


CE News

UC 
**UNIVERSITY OF
CANTERBURY**
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Number 20
May 2007

07

2006/2007 Departmental Staff

* - Emeritus professors

Academic/Research Staff

Lis Bowman : Geomechanics
Andy Buchanan : Timber and fire engineering
Des Bull : Structural concrete design, earthquake engineering
Athol Carr : Structural dynamics, finite element analysis
Misko Cubrinovski : Geomechanics
Erica Dalziell : Risk, systems
Andre Dantas : Transport planning, GIS
Mark Davidson : Fluid mechanics
Roger Dawe : Surveying
Bruce Deam : Earthquake and timber engineering
Rajesh Dhakal : Structural engineering
Charley Fleischmann : Fire engineering
Massimo Fragiaco : Timber engineering
Glen Koorey : Transport and traffic engineering
Jason LeMasurier : Eng. management, risk, geotechnical engineering
James Mackechnie : Concrete materials
John Mander : Structural and earthquake engineering
Ian Mason : Environmental engineering
Mark Milke : Environmental engineering
George Mullenger : History of civil engineering, continuum mechanics
Alan Nicholson : Transport planning, engineering and safety
Roger Nokes : Fluid mechanics
Aisling O'Sullivan : Natural resources engineering
David Painter : Water resources engineering
Stefano Pampanin : Structural engineering
Mofreh Saleh : Transport and pavement engineering
Michael Spearpoint : Fire engineering
Hugh Thorpe : Groundwater, ecological engineering
Warren Walpole : Structural steel design, earthquake engineering
David Wareham : Environmental engineering

Support Staff

Louise Barton : Postgraduate Administrator
Janet Butcher : Departmental Administrator
Rebekah Hunt : Administrative Assistant
Belinda Jemmett : Departmental Administrator
Catherine Price : Undergraduate Administrator

Technical and General Staff

Melody Callahan : Graphics, Publicity, Webmistress
Peter Coursey : Computer technician
Nigel Dixon : Structures laboratory
Grant Dunlop : Fire Engineering laboratory
Siale Faitotonu : Geomechanical laboratory
Mosese H Fifita : Structures laboratory

Frank Greenslade : Transport laboratory
Brandon Hutchison : Computer analyst
Gavin Keats : Structures laboratory
David MacPherson : Technical Services Mgr, Environmental laboratory
Russell McConchie : Fabrication and testing
Peter McGuigan : Environmental laboratory
John Maley : Structures laboratory
Richard Newton : Electronics workshop
Tim Perigo : Structures laboratory
Norman Piling : Structures laboratory
Alan Poynter : Model structures laboratory
Ian Sheppard : Fluids laboratory
Bob Wilsea-Smith : Fire laboratory
Stuart Toase : Fabrication, testing and stores
Michael Weavers : Electronics laboratory
Kevin Wines : Fabrication and testing

Retired Staff

John Berrill : Geomechanics, engineering seismology
Nigel Cooke : Structural engineering
Rob Davis* : Geomechanics
David Elms* : Risk analysis
Richard Fenwick : Structural engineering
Bruce Hunt : Fluid mechanics, groundwater flow
Peter Moss : Structural analysis
Tom Paulay* : Structural design
Ian Wood* : Fluid mechanics

CENews

Number 20 2006-2007

Editor: Lis Bowman

Design: Melody Callahan

Printer Production: The Caxton Press

Many thanks to all those who contributed articles and photos in the making of CE News.

CE News is an annual publication by the University of Canterbury Department of Civil Engineering. It is for staff, students, alumni, friends and industry. Views expressed are those of the contributors, not necessarily the University.

Enquiries should be directed to:

University of Canterbury, Civil Engineering Department
Private Bag 4800
Christchurch, New Zealand 8020
Attn: CENews Editor

Printed May 2007.

Head of Department Messages

The last 12 months has been rather busy, with the Department grappling with a number of complex issues.

Firstly, we have continued to face a growing demand for entry to the Department. This year we admitted 134 students to the 1st Professional year of the BE (Civil), compared with 110 in 2004, to 117 in 2005 and 127 in 2006. We also admitted 26 students to the 1st Professional year of the BE (Natural Resources), compared with 20 in 2004, 25 in 2005 and 29 in 2006. It is estimated that nearly 200 students were seeking entry to the Department, but went into other Engineering programmes, because their average grades in Intermediate were such that they were unlikely to gain admission to our programmes. The large number of students means that staff are having to work hard to maintain the quality of our degrees, and some of our undergraduate teaching facilities have been under considerable strain.

I am pleased to report that Andy Buchanan has recovered very well from his head injuries, and resumed full duties late in 2006. For more details about what he's doing please read his report on page 10.

I am also pleased to report that James Mackechnie, who has been the NZ Cement and Concrete Association Fellow in the Department since 2001, has been appointed to a continuing position. James has made a very big contribution to the Department since 2001, and we look forward to that continuing well into the future. He will carry on teaching structural mechanics and concrete technology, as well as doing research on the latter.

The Department has been successful in obtaining industry funding for two new positions. Firstly, Land Transport NZ has agreed to increase its funding, to enable the appointment of a second fixed-term position teaching transport, bringing the number of staff teaching Transport Engineering to five. In addition, Fletcher Construction has agreed to fund a fixed-term position in Engineering Management, to enable us to participate with the Department of Civil and Environmental Engineering at Auckland in establishing a Master's programme in Construction Management.

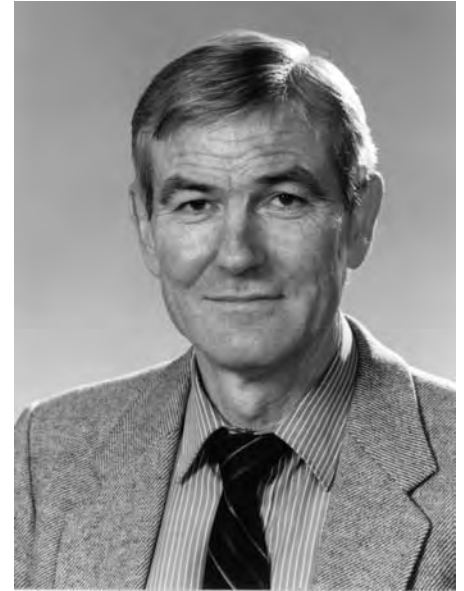
We have also been seeking to fill three other continuing positions, one each in Geotechnical Engineering, Environmental Engineering and Water Resources Engineering.

I regret to advise that Jason Le Masurier had a very serious accident during January, and was unable to teach his first semester Engineering Management courses. We were fortunate to gain the services of Raiyo Nariman at very short notice, and the courses have proceeded as planned this year. Jason remains in the UK, we wish him well as he recovers from his head injuries.

Two staff resigned during the last 12 months. David Painter left after five years in the Department to resume work as a consultant, while John Mander left after 6 years in the Department to take a position at Texas A&M University.

The Department has continued to receive assistance with our teaching programmes from a number of practitioners and organisations. This has enabled our students to gain insights that will help them considerably when they leave us. Such assistance has been very helpful in keeping both the Natural Resources Engineering and Civil Engineering programmes going, and in establishing two design courses. For the 2nd Pro design course the students worked in teams to undertake the preliminary design of a cheese factory and motel on sloping land near a major road. This exercise alerted students to the importance of the Resource Management Act and the consents process, as well as technical issues relating to transport access, water supply and wastewater management. We also trialled an optional final year design project, with the students working in teams to design a multi-storey building in concrete, steel or timber. Such courses are very beneficial in introducing students to a number of important issues that they will confront in practice.

During the last year, there has been further progress made towards integrating the Civil and Natural Resources programmes, to avoid inefficiencies in teaching by having the students together for lectures on topics which are covered in both programmes, and freeing resources for those parts of the programmes which are distinctly different. This has led to further adjustment of the 1st Pro year, which are the same for both programmes, and further changes in the 2nd Pro year, which will become 60% common. This will enable Civil students with an interest in Environmental Engineering to take more Natural Resources papers in their 3rd Pro year, and these changes are expected to be beneficial to the students in both degree programmes.



The Department has been arranged into three clusters; the Structures/Geotechnical, the Transport/Management and the Hydraulics/Environmental/Natural Resources clusters. This is designed to assist with curriculum and course reviews, which will be done more frequently at the cluster level, and developing coherent suites of postgraduate programmes (akin to those in Transport/Management, as well as Fire) in the other two cluster areas.

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 let me know. I would appreciate hearing from you.

Associate Professor Alan Nicholson
Head of Civil Engineering
alan.nicholson@canterbury.ac.nz



Mayhem to methodical

Management Camp 2007

Another successful annual Fulton Hogan 2nd Pro Management camp was held at Wainui over the last four days of the first term break. Congratulations to all the students and their teams.

This year's camp was opened by Mike Fulton of Fulton Hogan fame. He reminisced somewhat on his days spent at Canterbury University, and mentioned just how tough he found the course work. There was no management camp around during his time here, but he did have fond memories of the survey camp, which for some reason he attended twice?

André Dantas was at the helm this year (he was chucked in the deep end, after Jason's tragic accident), Despite this, he managed to survive nicely without using Prozac and is actually looking forward to next year's camp! Andre by the way is occasionally known to wear ladies makeup, which was much to the delight of the students but met with the disapproval of his great grandfather whom we all got to meet briefly on 'Talent' night.

Pedro too is not one to be out shone, It's fair to say he looks ravishing in blush red lipstick.

The night-orienteering on Friday wasn't as well supported as it could have been due to the poor weather conditions and shortage of torches. Instead, the students (inadvertently not told to bring their torches) were expected to eat plenty of carrots as part of a well balanced diet!

On the subject of diet, the food at the camp was reasonably good with plenty of seconds going around for the hungry. This was only bettered by Andre himself who actually had thirds at one sitting, and helped his lovely wife polish off her meal too.

That's stress for you!



The talent / skit night on Saturday went down an absolute treat with acts ranging from excellent to incredibly poor.

The talent night was 'almost' professionally hosted by Rafferty Fox, (who was not in the mood to suffer fools gladly), as was proven by his encouragement to a disinterested audience, to offload their empty cans onto one of the worst acts of the night.

The Staff were a little disillusioned too, as they had by far the best act comprising of a musical and dance 'feast' that didn't even recon in the top three. Ah well! next year we'll be back.

I think everybody enjoyed themselves, the students worked extremely hard for the four days of camp. Thanks must go to André Dantas, Rob Davis, and everyone else involved with the running and organising, including all the YMCA camp staff. Over 150 students and staff in a dining room designed for 90 people, was always going to be challenging! Well done everyone.

Teams

Suk Pistrix	Wake Water
Slippery Sailors	Wainui Sand
Five Star Sand	Sand Blasters
Grinch	Raging Willy
Kursk	G-Dogg X
Carbon Neutral	Pirate Team
Red Light	Wainui Water
Seven Pirate	



Chess Olympian

Roger Nokes was selected as a member of the New Zealand Chess Team to represent the country at the 37th Chess Olympiad to be held in Turin, Italy in late May. This was not an opportunity to miss, so study leave plans were slightly altered to allow time to travel to Turin for the chess tournament in mid-May,

Roger explains "The chess Olympiad, for an amateur like myself, is always a special occasion. The vast majority of the world's top players are present and you literally have the opportunity to rub shoulders with them. Unfortunately New Zealand is not a country with a great chess tradition and our playing strength doesn't generally allow us to play these stars. If we are to get such an opportunity it is normally in the first round, and in Turin we met the strong USA team first up, pulling off a surprising result by losing with a score of 1/2 to 2 1/2."



Conferences and Workshops organised at UoC

New Zealand Workshop on Geotechnical Earthquake Engineering

The workshop was held on 20-21 November 2006, at the University of Canterbury. The workshop brought together nearly 100 researchers and practitioners from USA, Japan and New Zealand to discuss research findings and design issues in the field of earthquake geotechnical engineering. Thirty leading researchers presented recent research findings on various topics including Fault Action and Ground Motions, Soil Modelling, Liquefaction and Lateral Spreading, Seismic Geotechnical Hazards and Soil-Structure Interaction among others. The workshop was supported by the TC4 Committee on Earthquake Geotechnical Engineering of ISS-MGE, the New Zealand Society for Earthquake Engineering (NZSEE), the New Zealand Geotechnical Society (NZGS), the Japanese Geotechnical Society (JGS) and by the University of Canterbury. The Earthquake Commission of New Zealand (EQC) partially sponsored this event.

The published proceedings include 30 high-quality papers, a selection of which will appear in a special issue of the Bulletin of NZSEE. Most of all, the workshop provided an excellent venue for geotechnical engineers here in New Zealand to share information and exchange ideas with leading researchers in the field. The scientific programme was followed by a scientifically very informative and scenic field trip along the Hope Fault.

19th Australasian Conference on Mechanics of Structures and Materials (ACMSM19)

This international conference was held in University of Canterbury from 29 November to 1 December 2006. It was organised by three current staff members of the Department (Dr Rajesh Dhakal, Dr Bruce Deam and Dr James Mackenzie) and a retired academic, Associate Professor Peter Moss. Around 200 academics, researchers and practitioners from New Zealand, Australia, and 14 other countries in Asia-Pacific and beyond attended. 153 papers were presented including 4 keynote papers by Prof I Gilbert (Australia), S Kittipornchai (Hong Kong), R Melchers (Australia) and R Plank (UK). The theme of the conference was "Progress in Mechanics of Structures and Materials", which was also the title of the 1060-page proceedings edited by Peter Moss and Rajesh Dhakal.

3rd Societal Planning for Natural Hazards Research Forum

The forum was held on 20 February 2007 at the University of Canterbury and kindly sponsored by the Earthquake Commission of New Zealand (EQC).

Nearly 40 researchers from across New Zealand attended the forum to learn and to discuss more about the diverse research programmes going on in New Zealand that look at how society plans and prepares for natural hazard events. The overall aim of the forum was to promote greater collaboration and co-ordination across these research programmes.

Eleven presentations were offered from academics (from University of Canterbury, Victoria University of Wellington, University of Tasmania, Massey University) practitioners (from OPUS and Kestrel Group) and CRI researchers (GNS). The research programmes presented included various topics, such as the Reduction, Readiness, Response and Recovery of the Society to Natural Hazard and the Modelling and Measure of Societal

Resilience, clearly showing a great deal of multi-disciplinary research going on in this area.

At the end of the day a final discussion was held where inter-relationships and potential collaborative efforts between research teams were identified and the transfer of information between research teams were promoted.

The 8th Pacific Structural Steel Conference (8PSSC), Wairakei, 13 to 16 March 2007

This was a very well organized and successful conference with the theme of Steel Structures in Natural Hazards. As well as our UC attendees; Massimo Fragiocomo, Gregory MacRae, Peter Moss, Warren Walpole and postgraduate students Brian Peng and Koichi Sugioka, there were over 250 delegates and their partners from all over the Pacific Rim and even as far off as the UK, South Africa and the Middle East, savouring the wide variety topics and discussions, as well as the local cuisine and sights.

The conference returned to NZ after the inaugural PSSC conference in Auckland 21 years ago. At that time the steel construction industry was struggling, especially in multi-storey construction with effectively zero market share and issues of price and capability. Now the steel industry is in a good state with around 50% of the market share in multi-storey construction, an active industry support group and with good technical and educational support.

Highlights included a construction method for steel frame connections initially developed in conjunction with HERA and developed further by UC undergraduate student Hamish Mackinven in 2006. Using this method there is almost no damage expected to the connection, no damage to the remainder of the steel structure, and the cost is the same as traditional construction. Other interesting papers described better techniques and understanding of steel-concrete composite flooring and structural steel/concrete walls. It was clear that even though there is a relatively small group of researchers active in structural steel in NZ, the research is world class and leading to new design methods and building systems.

Annual Conference of the New Zealand Society for Earthquake Engineering, Palmerston North, 30 March to 1 April

Once again the University of Canterbury figured very prominently in the NZSEE annual conference. About half of the papers presented in the conference were from UC researchers. Presentations from all of our students were well received. Mr Kam Weng received the best research paper prize and Mr Brian Peng was awarded the best poster paper prize.

Also honoured in the conference was Dr Rajesh Dhakal, who won of this year's Ivan Skinner Award for the advancement of Earthquake Engineering Research in New Zealand. In addition, Dr Bruce Deam, who is a Senior Lecturer and Dr Kevin McManus, a past member of the department, were each honoured with a promotion to Fellow of the New Zealand Society for Earthquake Engineering.

Out and about: travel tales

Team Italia: What do a Kiwi, a Turk, a Malaysian and a Colombian, in the middle of Europe, have in common...?

The 3rd to the 8th of September saw a number of Canterbury's Civil Engineering academics and postgrads attend one of the largest European conferences ever held. The 1st European Conference on Earthquake Engineering and Seismology (ECEES) was held on the water front of Lake Geneva in Switzerland. The conference was a combination of Earthquake Engineering and Seismology, providing a unique opportunity for two similar disciplines to build upon each other's knowledge.



Four of us postgraduate students, Alejandro Amaris, Kam Weng, Dion Marriott and Umut Akguzel, also known as members of "Team Italia" within the structures group, were given the unique opportunity to present our latest work to a formidable audience. The technical content of the conference

was overwhelming - the only problem was putting together a proper plan to catch as many sessions as possible. All was not work however, since the final night of the conference was spent on the water of Lake Geneva aboard two fully restored paddle boats, cruising majestically out to the sunset...

Two days on it was time for for us to be at the ROSE school (The European School for Advanced Studies in Reduction of Seismic Risk) in Italy. While we brought away from Switzerland a huge wealth in new knowledge, we left behind excellent food, great wine and an empty wallet - damn Swiss!

We spent a month at the ROSE school in Pavia and as part of our study-tour, Stefano arranged a day at the EU Joint Research Center (JRC) European Laboratory for Seismic Assessment (ELSA) at Ispra, where we were astounded by the sheer size of the testing facility. We also managed to travel around to see many of Italy's wonderful sites, visiting historic places in Venice, Rome, Florence and Bologna. Words do not do justice to the experiences we had - so a picture or two may help!

So what do a Kiwi, a Turk, a Malaysian and a Colombian have in common? The memories and the lessons from this trip which will certainly be the highlight of our time at Canterbury.



JSPS Fellowship for Research in Japan

Athol J. Carr

I spent January and February in Japan as a Fellow of the Japanese Society for the Promotion of Science. At the University of the Ryukyus in Okinawa I worked with Professor Yamakawa's post-graduate students on the computational modelling of structures using the retrofit techniques they have developed during the past decade. Although there were ample laboratory results available, the modelling of the retrofit technique was not possible with the currently available engineering software. After six weeks work we could match the experimental results and then demonstrate that the retrofitted structures would show a ductile behaviour and that the retrofitted ground floor columns in the pilotis (soft-storey) structures did not lead to problems elsewhere. I also presented a seminar to the Professional Engineers in Okinawa.

In the final two weeks we visited the University of Kyoto, Kagoshima University, Fukuoka University and Kyushu University. We also saw the shake-table tests of two two-storey wooden houses at the E-Defense facility near Kobe. In Tokyo we visited the Shimizu Corporation Institute to see their work on base-isolation and other structural projects.

The large research facilities that we visited, E-Defense and Shimizu Institute Corporation, are most impressive and beyond anything that could be imagined in New Zealand. The university research facilities that I saw are of a similar standard to those here at Canterbury. However, the computational facilities that I saw at the different universities did not seem to be as good as those at Canterbury.



Athol Carr with Professor Yamakawa and his research students

Mofreh Saleh:

Mofreh travelled to Muscat, Oman on March 2006 and presented two papers in the 3rd Gulf Conference on Roads. Additionally, he travelled to Quebec City in August 2006 and presented three papers at the 10th International Conference on Asphalt Pavements (ICAP). Mofreh is seen here in Quebec.



Awards

Inaugural Research/Industry forum on organics recycling

Ian Mason co-organised, and gave two presentations at, the inaugural New Zealand Researcher/Industry Forum on Organics Recycling held in Wellington in October, 2006. The day long event featured two invited Australian guests, Angus Campbell, Manager of the Recycled Organics Unit, University of New South Wales, and Dr. Richard Stewart, CEO of Flinders Bioremediation, Adelaide. Approximately 30 scientists, industry leaders and local government representatives attended and, says Ian "the participants contributed to a very productive discussion on our current capabilities and activities, and provided a clear direction for the future of organics recycling research in New Zealand. It was also great to continue to build friendly links with our Australian colleagues". The forum was held as a part of a Sustainable Management Fund financed project entitled "NZSOIL3", led by one of Ian's former students, Jonathon Hannon, who is now Director of the Zero Waste Academy, Massey University. Other "NZSOIL3" activities include the development of a verification process for New Zealand standard NZS4454:2005 "Composts, soil conditioners and mulches", creating an end-user kit and workshop series for NZS4454:2005, and holding a series of resource consent workshops with regional councils. Ian has also been active over the past couple of years as a consultant on the new food residuals and green waste composting plant in Timaru.

SIM Engineers?

The Brian Mason Scientific and Technology Trust has awarded the team of Dr. Susan Krumdieck and Dr. André Dantas a grant of \$10,000 for a project to assess the adaptability of individuals to transportation fuel shortages. The objective of the project is to develop a virtual reality role-playing game, much like The SIMS™ which will not only simulate ordinary travel behaviour, but will also subject the player to fuel shortages and track how they deal with the situation. If you think about it, this would be a very difficult experiment to conduct in real-life. The grant is being used to support PhD student, Montira Watchasukarn, to attend specialist training on programming role-playing games and for a fees scholarship. Dr. Richard Green of Computer Science/ HITLabNZ is also a collaborator on the project.

Pedro's pipeline problem

Pedro Lee is looking at the issue of how to detect problems; leaks, blockages, air pockets; in any fluid pipeline. A research project has been started using technology similar to SONAR - sending a shock wave through the pipeline and then reading any resulting reflected waves to identify problems along the pipe.

The overall aim of the proposed research is to utilise these small reflections to diagnose the interior condition of the pipeline along its length. This will enable the simultaneous non-invasive diagnosis of pipelines of tens of kilometers long in contrast to invasive video camera investigations that are limited to around a total of 0.5 km per cut in.

A grant of \$470,000 has been given for this collaborative research between University of Canterbury, Hong Kong University of Science and Technology and the University of Adelaide.

Natural Resources finding funding resources

Mar. 2007 Balancing Middle Earth through Interdisciplinary Engineering Education: \$3,700 travel grant from UCTL (UC) to present a paper at the 2007 Conference on Engineering Education Coimbra, Portugal, (Sole PI).

Feb. 2007 Quantifying Stormwater Contributions into Okeover Stream. ECan, New Zealand \$10,000 for undergraduate research project, (Sole PI).

Dec. 2006 Automatic Sampler, Rain Gauge and Flow Meter, Internal Contestable Grants, Facilities Management, University of Canterbury, NZ\$ 15,000, (Sole PI).

Nov. 2006 Quantifying Stormwater Contributions to the Okeover Stream on the University of Canterbury campus. Christchurch City Council, New Zealand \$3,500 for undergraduate summer research project, (Sole PI).

Oct. 2006 Geotechnical Analysis of Hydraulic Properties of Substrates for Engineered Treatment Wetlands at Stockton Mines, New Zealand. Solid Energy New Zealand, \$2,000 for consumables plus a stipend for an undergraduate summer research project, (Sole PI).

Student Prizes

The department would like to extend congratulations to all the students who won prizes for their excellent work in 2005. These prizes are made possible by the generous support of industry sponsors.

Concrete and Cement Association NZ Prize
2nd Pro : Peter Holden
3rd Pro : Brendon Bradley

Civil Engineering Prize
Brendon Bradley

Concrete Prize
Au Eu Ving

Environment Canterbury Prize in Natural Resources Engineering 2
Michael Carroll

Laserframe Award

1st : Liam Duff, Guanting Li,
Damian Philipsen, Neville Wilson

2nd : Richard Harriss, Alex James,
Ashley Mitchell, Jaspreet, Singh,
Rachel van der Velden

3rd : Isabelle Gensburger, Gareth Horne,
Bret Koehler, Gerard Verhaart

MWH NZ Ltd/Jim McFarlane Memorial Prize
Jenny Haskell

NZ AA Prize in Traffic Engineering
Hamish Makcey

Prattle Delamore Partners Prize in Ecological Engineering
Stuart Farrant

Roading NZ Prize in Pavement Engineering
Derek Bon

RW Morris Prize for Coastal and Ocean Engineering
Jonathan Corskie (Hydrology) , Brendon Bradley (Hydraulics)

Tonkin & Taylor Prize in Geomechanics
Megan Roper and Brendon Bradley

Tonkin & Taylor Prize in Hydrology
Colin Roxburgh, Michael Carroll

Traffic Design Group Prizes
2nd Pro : Yih-Pying Hou
3rd Pro : Hamish Mackey

For information on how you can be a prize sponsor please contact Alan Nicholson, Head of Dept.
alan.nicholson@canterbury.ac.nz

Travel, teaching and tidbits....



Nokes receives National Teaching Award

Roger Nokes was recognised as one of the country's top tertiary teachers.

He was one of 10 teachers honoured for sustained excellence in their teaching field at the fifth annual Tertiary Teaching Excellence Awards presented at Parliament in June.

The awards recognise exceptional teachers who show outstanding commitment to their subject and demonstrate knowledge, enthusiasm and a special ability to stimulate learners' thinking and interest.

Tertiary Education Minister Dr Michael Cullen says the awardees have been recognised for their innovative teaching methods, their original thinking and their outstanding commitment, by both their students and their peers within their profession.

"It is wonderful that we have such inspirational teachers and it is important to recognise them, not only for their own achievements, but also as examples to the rest of the education sector."

Roger tells us; "I had the opportunity to return to Wellington (5 days after arriving in Perth for my study leave!) for the official ceremony at Parliament. My adult daughter and son joined me for the ceremony. It was a memorable occasion, and a thrill to be surrounded by people with a shared passion for teaching their students."

Nokes reports study leave is a busy time

The College of Engineering granted me a full year's study leave for 2006. Despite being an academic staff member in three different tertiary institutions since 1988 this was my first study leave, and thus its planning was not as straightforward as one might think. The fundamental problems of where to spend the time, how long to stay, and what to do while there, had many plausible solutions. The financial demands of spending all 12 months overseas, were prohibitive, and, from a personal point of view, impractical. Ultimately, the final decision was to split the year roughly equally between Christchurch and Perth, Australia.

Professor Greg Ivey, head of the School of Environmental Systems Engineering at the University of Western Australia, is a long standing colleague. He is leader of a very well respected group working in the general area of geophysical, or environmental, fluid dynamics and we have a number of areas of common research interest. I went as a Senior Visiting Gleddin Fellow, which provided a financial which greatly eased the burden of spending 6 months in Perth.

My time in Perth rapidly filled with a number of projects. My primary reason for visiting Greg's group was to assist one of his PhD students develop the quantitative data acquisition systems for his experimental programme. His research explores a problem which is particularly topical. Oil companies, extracting oil from offshore wells on the Northwest shelf of Australia, are concerned about the impact internal wave motions might have on their infrastructure.

Greg was keen to have access to my *Stream* library software and for me to assist his student in getting two data acquisition systems working for his experiments. The first, called light attenuation, is something our laboratory at Canterbury has significant experience in and my *ImageStream* software is designed for analysing the resulting digital images. The second is called particle tracking velocimetry. It again utilizes digital video technology. By the time of my departure both experimental systems were working satisfactorily and we were able to present preliminary results at the International Symposium on Stratified Flows that was held in Perth the week before I left. This work is ongoing.

I gave a school seminar on my particle tracking velocimetry system and this seminar generated some interest from Dr Anye Waite who is interested in the particles present in the water column above coral reefs. We are hoping to develop a low cost system for making such field measurements based loosely on the techniques we use in the laboratory. This is an on going collaboration which might lead to some interesting new techniques.

I found time to complete and submit several journal papers (9), some conference papers (3) and update my *Stream* software manuals. Of course much of the work was collaborative.

My year's study leave was stimulating both at a personal and professional level and I certainly have enjoyed the opportunities it provided. The change in lifestyle, offered by living on campus in a university unit, was exciting and the whole Perth experience provided us with a healthy change from the normal routine of life in Christchurch. I am convinced that the personal aspects of study leave are as important as the professional in providing a new perspective on life. I feel my time away has provided me with the chance to reflect on my professional priorities and directions, and this, undoubtedly, will have a fundamental impact on my future academic activities.

Pedro Lee: Best Lecturer 2006

The annual UCSA Lecturer of The Year Awards, are a chance for students to vote for their favorite lecturers on campus who deserve recognition for their efforts. Awards are given to the Best Lecturers in each College and then an overall winner is also named. In 2006 Pedro Lee received Lecturer of the year for the College of Engineering as well as Lecturer of the Year overall for the University. (It was good to get one in there for the department--Law and Commerce had won it for the last few years.)



Out and about: travel tales

Visit to the Guinsaugon landslide, Southern Leyte, Philippines, November 2006

Lis Bowman

On February 7th 2006, a massive debris avalanche of soil, rock and water occurred in southern Leyte in the Philippines, burying the village of Guinsaugon in St Bernard and killing 1122 people. The debris material fell a vertical distance of 800m and spread over a horizontal area of approximately 4 million square metres. I joined a small reconnaissance team, led by Assoc. Prof. Marte Gutierrez of Virginia Tech. USA, which visited the site in November 2006. At the site we performed geological investigations, soil and rock sampling, in situ testing, DGPS survey, LIDAR survey and Digital Stereo Photogrammetry (DSP). From these investigations and discussions with witnesses, we have put together a tentative chain of events. The cause of the slide appears to have been a combination of a number of factors including high groundwater levels, the

damming of a stream at the base of the main scarp in the days preceding the slide, a number of small ground tremors just before the event and high rainfall.

While staying in the nearby town of St Bernard, I was struck by the resilience and general helpfulness of the local people, who have hosted a continuous stream of geotechnical teams (amongst others) that have visited since the disaster. Some of our porters and helpers were among those who lost entire families, and some had witnessed the event at first-hand. They were keen that similar such catastrophes should be avoided in the future and did what they could to assist the various scientific groups from different countries.

For further studies, soil samples were taken from the deposit and these are forming part of

a 3rd Pro research project undertaken by Jodine Wooding aimed at understanding aspects of the landslide deposit, including its high areal spread. It is hoped that this type of study can inform future land-use planning in this part of



“Study leave is a chance to see how others do what you do.”

An excerpt from Mark Milke's study leave report regarding how different universities work: Period of Leave: Jan.-Dec. 2006

During my study leave, I visited and gave seminars at Napier and Strathclyde Universities. I also gave two lectures at Napier University (from the altar of a converted church – talk about feeding my ego!). I attended teaching workshops at Napier on the role of computers in instruction; one on plagiarism, one on blogs and wikis, and a third on using e-mail communications with students effectively.

There were a couple important lessons I gained from my time at Napier, but to understand them, one must also know a little about Napier. Napier is a 'new university' in the UK, promoted from polytechnic status in the early 90's. From my assessment, it has some parts that are still at polytechnic level, and others that are at a university level. The institution is very 'hungry' because of its lower status, and willing to experiment and find new niches, compared with less nimble, higher status universities in the UK. For a higher status university such as Canterbury, which is vulnerable to semi-universities such as AUT and Unitech, it is valuable to look at how the hungry ones operate.

Napier's strategy is to identify changes in how students prefer to be educated and position themselves to deliver education in these new ways. I want to comment on three aspects of this strategy: more reliance on electronic resources in teaching, new timetabling, and stronger student support services. Many students want and expect to learn using computers. The use of WebCT was mandatory for all classes, and electronic methods of instruction and communication were the norm. A great deal of support was available to help lecturers take up the new technology. My time there opened my eyes to the new potential in electronic education. The second part of the new niche was based on developing a new timetable to match students'

needs. Napier was moving away from standard one hour lectures and towards focused half-days or full days on particular subjects with a mix of lecture, tutorial, and laboratory time. They were not going so far as pure project-based learning, but were clearly changing the timetable to match the preference of students to learn in more of a block mode. The final part of the strategy was to provide much stronger student support services. Orientation, writing guidance, computer instruction, teaching support, counselling, secretarial support, and career planning were all better funded and supported than at Canterbury. The strategy seems to be working, because they are attracting bright students who value these aspects above the traditional 'academic quality' dimension to university selection. Napier is hoping that attracting bright students with new learning methods and extra support will in turn lead to better graduates and slowly raise the university's academic quality ranking. They are also expecting that the more staid universities will not be so bold as to attempt these changes. I took this as a lesson in the importance of always trying to find ways to improve how a university delivers high quality education.



“They told me it was this way....”
Mark hunts for the conference venue in northern Sweden.

Koichi Sugioka, PhD
Fatigue Assessments and Mitigation for Orthotropic Steel Decks of Highway Bridges
Supervisor: Gregory MacRae

Sudan Raj Panthi, PhD
Effect of arsenic on the denitrification process in the presence of naturally-produced fatty acids
Supervisors: David Wareham, Mark Milke

Vinod Kota Sadashiva, Ph.D.
Building regularity for simplified modelling.
Supervisors: Gregory MacRae, Bruce Deam.

Brian Peng, Ph.D
Seismic performance of reinforced concrete building with precast concrete floor systems
Supervisors: Rajesh Dha, Richard Fenwick, Athol Des Bull

Sean Rees, PhD
Undrained behaviour and liquefaction strength of Christchurch soils
Supervisors: Misko Cubrinovski, Lis Bowman

Lisa Woods, ME
Investigation into the seismic behaviour of steel reinforcement details employed when there is insufficient support for precast concrete hollowcore flooring units
Supervisors: Des Bull, Stefano Pampanin

Matthias Egli, ME (Ecole Polytechnique Federale de Lausanne)
Methodologies for Integrating GIS and WEPP for Forest Road Erosion Modelling.
Supervisors: Regis Caloz (EPFL), Tom Cochrane

A postgraduate's life is mixed in with all t

Cameron Oliver, PhD
Near Field Mixing of Desalination Plumes
Supervisors: Mark Davidson, Roger Nokes



Min Ho Chey, PhD
Semi-Active Tuned Mass Damper Building system
Supervisors: Athol Carr, Geoffrey Chase, John Mander (Texas A&M University)



Brendon Bradley, PhD
Performance based risk assessment of building
Supervisors: Rajesh Dha, Misko Cubrinovski, Greg MacRae, Dominic Lee (Maths)

Roberto Franco Anaya, PhD
Seismic performance of semi-active control systems
Supervisors: Athol Carr, Geoffrey Chase (Mech.Eng.)

Roger Harrison, PhD (Fire)
The Design of Smoke Management Systems Involving the Thermal Spill Plume
Supervisors: Mike Spearpoint, Charley Fleischmann

Nor Hayati Abd. Ghafar, PhD
Dynamic Response of Concrete-Timber Composite Floor Systems.
Supervisors: Massimo Fragiocomo, Andy Buchanan, Bruce Deam

Adam Walker, ME
Assessment of material strain limits for defining different forms of plastic hinge region in concrete structures.
Supervisors: Rajesh Dhakal, Richard Fenwick

Mark Flintoft, ME
Optimising the use of Flow Treatment Wells for determination of Aquifer Conductivity
Supervisors: Tom Cochrane, Mark Milke; Murray Clouston, Goltz (Air Force)

Mauricio Taulis, PhD

Groundwater extraction and disposal modelling for coal seam gas recovery

Supervisors: Mark Milke, David Nobes, Aisling O'Sullivan

David Yeoh Eng Chuan, PhD

LVL-Concrete Composite Floor System

Supervisors: Massimo Fragiacomo, Andy Buchanan, Bruce Deam

Alejandro Amaris, PhD

Developments of Advanced Solutions for Seismic Resisting Precast Concrete Frames

Supervisors: Stefano Pampanin; Athol Carr; Desmond Bull; Alessandro Palermo



Jerry Chang, PhD

Computer Simulation of Hollowcore Concrete Flooring Systems Exposed to Fire

Supervisors: Andy Buchanan; Rajesh Dhakal; Peter Moss

Nastaein Qamaruz Zaman, PhD

Waste biodegradability tools to assess biological treatment options

Supervisors: Mark Milke, Dave Wareham

Debra Gardiner, PhD

Development of Design Recommendations for the Internal Forces within Concrete Floor Diaphragms

Supervisors: Des Bull, Athol Carr

Umut Akguzel, PhD

Experimental and computational evaluation of retrofitted existing beam-column joints under uni- and bi-directional earthquake loadings

Supervisors: Stefano Pampanin, Athol Carr, Constantin Christopoulos (University of Toronto)

Life has a little play
in the hard work...



Govind Acharya, PhD

Analysis of the Spatial Distribution Pattern of Sediment Deposition from Water Induced Erosion and Landslides

Supervisors: Tom Cochrane; Tim Davies (Geology)

Hayden Bowen, ME

Behaviour of piles in liquefiable deposits during strong earthquakes

Supervisors: Misko Cubrinovski, Athol Carr

Craig McCauley, PhD

Engineered Wetlands for Passive Treatment of Complex Mine Waste Waters

Supervisors: Aisling O'Sullivan, Mark Milke



Shameer Samad, ME

An Analysis of the Impact of Sea Level Rise on Lake Ellesmere - Te Waihora and the L2 Drainage Network, New Zealand.

Supervisors: Tom Cochrane, David Painter

Peter Brown, PhD

Optimal Irrigation Scheduling.

Supervisors: Tom Cochrane, David Painter, Thom Krom, John Bright

Kam Weng Yuen, PhD

The development of selective retrofit strategy and techniques for RC structures within the performance-based approach.

Supervisors: Stefano Pampanin, Athol Carr, Des Bull, Alessandro Palermo (Technical Univ of Milan)

Eric Scheepbouwer, PhD

Outfall behaviour in an unsteady ambient fluid

Supervisors: Mark Davidson, Roger Nokes, Pedro Lee

Keiko Munakata, ME Transport

Correlation between links in network reliability analysis

Supervisor: Alan Nicholson

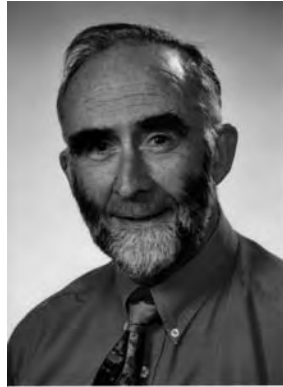
People updates

David Painter

David Painter graduated with a 1st Class Honours BE(Hons) in Mechanical Engineering in 1965. He went on to gain a PhD under the primary supervision of Dr Alex Sutherland from the Department of Civil Engineering (former UC College of Engineering Dean) in 1969 in fluid mechanics.

David was employed at the University of Canterbury from 2002-2006 as Associate Professor of Natural Resources Engineering, housed within the Department of Civil Engineering. Prior to this, David served as Head of the Department of Natural Resources Engineering at Lincoln University and also practised as a consulting engineer. Before 2002, the University of Canterbury and Lincoln University jointly taught the BE(Hons) degree in Natural Resources Engineering, but in 2002, UC assumed responsibility for wholly teaching the degree. David Painter was an instrumental person in facilitating this and served as a true advocate for continuing to offer, guide and nurture this important engineering degree since it was accredited in 1969 (previously known as agricultural engineering). In the four years that David Painter served the Department of Civil Engineering, enrolments in the natural resources engineering steadily increased from under 12 in 2001 to 21 in 2004, to beyond limitation of entry (25) of 25 in 2005, 29 in 2006, and 26 in 2007.

In late 2006, David decided to return to consulting practise and to engage in vibrant research relating to biofuels, ecological engineering solutions for urban catchments and water resources modelling – all of which are gaining heightened importance in New Zealand. We are very fortunate in being able to have David continue teaching in the Department on a contract basis while simultaneously pursuing some collaborative research with the Natural Resources Engineering group members and others. In 2006, the undergraduate students initiated a social gathering to thank David for his commitment, time and efforts in facilitating their choice to pursue a degree in natural resources engineering and this was testament to the dedication David gave to many students in their undergraduate degree.



Professor Andy Buchanan

Andy had a busy year in 2006 as he returned to full time work, fully recovering from an accident which occurred during his study-leave in Bristol, UK, in 2005.

Andy Buchanan has been seconded to a new position as Professor of Timber Design. This new chair in timber design is supported by the Ministry of Agriculture and Forestry, established with the aim of increasing the use of timber as a building material in non-residential buildings in New Zealand, leading to new offshore markets. This initiative, funded by industry and government, is intended to add value to New Zealand timber exports and to assist the country in meeting its Kyoto Protocol obligations.

In complementary activities, Andy was re-elected President of the New Zealand Timber Design Society after a break of 20 years, and has joined the Management Team of a timber industry campaign promoting the use of wood as a renewable building material. He is seeking funds for a multi-million dollar research project into prestressed timber buildings, including seismic design, fire safety and sustainability.

A big delegation from the Department of Civil Engineering attended the World Conference on Timber Engineering in Portland, Oregon, in August 2006. Papers were presented by Stefano Pampanin on seismic design of prestressed timber buildings, Massimo Fragiaco on timber-concrete composite floor systems, and Peter Moss on fire resistance of bolted timber joints. Andy Buchanan joined an international panel on performance-based design of timber buildings.

Following that conference, Andy and Massimo Fragiaco moved on to the CIB-W18 workshop on timber engineering in Florence, Italy, and Stefano Pampanin went to the European Conference on Earthquake Engineering in Geneva.



John Mander

Professor John Mander has recently left the University of Canterbury to take up a faculty position at Texas A&M University in the USA. John is a Canterbury graduate who worked at the State University of New York in Buffalo, New York State, before joining the academic staff at Canterbury in 2001. While at Canterbury he helped to establish the Future Building Systems project which continues to investigate innovative concrete building solutions, with funding from Fletcher Construction and the Foundation for Research Science and Technology.



Alum releases autobiography



Department alum, Norman Hardie, has released a book on his life, *On My Own Two Feet: The Life of a Mountaineer*, that might be of interest to readers. He is an amazing man, with a life that includes the likes of working on the Pukaki hydro-electricity scheme to climbing in the Himalayas and working at Scott Base Antarctica. Norman graduated with a BE in Civil Engineering in 1948.

Of additional interest, Janet, who is the wife of current staff member Mark Milke, wrote a review of the book for the Antarctic Society.

There is an expanded story on the Canterbury University Publishing website, www.cup.canterbury.ac.nz/releases/2006/061128a.shtml.

People Updates

Mosese Fifita

My name is Mosese H. Fifita and I was born in Nuku'alofa, Tonga. As well as two younger brothers, I have parents who are now living in Auckland. I went to Primary school in Nuku'alofa and then to Tonga College and Tonga High School before coming to New Zealand in 1978. After completing college and finishing at Waikato Technical Institute, I started an Apprenticeship in Fitting, Turning and Machining with Fletcher Wood Panels at Lake Taupo. My first daughter was born soon after in 1982.

After completing my apprenticeship I transferred to Auckland and worked for Fletcher Wood Panel Door Division. My second daughter was born in 1988 and soon after I took voluntary redundancy followed by a 4 month stint in Sydney working as a shift fitter. Upon my return to Auckland, I worked in Westfield Freezing Works as a fitter until my old manager at Fletcher Doors found out that I was back in the country and offered my old job back for better wages, which I could not turn down. Later, I transferred to NZ Wires for two years but found myself back at Fletcher's again in 1991 as a maintenance fitter, looking after the Engineering department and a maintenance gang of three tradesmen. My son was born in 1999 and after facing another redundancy in 2001 we went to Sydney for a holiday and ended up working there for 3 and a half years in Plastic industries. In 2005, we came to Christchurch for a holiday and fell in love with it so we decided to make it our home for the rest of our lives. I found a job with Skellerub for 6 months and then with Transfield Services for a year before I got this opportunity here at Canterbury University. I am enjoying working here very much and look forward to it continuing.



Peter McGuigan

Peter commenced his employment in the department in June 2006 as the Environmental and Natural Resources Engineering Technician .

His previous positions have included Technical and Laboratory roles in both the Tanning and Export Meat Industries.

(Peter is a man of very few words. -ed.)



Gavin Keats

Gavin is a technician in the Structures Lab. He is an aircraft engineer by trade and has also worked in the motorcycle, footwear, welding, mechanical services and sports car construction trades.

Gavin has an interest in sustainable transport and commutes to work in the aluminium alloy velomobile "Car-not" which he designed and fabricated. Other hobbies include Alfa Romeos, vintage Riley cars, Velocette motorcycles, and since joining the structures lab, concrete garden sculptures. As a Red Cross volunteer, he enjoys learning about the people, history and culture of Ethiopia. Currently he is building the Staaken Flitzerz21, a parasitic reconnaissance biplane designed to be launched from the plywood Schutte-Lanz airship DZ.1.

His daughter is currently wrestling bears as she traverses the Russian Steppe on a motorcycle and his son is an electronic development engineer for Whispergen after graduating from Canterbury in 2003. His best friend and partner Daphne is a lecturer in mathematics at CPIT.



Norman Piling

I have been employed on a 12 month contract as a Technician in the Structural Engineering Laboratory. My background is a little different from most of the other Technicians in that I worked for Christchurch Local Bodies for 25 years in various capacities starting as a draughtsman, then morphed into Town Planning, then Traffic Engineering and even worked for a couple of years in Publicity/DTP until being made redundant in 1994. I hold a NZCE in Civil Engineering.

My passion for years has been cars and car racing, which led to me becoming a self taught motor mechanic, panel beater, welder, fabricator machinist and engine builder in my spare time.

Since 1994 I had been running my own business in automotive engineering and car restoration using these skills, as well as working as a consultant carrying out traffic counts and surveys for ChCh Local Bodies.

I am a bit of an avid car collector, having an interest in American and Aussie muscle cars, owning around 6 vehicles at present in various states of restoration. I also race a 1965 Cortina GT in the classic car class at Ruapuna.

More recently I have taken an interest in boating and now have three boats of various sizes. I use these on my numerous fishing trips to the Lake Coleridge area where I enjoy the outdoors and have a cabin under construction.



Undergraduate Research

Undergraduate research projects, both as formal 3rd pro course options and as summer work, give some of the undergrad students a chance to a look more deeply into problems that are at the “cutting edge” of engineering. Some of the recent undergraduate research projects are detailed here...

Design and Development of an Improved Stormwater System for Discharge into Lyell Creek, Kaikoura

Students: Aimee Hynes, James McPhail, Jeffrey Telfer

Degree: BE Natural Resources Engineering
Academic Supervisor: Tom Cochrane

This project considers the design and development of an improved stormwater system for discharge into Lyell Creek, Kaikoura. The current stormwater reticulation structures are largely inadequate to treat the water, and many discharges lack consents. The project focuses on incorporating all the individual discharges into several main discharges, to ease the treatment and consent processes. The key outputs of the project are to be design details and drawings of the suggested stormwater treatment system, an appropriate construction methodology, and a final report, poster and presentation.

Investigating the Importance of Physical Parameters When Modelling Debris Flows

Students: Michael Carroll, Violette Edwards, Perry Jackson

Degree: BE Natural Resources Engineering
Supervisor: Lis Bowman

Debris flow events are sporadic and violent; posing a significant risk to people, property and lifelines. This project aims to further the understanding of the scale modelling of debris flows by establishing those dimensionless groups that most influence flow behaviour. Using a small-scale laboratory flume, relevant physical parameters will be systematically varied to determine their individual effect(s) on the observed outcome.

The importance of this research is the potential application of scaling analysis in providing a better basis for analytical solutions and predictions regarding debris flow behaviour.

Geotechnical Analysis of Hydraulic Properties of Substrates for Engineered Treatment Wetlands at Stockton Mines, New Zealand (with Solid Energy)

Student: Nicola McHaffie

Degree: BE Natural Resources Engineering
Supervisor: Aisling O’Sullivan

For this project, hydraulic conductivity experiments were run to ascertain optimal hydraulic conditions of various waste substrate mixes for use in treatment wetlands. It is ideal to use waste materials as reactive treatment materials in such systems since they are ecologically and economically attractive. This work aligned with the principles of ecological engineering by converting wastes into commodities. This research was supported by Solid Energy.

Monitoring Stormwater Discharge into the Avon River from the Fine Arts Carpark at the University of Canterbury for Resource Consent Renewal

Students: Jesse Adams, Sophie Broad, Therese Mahar

Degree: BE Natural Resources Engineering
Supervisor: Aisling O’Sullivan

The University of Canterbury is currently re-applying for resource consent to discharge stormwater from the Fine Arts and Student Union Carparks into the Avon River. To achieve the required level of stormwater treatment Opus International Consultants have proposed the use of hard treatment devices. This project aims to characterise the stormwater runoff from the Fine Arts Carpark and ascertain the background chemistry and flow for the Avon River. This will be accomplished through a comprehensive sampling regime. Project results will be used in the resource consent application, in assessing the effectiveness of the proposed treated systems and for future stormwater management on campus.

Solar Panel Design and Potential Application Research Project

Students: Colin Roxburgh, Logan Thomson, Chelsea Giles-Hansen

Degree: BE Natural Resources Engineering
Supervisors: David Painter, Chris Bathurst (industry)

It has been identified that there is a gap in the market for solar water heating panels consisting of materials that allow low cost mass production. We aim to continue research initiated by Chris Bathurst (Solvent Rescue) into the design of such a panel.

After material selection, based on cost effectiveness (monetary and ecological footprint) and thermal properties, a final design will be completed with sufficient detail that a prototype panel can be produced. Construction plans, a detailed methodology for performance trials and a feasibility analysis of applications where the panel would be commercially viable will be drawn up.

Quantifying Stormwater Contaminants in Water and Sediments in the Okeover, Christchurch (with ECan and CCC)

Student: Ellie Taffs

Degrees: BE Natural Resources Eng. BLaws
Supervisor: Aisling O’Sullivan

Research was conducted on Okeover Stream on campus, which has been the focus of rehabilitation efforts by the University of Canterbury, The Christchurch City Council and Environment Canterbury for the past 11 years. The aim of this research was to quantify contaminants such as metals entering Okeover in runoff from storm events, which is jeopardising the success of the restoration project. Outcomes from the work were reported to the local and regional councils and were received very favourably at the Waterways workshop.

Long Term Behaviour of Prestressed Laminated Veneer Lumber (LVL) Members

Student: Matthew Davies

Degree: BE Civil Engineering

Supervisor: Massimo Fragiacommo

The purpose of the research is to investigate the reduction in prestress load in prestressed LVL members, ultimately aiming to determine the contribution made by key factors, such as creep and mechanosorption of timber, relaxation of steel, and variations. Thereby, allowing the losses to be reliably estimated at the design phase and to answer questions regarding the viability of multi-storey prestressed timber frame structures. The project is jointly funded by the Department of Civil Engineering (\$9450) and Carter Holt Harvey (\$6300 plus material). It comprises full-scale specimens, reduced scale specimens, and small blocks tested in uncontrolled (civil engineering laboratory) and controlled (climate chamber) environmental conditions.

The embedment strength of bolts in timber in fire conditions

Student: David Carshalton

Degree: BE Civil Engineering

Supervisors: Peter Moss, Andy Buchanan, Massimo Fragiacommo

Research is being carried out to provide additional data for predicting the load capacity of connections in timber structures when exposed to known heat flux levels. As a summer project, a large number of singly bolted connections using steel splice plates have been tested at constant temperatures ranging from ambient to 300 degrees. Several similar connections were also tested in a small furnace simulating fire conditions. Data from these tests enables the embedment strength of the timber to be determined as a function of the bolt temperature. The research is ongoing in order to propose a suitable method for use in building codes. In addition, this research needs to be extended to screws and nails, loaded both parallel and perpendicular to grain. A related question is whether we can protect truss plates or nailplates with intumescent coatings, plasterboard or other protection.

Control and Erosion Quantification from Restored Slopes at the Stockton Mine (Solid Energy)

Student: Isabelle Gensburger

Degree: BE Natural Resources Engineering

Supervisor: Tom Cochrane

Laboratory experiments of soil erosion were conducted under various slopes and rainfall intensities on topsoil, capping material, and waste rock from Stockton Mine. The performance was examined of a variety of materials as mitigation strategies for soil erosion and acid production from the underlying overburden. Outcomes of this will help with landform and environmental restoration at the mine. This research was supported by Solid Energy.

Structural Parameter Identification

Student: Martin Luoni

Degree: BE (Civil)

Supervisors: Greg MacRae, John Berrill (industry)

The aim of this research is to develop a simple decision making tool based upon the analysis of seismic response data of the UC physics building, which has been recently instrumented with a 'CUSP-M' seismic sensor system. The decision making tool will be able to give a preliminary structural condition assessment of the building following a major event, aiding the reoccupation process of the building. From analysis of the response, the structural parameters of the building will also be found. The analysis of the records is to be carried out by using a range of methods, then comparing the adequacy and validity of each method.

Modelling, Experimental Analysis and Implementation of Lead Dampers in Structural Connections

Students: Thomas Mander, 3rd Pro Civil Eng Degree with Geoffrey Rodgers, PhD Candidate, Mechanical Eng Department

Supervisors: Greg MacRae, Rajesh Dhakal, Geoff Chase (Mechanical Eng Dept)

The use of lead dampers in buildings is important in seismic areas for damage avoidance design of structures. The dampers used are extremely small (the size of a coke can) and easily installed into steel joints while being able to resist large forces dissipating energy from the structure. The dampers have already been built and the project focuses on characterising them on the Avery in the Civil Engineering Lab and DARTEC to examine velocity dependence of the dampers. The dampers are to be tested in a steel beam column joint in the lab to determine overall joint hysteresis under typical seismic action.

Long-term performance of epoxied-glued glulam connections

Student: Christopher Wallington

Degree: BE Civil Engineering

Supervisors: Massimo Fragiacommo, Andy Buchanan, Mark Batchelar (Industry)

The purpose of this research project is to resolve some uncertainty regarding the design of epoxied-glued connections to join timber members. The behaviour of such types of connection, which are extensively used in New Zealand, is affected by creep of the timber (parallel and perpendicular to the grain) and heterogeneity of the cross-section (timber and epoxied steel rods) when subjected to long-term loading. The stress distribution at the column-to-rafter interface may change over time leading to a possible stress concentration at the end of the service life, and an opening of the joint may occur, possibly leading to excessive deflection of the rafter.

In order to investigate the long-term behaviour, four different beam-to-column connections are being tested under a constant load applied over time, by monitoring deflection and strains. Some other tests have been and will be performed on small specimens in order to characterize the mechanical properties of glulam. The creep of glulam parallel and perpendicular to grain in compression and tension, and the creep of the epoxy at the interface with the rod and glulam are also being measured.

Undergraduate Research

Ice-Rock Avalanches

Student: Daniel Smith
Degree: BE Civil Engineering
Supervisors: Lis Bowman

The purpose of this research was to investigate one of the potential mechanisms of ice-rock Avalanches. The research involved undertaking a series of experiments in the cold room at the International Antarctic Centre. Blocks of ice were slid down a slope, and the fracturing of the ice at the base of the slope was recorded using a high speed camera. This information was later analyzed using a Particle Image Velocimetry (PIV) software suite, which produced information about the velocity and strains of the ice blocks during fracturing. Ice-rock avalanches are a poorly understood phenomenon that behave in an interesting manner, where large volumes of material fall and fracture. Upon fracturing, the material spreads out thinly over a large area at high speed. Understanding this phenomenon could potentially allow for modelling and an ability to define hazardous locations near probable ice-rock avalanche zones.

Grading Sand Using Upward Flow of Water and Automatic Valveless Gravity Filters (AVGF)

Students: Tim Fowler, Kent Jacobsen, James Maunder
Degree: BE Natural Resources Engineering
Supervisor: David Wareham

This project aims to improve water quality in developing nations. This will be done by refining sand grading techniques and investigating a low maintenance filtration device. Graded sand is needed for water filtration but the current systems are inadequate. The project aims to improve a process called elutriation, which means sand grading using an upwards flow of water and controlled outlet valves. The filtration device, called an automatic valveless gravity filter is currently in municipal use in New Zealand but the idea has not been adequately applied to developing nations. The key outputs for this project will be a final report, poster, presentation and a construction and operation of the final designs.

Investigation of a Fatal Rockslide-Debris Avalanche, Leyte Island, Philippines

Student: Jodi Wooding
Degree: BE Civil Engineering
Supervisor: Lis Bowman

This research is based on the catastrophic rockslide-debris avalanche event on Leyte Island, Philippines, that occurred on the 17th February 2006. Elisabeth Bowman visited the site of the disaster and brought back samples to carry out tests such on particle size and friction angles.

This project is aimed towards understanding the mechanics of rockslide-debris avalanches and the triggers which begin and enhance the events. Special features of the Leyte Island tragedy which are being investigated are the unusually long run out distance possibly caused by flooded paddy fields and the formation of "molders", large cone shaped sorted piles of debris. Extensive research of publications written on the subject have been carried out and this will be followed by constructing a scale model of the Leyte event in the laboratory to analyse the behaviour of the rockslide-debris avalanche.

It is hoped to provide better understanding of the significant features contributing to these events and thus predictions will be able to be made on possible hazardous areas in future, saving many lives and millions of dollars of destruction.

Did you know....???

The frontman for the NZ rock band Zed, Nathan King, was a civil engineering student before dropping out for greater things. The band Zed recorded parts of the video for their breakout hit "Glorafilia" in the environmental engineering laboratory.

What is Nathan doing now? Find out on his website : www.nathanking.co.uk

Investigation of Aging Effects on Christchurch Soils

Student: Kaley Crawford-Flett
Degree: BE Civil Engineering
Supervisor: Lis Bowman

This research project is based on the process of 'aging' in granular soils where a noticeable increase in strength and stiffness is commonly observed in soil at constant global density following a period of compressive loading. By simulating compressive loading situations over varying durations in a laboratory setting, the project aims to confirm and begin to quantify the effects of ageing in local soils.

With the assistance of the Geology Department, the mechanics of the ageing phenomenon will also be investigated. Through optical microscopy of resin-impregnated sand samples, local particle rearrangement and void distribution changes during aging will be visually analysed. It is hoped that an eventual correlation between lab data and in situ field test results will enable likely soil strength increases during construction to be estimated in the silty sands common to the Canterbury region.

Long-term Management of Christchurch's Biosolids

Students: Mark Anderson, Rory Howell, William Platts
Degree: BE Civil Engineering
Supervisor: Mark Milke

This project is researching the options available for long-term management of Christchurch's biosolids. It will assess which option is most appropriate for Christchurch. The forecasted characteristics of biosolids from Christchurch's wastewater treatment system will be obtained from the relevant authorities. The geography of possible sites for application will be studied using GIS. The emphasis will be on using biosolids beneficially in an energy descent future. Social perceptions of biosolids will be considered along with possible changes to Christchurch's wastewater treatment infrastructure.

Group updates

Fire Engineering

Scholarships and awards

The NZFS Commission continues to support the MEFE programme. Three scholarships to the value of \$20,000 were awarded to Marcus LeQuesne, Delwyn Lloyd and Daniel Tobeck.

The Arup Fire scholarship awards \$AU2,500 to a full-time student to support their research work. Arup Fire is one of the leading international fire engineering consultancies and many of our graduates are or have been employed by Arup Fire throughout Australia, Asia, USA and the UK. This year's recipient of the Arup Fire scholarship is Delwyn Lloyd who is comparing the safety of occupants in buildings currently designed to the New Zealand Acceptable Solution with a proposed suite of prescribed design scenarios for performance-based design.

A new scholarship has been provided by the Society of Fire Protection Engineers New Zealand chapter. The scholarship is open to

all full-time thesis research students who are enrolled in the MEFE programme. This scholarship is worth \$NZ2,000 to the student plus an additional award of up to \$NZ500 to fund the costs of the research. The 2006 award has been made to Daniel Tobeck.

Jerry Chang received a scholarship from the Dante Alighieri Society to visit Italy on the way to the Structures in Fire (SiF) conference to improve his Italian language skills.

We are also very pleased to have Roger Harrison awarded the David B. Gratz scholarship for graduate students enrolled in fire science or fire engineering programmes outside of the United States. This annual award is sponsored by the National Fire Protection Association (www.nfpa.org) and is the second time that a University of Canterbury student has been selected as a recipient.

And last but not least, congratulations to Keryn Goble and James McBryde who each won merit prizes of \$200 in the first annual College of Engineering Postgraduate Poster Competition. They had to present their research on a poster in a manner that high school students could understand it, but not lose the science behind the research.

Visitors

Prof Roger Plank from the University of Sheffield, UK visited us through the Erskine Fellowship scheme. This year we also welcomed exchange students Johanna Bjornfot and Jakob Karlsson from Lund University and Dr Marc Janssens paid a brief visit and gave a presentation on recent research on various aspects of motor vehicle fire safety.

For more information on Fire Engineering visit: www.civil.canterbury.ac.nz/fire/firehome.shtml

Transportation Engineering

Awards and Achievements

The University has been successful in obtaining a two-year extension to the MET programme funding from Land Transport NZ, with an increased value of \$160k per annum.

Congratulations also to our most recent programme graduates. Eight students completed their MET degrees in the past year (including our first five part-time MET graduates), with another one completing their Postgraduate Diploma. Dept Research Fellow Bruce Steven also completed his PhD on unbound granular pavements and has now taken up a position with University of California at Davis.

Glen Koorey and Alan Nicholson have secured a \$60,000 Land Transport NZ research project to investigate "Effectiveness of Incident Management on Network Reliability". The money has also allowed for a PhD student, Susan McMillan, to start research in this area.

2006 MET graduate Mike Smith received the "Best Presentation" prize at the IPENZ Transportation Technical Conference in Queenstown for a paper on his Master's

research into fatigue crashes. Ex-MET graduate Aaron Roozenburg (now with Beca) also did well in Queenstown, picking up the Best Technical Note prize and the Young Author award.



Park and Ride Schemes

Supervised by Dr. André Dantas, Stuart Woods recently completed his MET research. He investigated and developed a predictive assessment method that would allow the identification of the most suitable type of Park and Ride scheme (from a proposed classification scheme)

for metropolitan land use development strategies. The method was applied in a case study in Christchurch. The results show that a Link-and-Ride scheme would be the optimal in terms of meeting current urban form objectives.

Bridges - no problem?

If you look closely, you'll see that Stefano Pampanin - a structural engineer - is attempting to explain how roads really need to have as many bridges as possible (that's structures for you...). Actually, he is talking to students at the 2007 Careers Expo about transportation planning. The model is a dynamic demonstration of transport planning issues where viewers are presented with the problem of finding the optimal roading solution across the grid. Glen Koorey designed the display.



Natural Resources and Geotech groups have been busy

Geotechnical Engineering

It was a busy year (!) for the geotechnical group. The beginning of 2006 said farewell to John Berrill which meant the staff were down to two members - Lis Bowman and Misko Cubrinovski, who both arrived the previous year. 2006 also saw the arrival of a new PhD student and one Master's student, while so far in 2007 both Misko and Lis have become involved in co-supervising a number of other postgraduate students. A new member of staff is expected to join the group in January 2008.

Visitors

In July, Prof. Hirokazu Akagi, Waseda University, and two of his colleagues presented a half-day seminar on Current Issues in Civil Engineering in Japan.

In September Prof Harry Poulos from Coffey, Australia, arrived on a delayed Erskine Fellowship, and delivered an extremely popular two-day course on Analysis and Design of Piles, with 40 participants from all over New Zealand. He also gave a seminar on his 2004 Terzaghi Lecture: Pile behaviour – consequences of geological and construction imperfections.

In October, James Schneider visited from University of Western Australia, and gave a very interesting seminar on the use of CPT tests to examine liquefaction potential in soils.

In November the group also hosted a workshop on Earthquake Geotechnical Engineering, organised by Misko, which attracted visitors from all over the world.

Laboratory / field testing developments

The postgraduate research room became home to a multi-stage advanced triaxial apparatus (proudly shown below by Sean Rees) and nold de-airator. These apparatuses are the first of several hoped-for pieces of equipment which will enhance the mechanical soil testing



capabilities of the group. The Cone Penetration Test (CPT) rig continues to be upgraded, with new jacks to be the final element in the re-design of the CPT (a.k.a. "big yellow") truck. This equipment will enable the group to carry out CPT field tests in all types of soil around New Zealand.

Trips

It was a busy year for travelling too. Misko travelled several times to Japan for the E-Defense shake-table experiments on full-size piles in liquefiable soils. He also attended a conference in Tokyo and participated in an NSF panel in Washington.

In 2006, Lis travelled to Switzerland for a month in June to undertake some debris flow experiments on the geotechnical centrifuge at ETHZ. She also attended conferences in Japan and Hong Kong. Finally, she spent a week in the field in Philippines in October of that year. She has recently been co-opted to the NZ Geotechnical Society committee as the Young Geotechnical Professionals' representative.

Natural Resources Engineering

Natural Resources Engineering (NRE) has been an IPENZ accredited programme awarded from the University of Canterbury since 1967. It has synergies with programmes named Ecological, Biological and Agricultural and BioSystems Engineering throughout Europe and North America. The NRE degree imparts an underlying principle of integrating ecological sustainability with technical problem-solving and design, by adopting the approach of engineering in partnership with nature. This is well aligned with governmental policy on the sustainable use of environmental resources and sustainable growth and development of New Zealand.

The NRE Group were busy over the summer period with many staff, postgraduate and undergraduate researchers pottering away in the laboratories and on fieldwork. Two undergraduate researchers (Nicola McCaffie; 1st Pro NRE and Isabelle Gensburger; 2nd Pro NRE) were supported by Solid Energy to conduct research on hydraulic conductivities of engineered treatment wetlands and sediment erosion control, respectively. Additionally, Ellie Taffs (1st Pro NRE and 3rd Yr Law) was supported on the Department's Undergraduate Research Summer Scholarship to quantifying stormwater contributions to Okeover Stream on campus along with CCC.



NRE Researchers

There is quite a bit of research happening in the NRE arena. You can read about our undergrad and postgrad work in progress on pages 10-11, 14-16. A brief synopsis of academic work is provided below:

Dr David Painter has commenced a new position with DPConsulting – his own consulting business! While David is no longer a continuing member of staff, he will be teaching some of the NRE courses for 2007.

Dr Tom Cochrane and **Dr Aisling O'Sullivan** continue to supervise many graduate and undergraduate research projects aligned to industry and regulatory authorities and look forward to having more students on board for 2007/2008.

Photos: Top (l to r) Tom Cochrane, Shameer Samad, Isabelle Gensburger, Ellie Taffs, Nicola McCaffie, Peter Brown, David Painter, Aisling O'Sullivan.
Bottom (l to r) Peter McQuigan, Govind Acharya, Craig McCauley, Mark Flintofft

Farewells

John Dean

Dr John Dean, ex academic staff member of the department died on 8 August 2006, aged 58.

John's first contact with this University was in 1965 when he dropped out of the 7th form at Nelson College to enrol in Engineering Intermediate. He was an outstanding student, and went on to do an excellent PhD in the UK before returning as a staff member at Canterbury in 1978. He taught and carried out research in many aspects of structural engineering, including structural dynamics and timber building design. He was responsible for establishing the creative structural engineering project in 1st Pro, which has become the annual bridge building competition.

In addition to his engineering interests, he had a very full list of pursuits - running, climbing, tramping, bicycling, also dancing and singing

- in the company of a wide variety of friends who will miss him. He won several prizes in the Coast to Coast competition. John had a surprising ability to tell stories - his sense of humour and sense of timing and storyline were all superb, all very natural unforced, which made listening to his stories just a pleasure.

When John left Civil Engineering to do a degree in Fine Arts in the 1990s, it seemed a natural thing. In his various sculpture projects he stopped trying to see machines as engineering and began trying to see machines as metaphor. As before this was a risky, unconventional move, but once again he could challenge himself and engage his mind fully. To be able to be effective in realising some expressiveness in the machine was now beyond ordinary calculation and required the full use of his imagination - which suited him.

John created a number of interesting machines. Many remember the machine built outside the Mushroom Building for the 1987 century of the School of Engineering. More recent, his mechanical hand remains in the ceiling of the HIT lab corridor; it is graceful and is quite at rest. Other works were much larger and often dynamic, given to unexpected movement, or balanced by movement of compensating weights, complementary to his long interest in extreme physical activities and dancing.

Eventually John had read so much, thought so much, was so responsive to ideas, that I felt it was like having conversations with a sort of encyclopaedia, and his power to express his ideas so delightfully made conversation very enjoyable. I certainly looked forward to our cups of tea together with anticipation and know already that there is now a dimension less in my experience of life.

George Mullenger

Peter Giddens

Peter Giddens a long time member of the Department of Civil Engineering died at the age of 81 on the 18th of October and he will be sorely missed.

Peter Giddens received engineering training at the University of Melbourne and Canterbury University College and he had four years experience in design on construction before being appointed at Canterbury in 1951. He was immediately thrown into designing the fluids laboratory for the whole of the Engineering School. This is a magnificent laboratory and an envy of many of our overseas visitors. He supervised the laboratory until the mid 80s and worked in it until he died. He retired in 1989. He was innovative in his teaching and indeed in his farewell speech put the case forward for a Chair in Engineering Education within the School of Engineering.

Peter was concerned with all his students particularly those less mathematical who came through the NZCE system.

Peter went out of his way to welcome new appointments to the Department. Indeed his colleague Derry Gordon stated 'As a newcomer to Christchurch and academic life I found Peter to be unfailingly friendly and almost always cheerful. I think his attitude and approach to his colleagues and students contributed to the friendly and supportive atmosphere in the Civil Engineering Department'.

Peter was a professional engineer and practised his profession in academia. This showed in the research projects that interested him. He was particularly interested in small engineering projects in the back country in New Zealand and in underdeveloped countries .

He returned to the laboratory in his retirement and worked with members of the co-supervising final year projects on his passion for Micro-hydro developments right up to the year before he died.

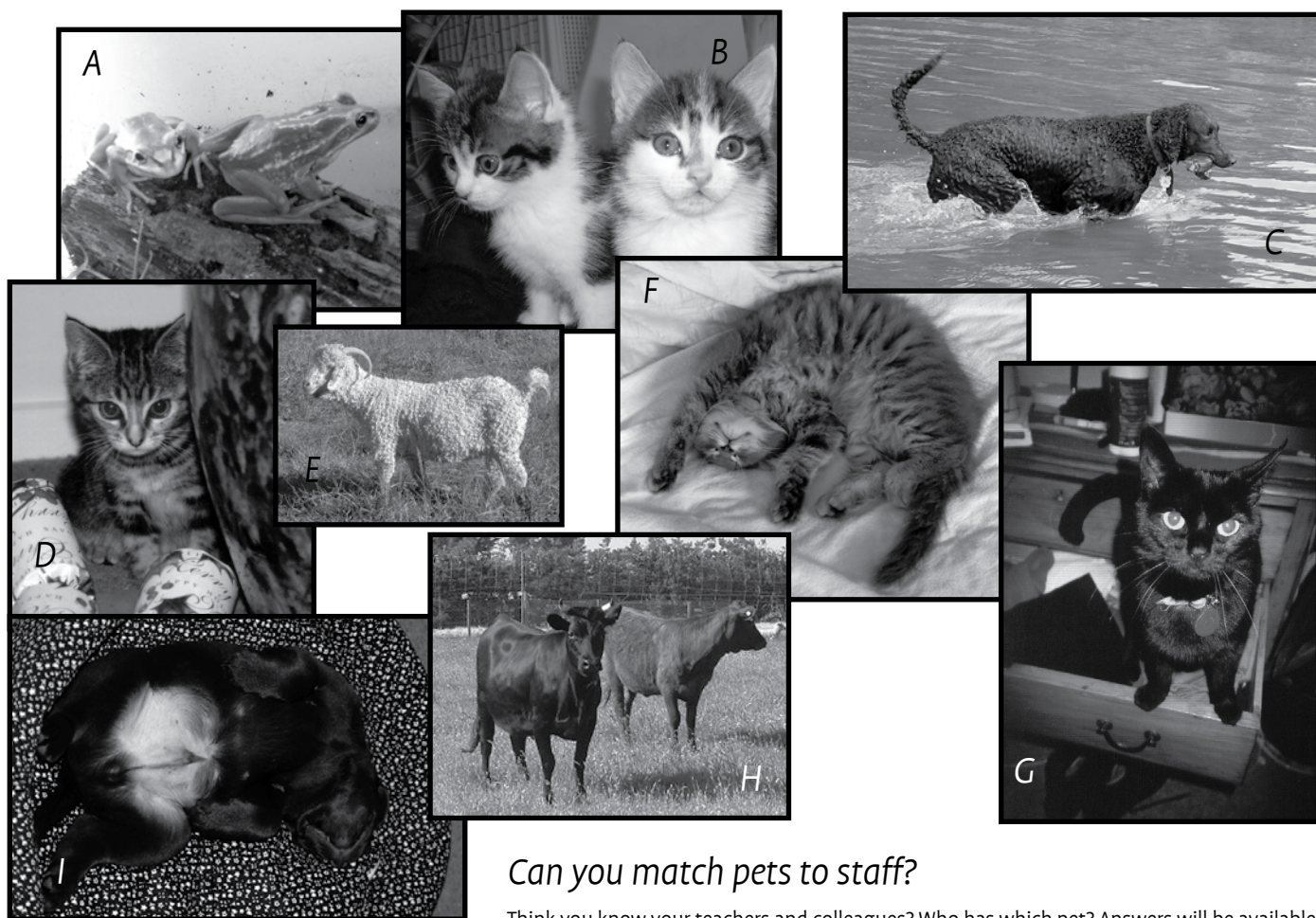
According to Dr Keith Alexandra of the Mechanical Engineering Department who was the academic supervisor 'Peter had a lot to offer students - quite often more than they bargained for.' He was genuinely interested in helping others. The whole idea behind his Micro-hydro work was that people in remote villages should be able to provide themselves with electricity. Typically small hydro schemes are expensive, but Peter went about developing designs that would be easy to make in regional workshops in third world countries. In his development program he built and tested these designs before releasing them for others to use. Several papers have resulted from his work. Peter was an original thinker. As such he had a different perspective on many things and this, not infrequently, disturbed those of us who prefer the known path. I always enjoyed hearing the reasons why he thought the way he did, even if I had to wriggle out of agreeing with him. Peter was a great hands-on person, and while he made use of computers his preference was to build an experimental rig to test his ideas on water or air flow. This was one of the most valuable lessons he could have taught students who are increasingly isolated from the hands on environment for their learning. One of my most memorable days is going with Peter and a group of students to the Springs Junction site of one of his schemes, where we saw a real system in operation and discussed the benefits with the farmer.'

Ian Wood



Peter out with some students at a micro-hydro station.

On the lighter side...



Can you match pets to staff?

Think you know your teachers and colleagues? Who has which pet? Answers will be available on the website at www.civil.canterbury.ac.nz/news/pets.shtml

The 7 pound club...

Some staff have really taken the idea of getting new life into the department to the highest level. There have been four new additions to our department family (with Andre's daughter only just making the printing deadline). There also appears to have been some coordination among staff as all the babes belong to the 7lb club. Congratulations to all!

Ethan Scott Davidson was born to Mark and Paek on the 14 December 2006. He was 7lb 2oz's at the time, but has grown a little since then.. He is a new little brother to Shaun, Emily and Andrew

Roo (from Kangaroo) was born to Greg and Ing MacRae on 6th of January 2007 weighing 3.25kg (7lbs and 3oz). His real name is Edward Anton MacRae. His middle name has significance in Chinese where the character "An" means peaceful, safe, tranquil and "ton" sounds like the Chinese character meaning lantern. His Chinese name is therefore lantern of tranquillity.

Belinda and Stuart Lansley welcomed Maia Sunshine to the family on 17 Jan 2007. She weighed in at 7lbs 9 oz.

Katarina Ribeiro Dantas, was born May 21 2007, to Andre Dantas and wife Karisa. She weighed in at Katarina 3.2kg (7lbs 4oz) and is doing very well.