (Director, Holmes Consulting Group);
- Andrew Robinson (Southern Region Manager, MWH);
- Robert Bell (Principal Scientist, NIWA);
- Andrew Fenemor (Principal Scientist, Landcare).

We are very pleased to have the assistance and support of this group of leading Professional Engineers.

Awards

And the winner is...

Roger Nokes was awarded the 2008 University of Canterbury Teaching Medal. The Teaching Medal recognises an outstanding and sustained contribution to teaching. Roger's teaching is characterised by his passion, his enthusiasm, and his commitment to mentoring and supporting students.

Roger started teaching in 1988 at the University of Auckland's School of Engineering, receiving Teaching Awards for excellence in undergraduate teaching in 1989, 1991, 1992, 1993 and 1994, plus a Teaching Medal in 1993. In 1995, he shifted to the School of Science and Computing at the Nelson Marlborough Institute of Technology. He joined the University of Canterbury's School of Engineering in 2001, since then he has been teaching courses on mathematics and fluid mechanics.

Since 2001, he has received a number of awards for teaching, including the UCSA Best Engineering Lecturer of the Year in 2001, 2002 and 2008, and the UCSA Best Overall Lecturer of the Year award in 2001 and 2008. In 2003, he received a University of Canterbury Teaching Award. In 2006, he received one of ten National Tertiary Teaching Excellence Awards. He has subsequently been a member of (and contributor to) the Ako Aotearoa Academy of Tertiary Teaching Excellence.

Roger does not see himself as a 'teacher' who instills new knowledge and understanding in his students; he sees his role as being to "encourage them, inspire them, cajole them, mentor them, and challenge them in their learning process" with the goal being "to provide (his) students with a framework, or environment, within which their efforts to develop and learn will be successful". He clearly is very successful in this role. Some of the comments submitted to the UCSA by his students, in support of the 2008 award were:

"Great positive attitude, well-prepared, very knowledgeable and great teaching methods";

"Super supportive - he is the most helpful lecturer ever";

"Comprehensive notes and unwaning enthusiasm";

"Who knew fluid mechanics could be so exciting?";

"Enthusiastic, clear, good notes, makes interesting and easy for complicated subjects";

"Always has an open door";

"He's enthusiastic, approachable and actually wants all of his students to pass";

"Very clear and logical teaching";

"An awesome lecturer and very good at teaching techniques - good attitude towards students";

"Makes lectures interesting (amazing!)".



International Association of Hydraulic Research Award

Pedro Lee was awarded the inaugural award for the best reviewer of the Journal of Hydraulic Research. Every review was noted as being "detailed, constructive, informative and had strong impact on improving the papers".



Mofreh Saleh now US Registered Professional Engineer

Mofreh Saleh has successfully passed all the requirements for registration as a Registered Professional Engineer in the State of California and the State of Arizona. To qualify for registration you need to have sufficient experience in the field of Civil Engineering and to successfully pass all five major examinations. The pass rate of which is around 35 to 40%. Mofreh is now registered as professional Engineer in both California and Arizona.



Best Paper award

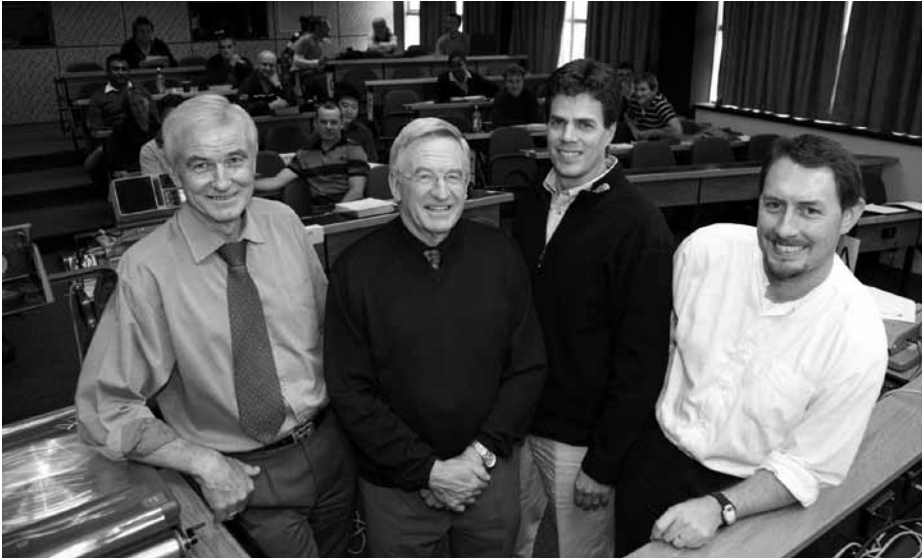
Kenneth Kuhn who was recently awarded 'best paper in session' at the USA-Europe Air Traffic Management Seminar for his paper on Airport Service Vehicle Scheduling.



MNSM Award to David Elms

Professor Emeritus David Elms was recently awarded the MNZM Award (announced in the recent Queens Birthday Honours List) for services to civil engineering.

New transport programme kicks off



(Left to right) Prof. Alan Nicholson, Assoc. Prof. Roger Dunn (University of Auckland), Prof. Eric Hildebrand (University of New Brunswick) and Glen Koorey all contributed to the new Fundamentals of Transport course in 2008.

Changing demands within the transport sector has seen the UC postgraduate transport programme revised and a new series of courses introduced this year. Part of the restructuring involves a new bridging course called Fundamentals of Transport (ENTR401).

It introduces the basic concepts and principles of traffic engineering and transport planning for those who not have been taught this material

at undergraduate level. Glen Koorey, Senior Lecturer in transportation engineering, says that the aim was to ensure that the postgraduate transport programme met a wide range of needs. "We have found that a lot of people, like planners, psychologists and geographers, want to enrol in our programme but with no prior transport engineering education." The Fundamentals course has been attached to the existing "Fundamentals of Traffic Engineering",

a week-long industry course that alternates annually between Canterbury and the University of Auckland. "For 2008 we had six students joining the 23 industry attendees. The timing of it allowed us to assess new students about their suitability for the full postgrad programme, prior to our other courses starting in semester one." This year, new courses were also offered expanding on topics such as NZ transport administration, sustainable transport and traffic modelling. Next year new courses in highway geometric design, urban traffic engineering, and freight logistics will also be introduced. Maintaining links with the transport industry is vital, said Glen. "By structuring our programme to meet their needs and the needs of their staff we do that. Our programme also involves good links with our colleagues at Auckland University, who are also funded by NZTA to provide postgraduate transportation study, and this collaboration is very evident in the Fundamentals course." From 2008 a Postgraduate Certificate in Transportation Engineering (typically requiring five papers) has been introduced, to complement the Masters qualifications offered. Students can also restructure their qualifications as they study. For example, if a person doesn't complete enough papers for the Masters, they can still graduate with a Postgraduate Certificate. Says Glen, "it offers flexibility to suit a range of students and situations."

ICP-MS to UC

The Department has helped co-ordinate the purchase of an Inductively Coupled Plasma-Mass Spectrometer (ICP-MS) to be used for research in the Colleges of Engineering and Science

Inductively coupled plasma – mass spectrometry (ICP-MS) is an advanced analytical technique for determining trace element concentrations in a wide range of water, sediment and biomass samples (following appropriate digestion) in a rapid timeframe. The technique provides rapid simultaneous multi-element measurements in combination with low detection limits (typically parts per trillion to parts per billion range).

The ICP-MS has been purchased as a collaboration between this department, Chemistry, and Biological Sciences, and will be housed in the Chemistry Department alongside their clean-lab facilities and with other high-end analytical equipment and a dedicated analyst.

The ICP-MS greatly enhances detection limits for trace elements (i.e. metals) compared to older technologies. Along with other instruments across campus, including a Gas Chromatograph in Civil and Natural Resources Engineering, High Pressure Liquid Chromatography in Chemical and Process Engineering, and a Stable Isotope Ratio Mass Spectrometer Facility in the Department of

Geological Sciences, the University of Canterbury now provides a hub for environmental quality analysis capacity in the South Island.

The instrument will be put to use this year for a collaborative research project involving the University, Environment Canterbury, and the Christchurch City Council examining heavy metals from urban stormwater sources. In addition, the instrument will be available for hire by outside organisations. The increased analytical capacity opens up multiple opportunities for new research projects with various organisations. Those interested in access to the instrument, or with thoughts on potentially funded projects where an ICP-MS could be valuable should contact Mark Milke or Aisling O'Sullivan.

Communal latrines, clay pot water filtration and ethics – *what one member of staff got up to*



The general plan for my study leave was to spend two months at the University of Canterbury, either side of a 10 month stint overseas. The 10 month overseas stint was to be split into 2 periods: a 4 month period in Tunisia and a 6 month period in Canada, with the majority of the time in Canada spent at the University of New Brunswick in Fredericton.

For several years, I have been interested in water and wastewater issues associated with developing countries, and to some extent in my last sabbatical in 2001 and more recently (and to a larger extent) during my Erskine leave of 2004; I had amassed extensive information on these issues. The major teaching objective of my sabbatical was therefore to coalesce this information into a course, Engineering for Developing Communities, that was to be offered on my return to Natural Resources engineering students. In Tunisia, I was hosted by the Institut Supérieur des Technologies de l'Environnement de l'Urbanisme et du Bâtiment (ISTEUB). Translated into English this is essentially the Higher Institute for Environmental Technologies, Urban Studies and Buildings which is associated with the University of Carthage, Tunis, the second largest university in Tunisia. While in Tunisia, I collected information relevant to water and wastewater issues faced by North Africa and directly useful

to the new course. For example, Tunisia leads the way in Africa in terms of ensuring that its citizens have access to improved sanitation services, a key goal promulgated at the 2002 World Summit on Sustainable Development in Johannesburg and enshrined as part of the 8 Millennium Development Goals (MDGs). The 8 MDGs form an underlying theme and a key lecture within the water and wastewater sections of the course that I have developed. Of particular note was the many Roman ruins. These were interesting from both a historical perspective as well as a sanitation perspective. That is, one can imagine the senators discussing the latest affairs amongst nobles as well as the intrigues associated with assassination attempts as they socialized in the rather communally-shaped latrines.

As would be expected, as part of the academic community, I also engaged in informal discussions concerning teaching methodologies and research interests with my counterparts in the host institutions that I was visiting. At the University of Guelph, Professor Ed McBean provided me with valuable assistance and information/publications with respect to the use of Clay Pots for Water Filtration in rural situations. Professor McBean has conducted extensive research on the use of these pots and through him, I was able to make a valuable connection with Rural Development

International, the organization in Cambodia that supplies these pots. I arranged to have some of these pots delivered upon my return and two, 4th year Natural Resources Engineering, project students are currently conducting their final-year project on the removal of arsenic, turbidity and bacteria from water using these pots.

At the University of New Brunswick, my host was Professor Kripa Singh, a wastewater specialist working in the area of anaerobic digestion. Professor Singh and I also share an interest in teaching ethics to engineering students, so I volunteered to teach that portion of his UNB undergraduate course so he could observe the teaching approach that I take here at the University of Canterbury. With that in mind, I gave 3 lectures on ethics and ran a 3 hour workshop for 70 students in the equivalent of ENNR203 which I am involved in teaching here at Canterbury. I also gave a well-attended technical seminar on the Use of Naturally-Generated Volatile Fatty Acids for 2,4-D Removal during the Denitrification Process to the civil and chemical engineering staff and postgraduates. This was a presentation out of some research from a former Ph.D student of mine.

*David G. Wareham, Dept. of Civil and Natural Resources Engineering
February/01/08 to January/31/09*

Pair learnt first hand from L'Aquila earthquake

Associate Professor Stefano Pampanin and research fellow Dr Sonia Giovinazzi recently returned from spending three weeks in the medieval city of L'Aquila which was hit by 6.3 magnitude earthquake on 6 April. More than 300 people died, making it the deadliest earthquake to hit Italy in more than a quarter of a century. The quake severely damaged upwards of 15,000 buildings and left more than 65,000 people homeless.

The husband and wife team, who were both born and educated in Italy, spent three weeks in the area representing the Department and the New Zealand Society of Earthquake Engineers. Stefano is an expert in seismic design and retrofit of existing structures while Sonia specialises in risk management and heritage buildings. The pair worked out of the Civil Defence emergency headquarters in L'Aquila, set up after the earthquake in the military barracks in Coppito. It was here that Italian Prime Minister Silvio Berlusconi hosted the G8 meeting in early July so world leaders could see first hand the strength and resilience of the people of L'Aquila and to help "keep the lights on" for the next delicate reconstruction phase.



"We were involved in several tasks and activities, from on-site evaluations and survey of damaged buildings, to the strengthening of existing schools so they can reopen for the beginning of the academic year in September," Stefano said. "We tried to help and give as much technical support as possible in this first phase. At the same time we learnt about the effects on population, building environment, lifelines and services, as well as the management during the initial emergency and in the reconstruction phase that followed," he said.

Sonia focused on the emergency management of critical lifeline networks, including roads, electricity, water and gas. "After a major disaster like an earthquake, the full and prompt re-

establishment and/or control of these supply networks are crucial to support the emergency response and avoid any further worsening of the direct consequences of the ground motion," she said. Sonia is working at UC on a number of projects related to the vulnerability of New Zealand lifelines under multi-hazards.

"I have been successful with an application to the International Science and Technology Linkages Fund grant from the Royal Society of New Zealand to collaborate with Italian universities on the development of methodology for a better control and mitigation of the seismic vulnerability of lifelines and L'Aquila could represent a valuable case study."

On their return to New Zealand, the pair intend to report on the important lessons to be learnt in terms of mitigation of seismic risk, action and planning. "We are acting as technical 'reporters' to share our experiences with colleagues and organisations in New Zealand to build safer and more resilient structures and communities," Stefano said.



I am David Carradine and arrived at the University of Canterbury in July 2008. My education was all done at Virginia Tech, but all in different departments. My Bachelors was in Architecture, my Masters in Civil Engineering with a structural emphasis and my Doctorate was in Biological Systems Engineering with a focus on timber structures. Following completion of my Ph. D. in late 2002, I went to work as the Technical Director for Structural Testing at the Washington State University Wood Materials and Engineering Laboratory in Pullman, WA (Northwest US), where I worked until coming to New Zealand.

I am currently a Research Timber Engineer working with the students and staff of the Civil and Natural Resources Engineering Department to continue the development of multi-storey and long-span timber structures using post-tensioned laminated veneer lumber as the primary lateral load resisting structural

system. This is a very new concept in timber construction and subsequently there are many research issues that need to be addressed in order to bring this building system into service. I am working on the connections between the floors and framing, fire resistance of connections and timber-concrete composite floor systems, and other projects relating to the resistance to gravity and non-seismic lateral loads of these buildings.

Other projects include the architecture and building envelope possibilities of multi-storey timber buildings and innovative structural systems such as structural insulated panels (SIPs).

Over the years I have had the opportunity to not only research timber buildings and their design, but have also worked as a builder, carpenter and woodworker in order to have a more complete understanding of wood as a versatile and efficient building material.

NRE Field trip 2009



A mixture of natural resources and civil engineering, 2nd and 3rd pro students braved storm winds, heavy fog, rain and sleet for 4 days to see a wide variety of natural resources engineering projects (there was plenty sunshine too, but that would have sounded less impressive).

Accompanied by members of staff Daniel Tsang, Becky Teasley and Tonny de Vries, the students visited sites all over the northern half of the South Island, such as the Waimakariri irrigation intake, the Kaikoura flood protection scheme, several storm water drainage schemes in Blenheim & Nelson, landslides in Motueka district, the Wai-iti dam. The trip ended with a visit to the Stockton mine, where the water treatment plant definitely proved to be a highlight, even though we couldn't see the actual mining due to the thick fog.

Some memorable quotes:

Staff: did you enjoy today?

Student: yes, I had a wonderful nap on the bus

Passer-by: are you the daffodil pickers?



What students get up to

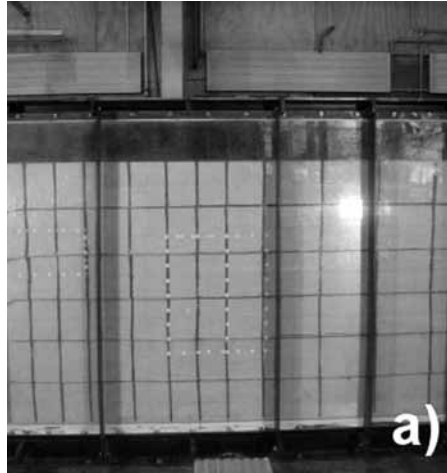
Geotechnical Engineering

Seven model scale Geosynthetic-Reinforced Soil (GRS) Walls were tested on the shake table in the Structures Laboratory. Geosynthetic-reinforced soil walls are an alternative to costly conventional reinforced concrete retaining walls. The research aims to investigate the seismic performance of these geotechnical structures and is the start of an on-going study into the use of geosynthetics for slope, wall and bridge pier reinforcement.

The model wall is 0.9 m high, 0.8 m wide and 2.4 m long. Five reinforcement layers are layered horizontally into the soil at levels corresponding to the horizontal coloured sand lines as seen in Figure 1. Figure 1a shows the completed model prior to testing, which involves shaking the model with increasing levels of acceleration. Figure 1b shows the model after it had failed at 0.65g acceleration shaking. The horizontal and vertical coloured sand lines show the mechanism and deformation of this overturning failure.

The length of reinforcement layered into the soil, and how the wall is inclined were varied in each test to better understand how these parameters affect seismic stability. Particle Imaging Velocimetry is also being used to further quantify deformation.

The research team comprises ME student Perry Jackson, supervisors Elisabeth Bowman and Misko Cubrinovski, and technicians John Maley and Allan Stokes.



Fire Engineering

Roger has finished his work on the design of smoke management systems and in particular the characterisation of thermal spill plumes. He has completed over 300 experiments in the 1/10th scale atrium rig. Roger has continued to collaborate with Suresh Kumar at the Building Research Establishment (BRE) in the UK who has been modelling the experiments

using their JASMINE CFD code. Roger presented his work at IAFSS international conference. (Supervisors – Dr Spearpoint / Dr Fleishmann).

Mun Kit Cheong is assessing the design fire requirements for smoke extraction rates for traffic tunnels in Singapore. His work includes the selection of design scenarios through a probabilistic methodology followed by detailed analysis using the FDS CFD code. Mun Kit has carried out a large number of simulations and has been using the University's multiprocessor high performance computer to do the calculations. He is currently writing up his thesis and has submitted papers to several journals and conferences. Mun Kit is sponsored by the Land Transport Authority of Singapore. (Supervisors – Dr Spearpoint / Dr Fleishmann).

Dennis Pau's research is to assess the accuracy of FDS 5 in predicting the mass loss rate and heat release rate of small and medium scale test methods involving polyurethane (PU) foam by extracting and optimising suitable inputs from experimental data. Dennis also hopes to carry out a series of thermogravimetry (TG) experiments which involves heating a small PU foam sample within an oven under a constant heating rate. The TG results will indicate the number of reactions during PU foam degradation and oxidation. Quantitatively, it will provide the pre-exponential factor and activation energy kinetic parameter constants and they are inputs of FDS 5. By knowing these values, parameter optimisation will be more accurate as the boundaries of the search domain become more refined. (Supervisors – Dr Fleishmann / Dr Spearpoint).



I'm Dr Brian Caruso, returning to New Zealand after 9 years in the US working with the US Environmental Protection Agency in Denver, Colorado as Chief of the Wetlands and Watersheds Programme, and as an environmental consultant. I joined the University of Canterbury in July teaching Water Resources Engineering and Ecological Engineering. I received my PhD in water resources and environmental engineering from Colorado State University.

My primary research interests include catchment hydrology, water quality, modelling, and ecosystem restoration. Recent research projects include modelling metals fate and transport in mining-impacted catchments, and evaluation of the effectiveness of water and

aquatic resources restoration programmes, including Project River Recovery in the Upper Waitaki River Basin.

I was previously Director of Technical Services with the Otago Regional Council in Dunedin, and a Lecturer in Environmental Studies in the School of Earth Resources at Victoria University of Wellington. I also have over 10 years of consulting experience working with a wide range of government agencies and industries involving nonpoint source pollution and stormwater management, monitoring systems, wetlands management, hazardous waste site remediation, surface and ground water interactions, and water allocation.

What students get up to

Dan Madrzykowski is starting his research to examine the repeatability of burn patterns on gypsum wall board exposed to a range of source fires and to develop the input data needed to examine the ability of Fire Dynamics Simulator (FDS) CFD model to re-create burn patterns. The study will include real-scale, replicate fire experiments which will include measurement of heat release rate, heat flux, mass loss and temperature. The results when combined with results from a series of bench scale tests will provide input to the FDS model. NIST is providing financial support and a majority of the work will be carried out at NIST. (Primary supervisors – Dr Fleishmann / Dr McGrattan, NIST)

Greg Baker is just starting his PhD which forms part of a wider project to integrate significant enhancements into BRANZFIRE resulting in a new probabilistic model that generates outputs in the form of probability distributions. Greg is to develop and experimentally validate a physics-based multiple-item fire spread submodel applicable to room fires and implement the submodel in the BRANZFIRE software. From there he will develop a methodology for quantifying total uncertainty associated with residential fire scenarios and the spatial arrangement of items in a room and use the fire spread submodel to generate probabilistic design fires. This includes a Quantitative Risk Analysis simulation procedure that uses statistical sampling techniques. (Supervisors – Dr Spearpoint / Dr Fleishmann)

Jeong-Ki Min is investigating the fire resistance of precast prestressed concrete floor systems. He is using the SAFIR software to predict the fire performance of hollow-core concrete floors,

and will be moving on to Double Tee floors and other commercially available prestressed floor systems. This work follows on from the PhD of Dr Jerry Chang, and will be extended to include a wide variety of floor systems and support details and analytical models which are much less time-consuming. This work is in collaboration with the Future Building Systems project funded by FRST. (Supervisors – Dr Buchanan / Dr Moss / Dr Dhakal)

Natural Resources Engineering



Final year students Matt Bayliss and Wendy Dean are close to completing their study of “Membrane Microfiltration of Glacial Flour Water for a Small Community Drinking Water Supply”.

The research of a membrane microfiltration plant in Mayfield, Mid Canterbury, is being carried out in conjunction with Filtec, Ashburton District Council, Opus and MWH. The surface water that is the source for the community's water supply contains high amounts of glacial flour originating from the Southern Alps. This glacial flour causes the water to become very turbid

and the water is not effectively treated by the low cost sand filter that currently is in operation. Not only does this give the water a rather organic flavour, it also increases the chances of cryptosporidium infection or other microbial diseases.

The pilot plant is a small scale version of a couple of water treatment plants in Dunedin. Studies and experience have shown that the plant is able to treat ‘normal’ surface water effectively but the question remains as to the effectiveness of the membranes treating glacial flour water, the efficiency of the plant and the associated maintenance. Initial results show that the plant can effectively treat the water to acceptable turbidity levels. Supervisors: Tonny de Vries (UoC), Katie Shorrock (MWH)

Timber Engineering

Connection analysis and tests

3rd Pro student Mike Cusiell is making a numerical investigation of panel zone joint flexibility of post-tensioned timber frames designed for earthquake resistance, with various types of joint reinforcing. Further testing on fasteners is being carried out by David Carradine and French exchange students Emmanuel Roubin, Sven Sviatoslav and Benjamin Almecija.

Shaking table tests

ME student Denis Pino (from Chile) is designing and building a 5-storey 1/4-scale model of a prestressed timber frame for shaking table tests. The first shaking table test was filmed for the NZ Wood TV commercial; the first time in the



My name is Ken and I joined the University of Canterbury in March, 2009.

Prior to March, I worked for a little over two years at the NASA Ames Research Center studying intelligent transportation systems and air traffic control. I have published research papers in the fields of infrastructure management, airport operations, and air traffic control. I am looking forward to teaching a variety of transportation engineering subjects at Canterbury, including pavement management and logistics.

I graduated from the University of California, Berkeley in 2006 with a PhD in transportation engineering. My dissertation investigated infrastructure maintenance decision-making under uncertainty in deterioration.

I have a MS degree in Operations Research (2002), also from Berkeley, and a BA degree in Math (2001), from Johns Hopkins University.

I am interested in statistical analyses of transport data, as well as mathematical modelling and optimization of transport systems. I'm always interested in learning about new potential research projects. I grew up near Washington, DC, before relocating to San Francisco, and now Christchurch.

I am excited to be in New Zealand and am currently learning how to correctly pronounce fish and chips. Please feel free to contact me. Thanks!

What students get up to



Long span prestressed timber beam tested by Claudio, Bruno, and David Carradine



Full-size timber column tested by Asif Iqbal

world for a shaking table test of a post-tensioned timber building, with the help of David Carradine and technician John Maley. See the ad on www.nzwood.co.nz.

Prestressed timber beams

Long span timber beams prestressed with draped tendons were tested by Bruno Dal Lago and Claudio Dibenedetto, exchange Students from the Technical University of Milan, supervised

by Dr Alessandro Palermo. Long-term tests on the prestressed beams started when Alessandro Palermo arrived in June.

Timber beam-column joint

Full-scale 2-D interior and exterior beam-column joints have been tested by PhD student Asif Iqbal with the help of technician Tim Perigo. Several alternative configurations of prestressing levels

have been used, in combination with different dissipative solutions (plug & play dissipaters). Excellent results have been achieved.

Sustainability

PhD student Nicolas Perez from Chile is modelling the operational energy for heating and cooling of timber buildings, compared with heavy buildings in other materials. Stephen John is completing a contract report for MAF on the



My name is Tonny de Vries and I joined the department of Civil and Natural Resources Engineering in January 2009.

Prior to coming here I worked for 4 years as a postdoc research officer at Cranfield University in the UK. There I was mostly involved in research on irrigated agriculture and adaptation to climate change. I have a PhD from the University of Southampton (UK) and a MSc from Wageningen Agricultural University (the Netherlands).

I have quite an international background, having worked in many countries. In Kenya for instance I worked on the re-design of a gravity-fed surface water irrigation scheme, in Australia I tested the possibility of using sub-surface drainage pipes for irrigation purposes and in Pakistan I studied the use of

bed-and-furrow irrigation for cotton growing. Other work included developing a method for optimal channel design, invention of a hydro-pneumatic siphon and a study of salinity and ochre control measures.

At the University of Canterbury I will be teaching Bioresources Engineering and parts of the Hydrology-related courses. My main interests are irrigation engineering, climate change and optimal scheduling. My research projects this summer will focus on best management practises for urban landscape irrigation and precision irrigation using GIS.

I am always interested in any collaborative research in these and related areas, so please to do not hesitate to contact me.

What students get up to



James O'Neill and David Carradine and the upside-down test specimen, after the fire test

carbon footprint of timber buildings, compared with concrete and steel, based on the Biological Sciences Lab block under construction on the UC campus. 3rd Pro Natural Resources students Casey Smythe and Scott Keene are doing a project on wood waste from construction and demolition, and Amber Murphy and Lydia Sadd are comparing GreenStar with other green building assessment models.

Fire resistance

Two fire tests on large scale timber-concrete composite floor systems were carried out at BRANZ in April, providing the excellent result and a 60 minute fire resistance rating. The specimens were built by James O'Neill (MEFE student) and David Carradine. Other supervisors are Rajesh Dhakal and Peter Moss.

Fire resistance of epoxied, bolted and nailed connections in timber structures are being tested by MEFE student Robert Gerard and visiting Norwegian student Trygve Nilsen, assisted by technician Bob Wilsea-Smith.

Timber floors

Three PhD students are working on TCC (timber-concrete composite) floors. David Yeoh is investigating short term strength and long-term deflections, Norhayati Ghafar is modelling floor vibrations, and Manoochehr Adelani is beginning a project on holes through joists for service penetrations, all with supervision from Bruce Deam, and Massimo Fragiocomo now at the University of Sassari in Italy. John Maley is about to start cyclic testing of full-scale floors and connections. Massimo and David presented a one-day seminar on floor behaviour for the Timber Design Society in Auckland in February 2009.



Back again! I am not really a new face for most of you but the news is that I will be here for a long time. My adventure within this Department started in 2003 where I spent four months for the completion of my PhD collaborating with Stefano Pampanin; in 2004 I came back to UoC as fixed-term lecturer and then, after spending thirteen months, I was appointed by Technical University of Milan as Assistant Professor until June 2009.

My research expertise areas are mainly related to earthquake and structural engineering. In particular, my research interests are mainly focused on the seismic response of precast concrete and timber buildings and

the structural performance of bridges with particular emphasis to serviceability / long-term behaviour, durability and maintenance.

I am co-inventor of an international patent on an innovative seismic resistant timber system developed in collaboration with UoC in 2005 and author of more than 75 papers published on international journals and conferences.

During my staying in Italy, I have experienced some consulting engineering collaborations and I am willing to participate to in engineering applications and design projects.

I have many hobbies, like playing soccer, swimming, windsurfing, skiing and going to restaurants, but my first one is my work, which I love!

Carbon neutrality research programme funded

A submission to the Marsden Fund entitled “Carbon neutrality – fact or fiction?”, and prepared by Markus Milne (Accounting and Information Systems), Amanda Ball (Accounting and Information Systems) and Ian Mason (CNRE) was accepted for funding in September 2008.

The research will examine New Zealand organisations’ claims to be “carbon neutral”, focusing on the public sector (project led by Amanda), voluntary carbon markets and offsets (project led by Markus), and organisations involved in a New Zealand Emissions Trading Scheme (project led by Ian). The programme formally commenced in February, 2009, and, with the arrival of two Canadian PhD students in February and May, is now gathering momentum.

Says Ian “I have always been interested in the prospects for interaction between engineering and the social sciences, and look forward to exploring ways in which these disciplines can learn from, and enhance, each other, in the context of carbon management”.

The programme is funded for \$824,000 and runs for 3 years.

Match report: Staff vs Post Grads

A sunny afternoon in March saw an opportunity for the post graduate students to fight it out with the staff in the annual match. It wasn't long before the postgrads took the lead.

Their feelings of triumph were quickly dashed when staff took one back within five minutes. A fierce fight followed where the postgrads managed to put so much pressure on the staff that at one point they needed three people just to defend their goal. Partial differential equations may hold no secrets to them, but the simple math of one person per goal seemed to have eluded some... Even with this blatant disregard of the rules the post-grads were rewarded with a second goal.

The talents and skills of the post-grads however could not prevent the disaster that was about to happen. Staff had finally found the rhythm and stamina they had been lacking and ball after ball started disappearing in the back of the net. Staff scored not once, not twice, not even three times, no, a total of six goals were scored by the various academics, technicians, post-docs and support staff.

So Postgrads 2 - Staff 6? Well, not quite....! At this point the reason for the staff's decision to put three people in their goal became rather obvious; in their enthusiasm some staff seemed to forget which was the direction of play and just aimed for the nearest goal. Final score: Postgrads 4 – Staff 4.....

A post-match BBQ followed so all got to meet and mingle in a slightly more relaxed environment.



Dan joined the University of Canterbury in July last year.

I received my PhD from Hong Kong University of Science and Technology and worked at Imperial College London before coming to this beautiful land.

I am teaching undergraduate and postgraduate courses on environmental engineering, contaminated land remediation, industrial pollution control, and environmental water and soil chemistry. I am an environmental engineer striving to develop effective and sustainable remediation technologies for contaminated soils, sediments, and groundwater.

My research interests include soil washing, soil flushing, permeable reactive barriers, reactive capping, phytoremediation, contaminant interactions with soil components, subsurface contaminant transport, and remediation sustainability.

I have supervised undergraduate, Masters, and PhD students on the applications of activated carbon, chelating agents, and zero-valent iron for cleaning up the land contamination of hydrophobic organics and heavy metals.

Over the past decade I have taken on consultancy work on sediment remediation and resource recovery from organic wastes, established skills in a wide range of experimental analysis and environmental modelling, and published forty research and technical papers. I am always keen to contribute to engineering applications and collaborative projects, please feel free to contact me anytime.

Cass Geotechnical Engineering Seminar

April 2009



Seminar participants, taken from the veranda of the field station. UC people (from far right to centre): Lis, Perry, Sean Brendon, Jawad, Nico, Misko, Jenny and Masoud.

In early April 2009, eighteen staff and postgraduate students from the University of Canterbury and the University of Auckland working in the field of geotechnical engineering took a short break from their regular activities to attend a research seminar come high country retreat at the University of Canterbury's Cass Field Station. The first trip of this sort, the 90 minute drive to Cass provided, for many of us, the first chance to get to know our colleagues from across Cook Strait.

We arrived at around 7pm on Wednesday evening and put all hands to work lighting the fire and preparing our dinner of Mexican burritos and corn chips. The purpose of this trip was to share and build an understanding of each other's projects, research problems, and skills, and dinner was quickly followed by the first of three presentation/discussion sessions.

The combination of an open and welcoming atmosphere, a flexible programme, and a shared enthusiasm for geotechnical engineering led to many fruitful discussions on a broad range of topics, from the fundamental (and very unusual) behaviour of pumice sand, to the modelling of soil-structure interaction, to the use of

centrifuge tests to study shallow foundations of bridge piers. Timed to coincide with the New Zealand Society of Earthquake Engineering annual conference, this seminar also provided many of us with a valuable opportunity to hone our presentation skills prior to speaking at the conference that weekend.

Not all of the time was spent working however, with all of Thursday afternoon free for exploring the area around the field station. An ambitious group of postgraduates chose to attempt a long tramp back to the station, and were dropped off on the other side of the river by another group going 'debris flow hunting' in one of the



Sean Rees giving the first presentation of the seminar.

New Post Doctoral Fellows

minivans. The final presentation session that night was slightly delayed, as the trampers returned somewhat later (and wetter) than they had planned (after failing to realise that they would actually have to cross the river again in order to get back to the station).

This delay was not a problem however, as it allowed our rival gourmet chefs Misko Cubrinovski and Lis Bowman time to perfect their dishes for the night's dinner come 'pasta competition'. This was no friendly match, with Misko insisting that engineering precision ("the mozzarella must be cut into cubes of exactly 5mm!") would surely be the key to victory, while Lis attempted to gain the upper hand through the use of her own home-grown ingredients. Both dishes were enjoyed by all and the competition was eventually declared a draw. We departed early on Friday morning (to make way for the 40 undergraduate geographers arriving later that day), after a quick but thorough clean of the station.

This trip brought together a very diverse group of research students and staff (among the eighteen of us at least eleven different countries were represented!), from those with more than 30 years experience, to those at the very beginning of their careers. The facilities at the field station were fantastic, providing an ideal environment for informal discussion and sharing of ideas and projects, and the strengthening of the relationship between the Canterbury and Auckland research groups. Such was the success of this seminar that we hope to make it an annual event, and look forward to meeting next year a little further north.

Jenny Haskell

Sonia Giovinazzi

Dr. Sonia Giovinazzi has been appointed with a two-year Research Fellow position to principally collaborate on the externally funded FRST "Resilient Organisations" project and NZTA projects and on the "Transport network reliability and resilience" research programme.

She had already collaborated with the department under different research contracts on a part-time basis for the past three years.

Sonia received her Laurea degree in Civil Engineering (Geotechnical) at the University of Genoa in 1999 and a Ph.D. in Risk Management of Natural and Man Induced Hazards at the Technical University of Braunschweig, Germany, and University of Florence, Italy (joined doctoral program) in 2005.

Sonia's main research interests comprise of:

- 1 natural and man-induced hazard risk analysis, including vulnerability analysis, damage scenario and risk modelling at territorial scale and within GIS-based environment;
- 2 risk reduction including mitigation strategies, emergency management and resilience enhancement;
- 3 extreme events decision making;
- 4 seismic assessment and strengthening of existing unreinforced masonry and heritage/monumental buildings.

Kaiyuan Li

Dr. Kaiyuan Li from China started a 3 year PostDoc position at the Civil and Natural Resources Department in December 2008. He has finished his PhD in Fire Engineering last year at the University of Science and Technology of China.

He has expertise in investigating the smoke movement in building with various management systems. As one of the "firemen" he is involved in research on measuring and modelling smoke moving behaviour during major fire, mainly working together with Michael Spearpoint and Charley Fleischmann.

Mizanur Rahman

Md. Mizanur Rahman from Bangladesh started a 3 year PostDoc position at the Civil and Natural Resources Department end of April 2009. He has submitted his PhD thesis in Civil Engineering in February this year at the University of New South Wales, Australia.

He has expertise in liquefaction of soil, modelling the behaviour of sandy soil (with fines), triaxial testing. He is involved in research on characterization of Christchurch soil, effect of fines on liquefaction of sandy soil. He is working with Misko Cubrinovski.

Rebecca Teasley

Dr Rebecca Teasley started a 3 year postdoctoral fellowship in the Department of Civil and Natural Resources Engineering in May 2009.

She finished her Ph.D. at The University of Texas at Austin in the United States and has a background in classical water resources systems analysis with experience in traditional optimization methods as well as, simulation modeling and Arc Hydro relational geodatabase design and operation.

She has worked on a variety of problems including optimization use for sediment control, development and analysis of environmental flows and water management on a large-scale international river basin. Becky is joining Mark Milke and the work that he has been doing on water markets in New Zealand with Fritz Raffensperger in Management Science.

Daniel Wicke

Dr. Daniel Wicke from Germany started a 3 year PostDoc position at the Civil and Natural Resources Department in December 2008. He has finished his PhD in Environmental Engineering last year at the Technical University Berlin, Germany.

He has expertise in investigating the fate of contaminants in various aqueous systems (e.g. heavy metals in stormwater systems, PAH in biofilm systems, pharmaceuticals during bank filtration). As a member of the HydroEco group he is involved in research on measuring and modelling contaminant transport in urban catchments regarding stormwater runoff, mainly working together with Tom Cochrane and Aisling O'Sullivan.

Departmental staff

Academic and Research Staff

Alan Nicholson: Transportation planning, Traffic engineering
Head of Department

Roger Nokes: Fluid dynamics, mixing in stratified flows and open channels
Deputy Head of Department

Misko Cubrinovski: Geomechanics, Geotechnical Earthquake Engineering
Director Postgraduate Studies

Mark Davidson: Fluid dynamics
Director Undergraduate Studies

Lis Bowman: Geotechnical Engineering, Geomechanics

Andy Buchanan: Timber, Fire and Earthquake engineering

Desmond Bull: Structural concrete design, Earthquake engineering

Athol Carr: Structural mechanics and dynamics, Finite element analysis

David Carradine: Timber Engineering

Brian Caruso: Water Resources Engineering

Tom Cochrane: Natural Resources Engineering

Andre Dantas: Transportation Planning, Public Transportation

Roger Dawe: Surveying

Bruce Deam: Earthquake and Timber Engineering, Computer Modelling

Tonny de Vries: Bioresources Engineering

Rajesh Dhakal: Structural Mechanics, reinforced concrete

Charley Fleischmann: Fire engineering, Compartment fire modelling

Sonia Gionvinazzi: Risk management

Glen Koorey: Transportation and traffic planning, road safety

Kenneth Kuhn: Infrastructure management, public transportation planning

Pedro Lee: Fluid Mechanics, Hydrology

Jason Le Masurier: Civil engineering & construction management, systems thinking

Kai-Yuan Li: Fire Engineering

James Mackechnie: Concrete engineering

Greg MacRae: Structural Engineering

Ian Mason: Environmental engineering, composting

Mark Milke: Environmental engineering, Groundwater quality

Aisling O'Sullivan: Natural Resources Engineering, Ecological treatment technologies

Alessandro Palermo: Structural mechanics, reinforced concrete/precast prestressed structures

Stefano Pampanin: Structural mechanics and design, Reinforced and Precast/Prestressed concrete

Mizanur Rahman: Geotechnical Engineering

Mofreh Saleh: Pavement Engineering

Eric Scheepbouwer: Engineering management, engineering dynamics

Allan Scott: Structural, Materials Engineering

Erica Seville (nee Dalziell): Risk management, engineering systems

Michael Spearpoint: Fire Engineering

Rebecca Teasley: Hydrological Optimisation, Management of Water Resources

Hugh Thorpe: Groundwater, Fluid Mechanics

Daniel Tsang: Environmental Engineering

David Wareham: Environmental engineering, Biological nutrient removal

Daniel Wicke: Environmental Engineering

Administrative Staff

Elizabeth Ackermann: Departmental Administrator

Louise Barton: Postgraduate Administrator

Alan Jolliffe: Administrative Services Manager

Catherine O'Shaughnessy: Undergraduate Administrator

Technical Staff

Shaun Cosgrove: Electronics Technician

Peter Coursey: Computer Technician

Nigel Dixon: Structures laboratory

Grant Dunlop: Fire Engineering Laboratory

Siale Faitotonu: Geomechanical laboratory

Mosese Fifita: Structures laboratory

Brandon Hutchison: Computer analyst

Gavin Keats: Structures laboratory

John Kooloos: Transportation laboratory

David MacPherson: Technical Services Manager, Environmental Eng

Russell McConchie: Fabrication and testing

Peter McGuigan: Environmental and Natural Resources Engineering

John Maley: Structures laboratory

Tim Perigo: Structures laboratory

Alan Poynter: Model structures laboratory

Ian Sheppard: Fluids laboratory

Stuart Toase: Structures laboratory

Michael Weavers: Electronics laboratory

Bob Wilsea-Smith: Fire Engineering laboratory

Kevin Wines: Fluids laboratory

Retired Staff

John Berrill: Geomechanics, Engineering seismology

Nigel Cooke: Structural mechanics, Structural design (bridges)

Rob Davis: Geomechanics and Continuum mechanics

Bruce Hunt: Groundwater flow

David Elms: Civil engineering systems, Risk assessment

Peter Moss: Structural mechanics, Structural dynamics

George Mullenger: History of Civil Engineering, Continuum mechanics

Warren Walpole: Structural steel design, Earthquake engineering

Ian Wood: Fluid mechanics, Civil Engineering hydraulics