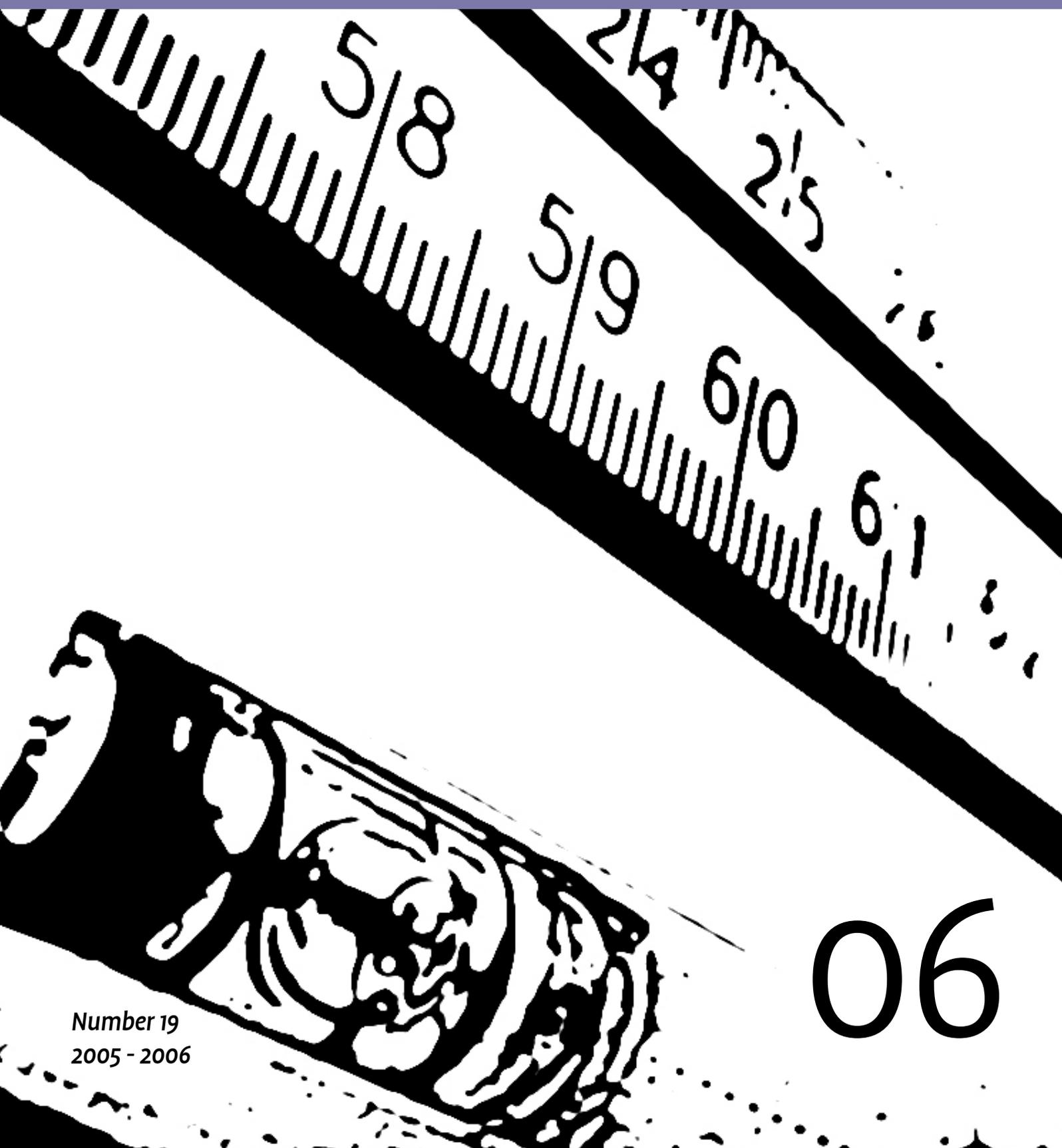


# CE News



Number 19  
2005 - 2006

06

# 2005 Departmental Staff

\* - Emeritus professors

## Academic/Research Staff

**Chris Allington** : Structural concrete  
**John Berrill** : Geomechanics, engineering seismology  
**Lis Bowman** : Geomechanics  
**Andy Buchanan** : Timber and fire engineering  
**Des Bull**: Structural concrete design, earthquake engineering  
**Athol Carr** : Structural dynamics, finite element analysis  
**Tom Cochrane** : Natural resources engineering  
**Misko Cubrinovski** : Geomechanics  
**Erica Dalziel** : 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  
**Bruce Hunt** : Fluid mechanics, groundwater flow  
**Glen Koorey** : Transport and traffic engineering  
**Pedro Lee**: Fluid Mechanics, hydrology  
**Jason Le Masurier** : Engineering management, risk  
**James Mackechnie** : Concrete materials  
**Greg MacRae** : Structural engineering  
**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  
**Alessandro Palermo** : Structural engineering  
**David Painter** : Natural resources engineering  
**Stefano Pampanin** : Structural engineering  
**Mofreh Saleh** : Transport and pavement engineering  
**Michael Spearpoint** : Fire engineering  
**Bruce Steven** : Transport and pavement engineering  
**Hugh Thorpe** : Groundwater, ecological engineering  
**Warren Walpole** : Structural steel design, earthquake engineering  
**David Wareham** : Environmental engineering

## Support Staff

**Louise Barton** : Postgraduate Administrator  
**Rebekah Hunt** : Administrative Assistant  
**Belinda Jemmett** : Departmental Administrator  
**Catherine O'Shaughnessy** : Undergraduate Administrator

## Technical and General Staff

**Ray Allan** : Fabrication  
**Colin Bliss** : Fabrication  
**Melody Callahan** : Graphics, publicity, webmistress  
**Peter Coursey** : Computer and electronics technician  
**Nigel Dixon** : Structures laboratory  
**Grant Dunlop** : Fire engineering laboratory  
**Siale Faitotonu** : Geomechanical laboratory  
**Frank Greenslade** : Transport laboratory  
**Gary Harvey** : Concrete laboratory  
**Brandon Hutchison** : Computer analyst  
**David MacPherson** : Technical Services Mgr, Environmental eng. laboratory  
**Russell McConchie** : Fabrication and testing  
**John Maley** : Structures laboratory  
**Richard Newton** : Electronics workshop  
**Tim Perigo** : 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 workshop  
**Kevin Wines** : Fabrication and testing

## Retired Staff

**Rob Davis\*** : Geomechanics  
**David Elms\*** : Risk analysis  
**Peter Moss** : Structural analysis  
**Tom Paulay\*** : Structural design  
**Ian Wood\*** : Fluid mechanics  
**Richard Fenwick** : Structural engineering  
**Nigel Cooke** : Structural engineering

### CENews

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

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Printed April 2006.

# Head of Department Message

The last 12-15 months has been a very busy period, for various reasons. Firstly, as the new Head of one of the largest Departments or Schools in the University, I have had to learn a lot in a short time!

The Department has continued to grow, with the number of students being admitted to the 1st Professional year of the BE (Civil) increasing from 110 in 2004, to 117 in 2005, to 127 in 2006, while the numbers of students admitted to the 1st Professional year of the BE (Natural Resources) has been 20 in 2004, 25 in 2005 and 29 in 2006. This growth has meant a strain on some of our undergraduate teaching facilities, and staff are having to learn how to teach large classes without there being a decline in the quality of the education of the students.

Two senior staff, Bruce Hunt and John Berrill, have been farewelled recently. They have retired after 33 and 29 years, respectively, of sterling service to the Department. We hope they have a long and enjoyable retirement, while maintaining close contact with the Department.

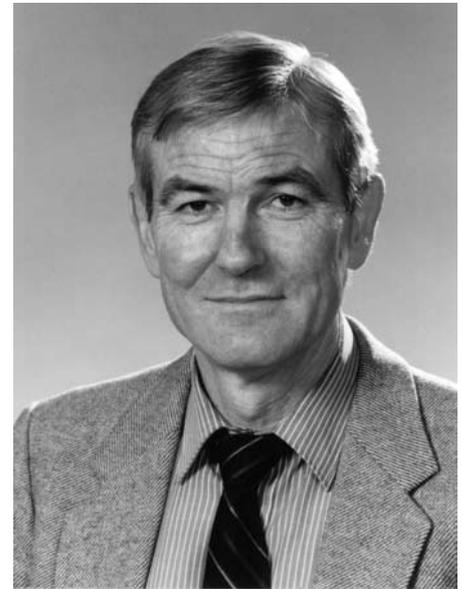
I am pleased to report that Andy Buchanan is recovering well after a serious road accident, and the Department is looking forward to having him back to full-time work later in 2006.

Six new academic staff have joined us in the last 15 months, and we are hoping to make another appointment shortly. In order of arrival, the new staff are: Tom Cochrane (Natural Resources), Massimo Fragiaco (Structures), Misko Cubrinovski (Geomechanics), Greg MacRae (Structures), Lis Bowman (Geomechanics) and Pedro Lee (Fluids). They have proven to be excellent appointments, and have made substantial contributions to the Department in the short time they have been with us. We look forward to their contributions continuing and expanding in the years ahead.

In 2005, we saw the start of a new 2nd Professional year for BE (Civil) students. This included a number of initiatives, including the broadening of the management course to include infrastructure (or asset) management. A new design course was also established; this involved students working in teams to do the preliminary design of a brewery and restaurant on sloping land near a major road. We were very pleased to have assistance from local consulting engineers GHD to guide the students, and from two developers to provide feedback on the presentation of the proposals. I believe this course has been very worthwhile in introducing students to a number of important issues that they will confront in practice.

During the last year, there has been considerable 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 the 1st Professional years being adjusted, so that they are the same for both. It is likely that about half the 2nd Professional year will be the same for both programmes in 2006. In addition, Civil students with an interest in Environmental Engineering will be better prepared to take some Natural Resources papers in the 3rd Professional year. It is expected that these changes will be beneficial to the students in both degree programmes.

Further changes in the two degree programmes are likely, partly because of a major revamp of the Intermediate year from 2007. This involves the establishment of a new course in Intermediate, to introduce students to engineering design, communication and other issues, and to ensure



the contents of the science courses are more closely related to the needs of the Engineering Departments.

A review of Master's degrees in the College of Engineering was conducted in 2006, and this led to the abolition of the Postgraduate Diploma of Engineering and the creation of a Master of Engineering Studies degree. This is a taught Masters, in contrast to the Master of Engineering degree, which is a research degree. The Master of Engineering Studies is intended to meet the needs of Professional Engineers wishing to increase their knowledge and skills.

Finally, if you have any suggestions for improvement of our degree programmes, or wish to support the above-mentioned changes, 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

## It's just not cricket...

This year's combined Departmental research involved assessing the air flow around a small moving spherical object. Department staff and postgrads repeatedly tested the properties of this configuration weekly at the Recreation Centre laboratory. The introduction of a rectangular wooden block typically failed to influence the path of the sphere whatsoever, although destructive testing of three cylindrical wooden columns was shown to be repeatable with some regularity. In a side-experiment, the presence of the block did increase the level of bruising exhibited by the test subject known as Melody Callahan. Attempts by another Department group to test a rectangular frame using a larger sized sphere proved similarly inconclusive. Further investigations will continue this year...

*Due to the blinding speed of our players, both Glen and Grant are mere blurs of action on the cricket pitch during one of the department games.*



# Editorial: Putting theory into practice



One of the distinguishing features of engineering is that it is focused on making things work. To quote the US Engineering Council for Professional Development:

*“Engineering is the profession in which a knowledge of the mathematical and natural sciences, gained by study, experience and practice, is applied with judgement to develop ways to utilize economically the materials and forces of nature for the benefit of mankind.”*

Whilst some may argue with the details and wording of this definition, the applied nature of engineering activities is not in dispute. In this respect, experimentation, field-work and real world implementation of new ideas can be regarded as essential components of our activities as professional educators and researchers. Here at the University of Canterbury, it is our technical support staff who make these aspects of engineering possible. Their presence provides academic staff with the means to try out new concepts (often at full-scale), gives students valuable practical experience, and offers to all the benefit of those practical skills typically required in the implementation of new, innovative and sometimes “wild” ideas. In the doing,

something new is often learned and to adapt the title of a recent movie, much can be “Gained in Translation”, through such a collaborative process.

Technical activities can be wide and varied. Machining, welding, surveying, instrument operation and maintenance, software development, electronics design and manufacture, installation of field instruments, and the collection of water and soil samples, not to mention going shopping for all those necessary bits and pieces, are some which come to mind. Technical staff also assist with demonstrating undergraduate laboratories, assisting with post-graduate research, and engaging in such fun activities such as standing in the Avon River for a whole afternoon, setting up one wooden bridge after the other, during the annual bridge-breaking contest. **If any one person could do all these things they would surely be a Supertech! Does Supertech exist?** We not only bring you more about the attributes of Supertech, but also the answer to this question, later in this issue - courtesy of Ian Sheppard.

The department is also fortunate to possess world-class technical facilities in many discipline areas. Other civil engineering departments around the world are now ahead, others have caught up, whilst some are less well endowed. In this age where space is increasingly under scrutiny, it is pertinent to reflect on the value of these facilities in enabling the department to complement its theoretical research with the practical. Readers will find aspects of our technical facilities illustrated in this issue.

Perhaps the last word on the value of the practical should go to Kurt Vonnegut Jr. who highlighted the following opinions from the literature: “To be is to do” – Socrates. “To do is to be” - Sartre. “Do be do be do” - Sinatra.

Ian Mason

## New design course launched

Second Professional students studied in a brand new, semester-long, design course in 2005. The emphasis of the course was on integrated project design at the conceptual level. The students, working in teams of four, were asked to submit a conceptual design and costing for a microbrewery and restaurant, with an on-site hop growing area, to be located at one of three rural South Island sites. Students had to consider issues associated with resource consents, consultation, water supply, wastewater treatment, geomechanics, roading, carparking, costing and scheduling and were asked to develop a poster along with their final report. In a competition held at the end of the course posters were judged by prominent local property developers Bruce Page (Harcourts) and Tony Sewell (Ngai Tahu Property). The judges, were impressed by the detail and dedication shown by the students and in particular commented on their ability to focus on client needs.

The academic staff were assisted by engineers from the local office of engineering management firm GHD, who gave advice to students throughout the course, and helped grade the final reports. The course received a grant from FutureInTech/IPENZ to support its innovative approach to teaching engineering design and management.



## MERIT 2005

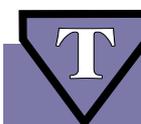
Top place in the New Zealand round of the MERIT 2005 competition went to “T&A Construction” comprising Jason Fox, Nathan Brooking, Hayden Pipe and Adam Tennant, from the University of Canterbury. In combination with the performance of the other Canterbury teams this resulted in an overall victory over rivals the University of Auckland, and the return of the ‘Fletcher Construction MERIT Shield’ to Canterbury.

Explains senior lecturer Jason Le Masurier: “Participants learn how to manage their own fictional construction company by making decisions that affect the key functions of the business, such as marketing, tendering, finance, overheads, personnel and construction, over 8 periods in the life of the company. The main competition is aimed at training construction industry graduates in the UK and this year 175 industry teams took part there. As with last year, the overall standard of the competition has been extremely high. All teams have continued to improve their overall scores, reflecting the effort and skill that has gone into their decision-making”

Comments from the UK based MERIT coordinator were as follows: “After leading for virtually the whole competition, “T & A Construction” were the emphatic winners of the Fletcher Construction sponsored Merit 2005 Competition between Canterbury and Auckland Universities. Their impressive final score of 3,215 points would have booked them a place in the UK national Merit 2005 Final, starting in 3rd place.

The performance matches those of previous years when the University of Canterbury top team has consistently finished in the top 10 of the UK competition.

Photo above: 1st and 2nd winning teams with Jason Le Masurier.

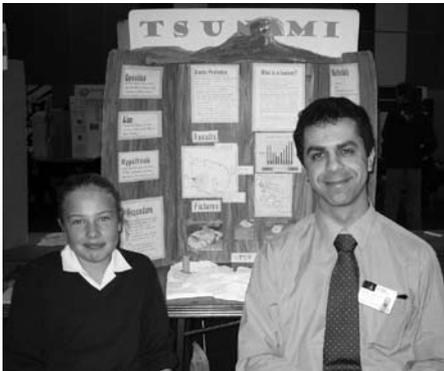


Supertech shares knowledge with, and learns from, fellow technicians.

# Awards

## Tsunami project wins Science Fair prize

Congratulations to Imagen Anderson of Cobham Intermediate School, Christchurch, who won the 2005 Department of Civil Engineering prize at the Canterbury Science & Technology Fair, for the best exhibit involving an aspect of Civil Engineering. Her innovative work, entitled "Tsunami," was selected by Dr. Andre Dantas from amongst 500 eligible displays. "Imagen's project presented a simple and inventive method for assessing the possible effects of a Tsunami," says Andre. "The method and the modelling of the Tsunami affected area (Banks Peninsula) used some advanced scientific procedures and the findings have demonstrated how the direction of a Tsunami wave is likely to damage Banks Peninsula's coastal communities. He continues: "The study has contributed to Civil Engineering in many aspects. It has created useful information that is of value to civil engineers and planning organisations (e.g. Civil Defence, Christchurch City Council, Environment Canterbury, Transit NZ) in assessing natural hazard risk analysis and management."



Prize winner Imagen Anderson with André Dantas at the Science fair.

## Meritorious Service Award

Richard Fenwick was honoured by Standards NZ in 2005 with a Meritorious Service Award, for his significant contributions to voluntary standards in the area of structural engineering. From 1989 - 1992 Richard was a member of the committee which wrote the Loadings Standard (NZS4203:1992). In more recent years, he has spent time working on its replacement, namely the Loadings Standard for Earthquake Actions (NZS1170.5:2004), and served as a committee member for the revision of the Structural Concrete Standard (NZS3101), which is expected to be published in 2006. Nominations for Meritorious Service Awards are made by fellow committee members of the recipients and are presented annually.



## NZSEE conference successes

University of Canterbury staff and students came away from the 2006 New Zealand Society for Earthquake Engineering (NZSEE) conference, held in Napier during March, with a number of major awards and prizes. John Berrill was made a Life Member of the NZSEE, in recognition of his significant contribution to both the society and geotechnical engineering over almost 3 decades. Stefano Pampanin was the inaugural recipient of the prestigious EQC/NZSEE Ivan Skinner Award, given "for the advancement of earthquake engineering in New Zealand." Postgraduate student James Jensen was awarded the NZSEE Scholarship to complete the trio of awards at the conference. Misko Cubrinovski was awarded the prize for the best research paper, PhD student Didier Pettinga was awarded the prize for the best student paper and Greg MacRae was awarded the prize for the best poster presentation.

## Pavement engineering grants

Two major grants for pavement research projects were awarded to Dr. Mofreh Saleh in 2005. The first, valued at \$60,000, was for a study of pavement stabilisation techniques on behalf of Transit New Zealand, as part of a broader Land Transport New Zealand funded programme. The second project, dealing with the modelling of factors affecting the lateral support and edge failure of pavements, carries a grant of \$80,000. This latter funding allowed the extension of an existing subcontract with Opus Consultants for a further 12 months.

# 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 : Megan Roper  
3rd Pro : Tony Pettigrew

### Civil Engineering Prize

Christopher Hartley

### Concrete Prize

Brendon Bradley

### Holmes Consulting Prize

Mike Newcombe

### Laserframe Award

1st : Michael Hewson, Joseph Laming,  
Christopher Morahan, Wu Yifan

2nd : Chelsea Giles-Hansen, Rory Howell,  
Luo Tau, Ben Niven

3rd : Daniel Langford, Thomas Mander,  
Katie Sherning, Zhang Quan

4th : Cai Qun, Kuke Marrett, Janelle Taplin,  
Saranghan Sakhthivel

### MWH NZ Ltd/Jim McFarlane Memorial Prize

Au Eu Ving

### NZ AA Prize in Traffic Engineering

Megan Fowler

NZ Pavement and Bitumen Contractors  
Association Prize in Pavement Engineering  
Megan Fowler

### RW Morris Prize for Coastal and Ocean Engineering

Megan Fowler, Christopher Hartley, Brian Peng

### Tonkin & Taylor Prize in Geomechanics

Callum Streeter and Hayden Bowden

### Traffic Design Group Prizes

2nd Pro : Megan Fowler

3rd Pro : Kylie Govan

Publication note: CE News now covers the period from the start of each academic year to the commencement of the following one (rather than the calendar year as previously).



# Learning from the Boxing Day tsunami



Ko Phi Phi: after tsunami

Erica Dalziell was part of a seven-strong New Zealand team of engineers, scientists and civil defence experts which travelled to southern Thailand in January, 2005 to assess the impacts of the Boxing Day tsunami. The team was funded and organised through the New Zealand Society for Earthquake Engineering (NZSEE). In August 2005, 8 months on after the tsunami, Erica returned to Thailand to look at how the area was recovering.

After touring the devastated regions of Phuket, Ko Phi Phi and Khao Lak on the Andaman Sea coast, Erica commented on the ways in which different communities in Thailand were recovering. "Some communities have bounced back a lot quicker than we thought they would, whereas for other communities the recovery process is barely starting," she said. "I was astounded at how Phi Phi Island has bounced back. The recovery has focused on one small area but just about everything in that area has been rebuilt. Everyone was quite positive and moving forward." Much of the success in rebuilding Ko Phi Phi was the result of using tourist volunteers in the clean-up. "These volunteers were renting rooms, buying food and were very socially responsible, sharing around their business, making sure they went to different restaurants each night, for example. This created an incentive for tourist businesses to get back up and running."

In contrast, it was a completely different story further up the coast at the resort centre of Khao Lak. "Khao Lak was not getting the casual backpackers going through" Erica explains. "The resorts attracted European families — conservative travellers — and they are slow to return." On both visits, she talked with a local man who had opened his first restaurant in Khao Lak just one month before the tsunami, having mortgaged the family farm for security. "His business wasn't directly affected by the tsunami; it suffered no physical damage at all. But in August the business was failing; he didn't have enough money to pay next month's rent. This will be a good business proposition in two-year's time but he is just not going to be able to hold on for that long. Like so many others, the business is dying a slow death."

Ko Phi Phi: rebuilt



Erica said that whilst there had been a huge influx of international aid into the devastated areas, a lack of co-ordination among the various non-government organisations (NGOs) had created problems. Some villages were inundated with NGOs, while neighbouring villages had none, and temporary camps close to the main road got a lot more ad-hoc aid. "Well-meaning foreigners were generous with donations without thinking the issues through. Some locals were finding it easier to stay at home and wait for random donations than to go out to work," she said. "When people bring in pens from America, all that does is put the local pen seller out of business. You are better to take the money over there and buy it in the local economy and get the money flowing through the community. It is important to start getting that money going round so people can help themselves."

There are important questions to ask, and lessons for New Zealand to learn, says Erica. "If we have a major disaster where a whole community is devastated, how do you start from scratch? It is almost like a New Orleans scenario - when there is very little to go back to, where do you start? How does the Government target its aid? What are the leverage points within our economy and communities such that if we put money into them, it will have a compounding effect?" "The FRST-funded Resilient Organisations research programme based in the department is trying to develop solutions to these very issues. In particular, we are developing a framework for improving organisational resilience. We take organisations through a five-step process that gets them to think outside the box in terms of a disaster. We then take the organisation through a readiness exercise and disaster simulation so that an organisation can experience what its strengths are and also identify its weaknesses." After seeing the importance of businesses in community recovery demonstrated so starkly in Thailand, it was critical that New Zealand organisations think about and plan for how they would respond and recover from a disaster, she said.

"We hope to be able to return to Thailand over the next few years to track the recovery process, in order to better understand the challenges businesses and communities face over the long recovery period ahead," says Erica.

## Erica Seville (née Dalziell) becomes part-time Research Fellow

As well as recently taking her married name (Seville), Erica has further changes lined up for 2006. In February 2006, Erica moved from being a Lecturer within the Department to the position of Research Fellow, for two days a week. In this role she will continue to lead the Resilient Organisations FRST research programme, which runs until mid-2010. As for the other three days a week, Erica is starting a new risk research and strategic consulting company, called Risk Strategies NZ. Erica was a consultant in London before starting life as an academic and says she has missed many aspects about working with clients. She hopes the new company will give her a vehicle to do more contract research and to get involved with some exciting risk management projects. Erica has been an academic with the Department for the last three years, teaching the Engineering Systems course at undergraduate level, and the Risk Assessment course at postgraduate level. We will still see plenty of Erica around the Department however, as she will continue to supervise students involved in the FRST research programme and to teach the Risk Assessment course until her replacement has been found.



## New Faces



### Tom Cochrane

Dr. Tom Cochrane joined the department in February 2005 as a Lecturer in Natural Resources Engineering. He teaches hydrology and hydraulics, water resources engineering, GIS, and in related areas. Tom obtained his BSc, MSc, and PhD degrees from Purdue University, Indiana, USA and worked at the USDA National Soil Erosion Research Laboratory conducting research on erosion, catchment modelling, and GIS.

After obtaining his PhD degree in 1999, Tom worked as a consulting engineer in South America. One of his most

memorable experiences was working on a project involving the world's largest hydroelectric facility, the Itaipu hydroelectric dam, in the Parana river catchment, Brazil. The work entailed monitoring river sediment transport and flows, and modelling land use changes. Subsequently he worked on various consultancies with government and non-governmental organisations, dealing with the long-term sustainable use of water, land, and biological resources in the Bolivian lowlands, the Brazilian Amazon, and the USA. This work stimulated his current interests in catchment hydrology, GIS, irrigation, erosion, water resource engineering, and international development.

Tom and his wife Belle spend their free time raising their young son Thomas. They enjoy bicycling, hiking and visiting the many attractions that Christchurch has to offer. Tom's hobbies include flying, building a single engine plane (if he ever gets time to do this now), and sports.

Supertech has the ability to deftly handle direction changes as a project grows and develops.



### Greg McRae

Greg is a New Zealander and University of Canterbury graduate who arrived back in the department in July, 2005 to take up an Associate Professorship in structural engineering. After graduating BE Civil(Hons) from this department in 1984, he spent a year working with a civil/structural consulting firm in Wellington, before returning to the University of Canterbury to undertake doctoral research on the behaviour of steel structures in earthquakes. "Because of our strong structures program, I was subsequently offered a fellowship to work with a leading earthquake research group in Tsukuba, Japan for two years," says Greg. "Then it was off to San Diego, where I had the privilege of working with Nigel Priestley (a former lecturer from Canterbury who has been responsible for a number of major developments in earthquake engineering worldwide) for 2.5 years." For the past 11 years, Greg has held an academic position at the University of Washington, Seattle, USA.

Greg is enthusiastic about the return home. "We all know that the University of Canterbury has a great engineering school, but it is nice to visit other countries to confirm it!" he says. "Japan, San Diego and Seattle offered different cultures, languages(!) and opportunities. Some other countries have more resources to pour into research than New Zealand, and I have had the chance to learn from, as well as contribute to, the state of the art. However, NZ engineers and researchers have developed some of the best concepts around and these are well respected in many places. I am sure that this is partly due to our strong relationships with industry and our desire to obtain simple and robust solutions which we can discuss with non-technical people."

It was on his sabbatical leave to New Zealand a few years ago that Greg met his wife, Ing – a physicist. "When our family size increased by 50%, and we were told that there was a position at the University of Canterbury that exactly fitted my interests, regarding steel structures, we decided that it was time to return," says Greg. "Even though we have been back at Canterbury for only a few months we feel quite settled. We have bought a kayak and hope to enjoy more of the great Kiwi outdoors. It is great to be home!"



### Misko Cubrinovski

Dr Misko (pronounced "Mish-ko") Cubrinovski joined the Department in June 2005 as a Senior Lecturer in geotechnical engineering. Originally from Macedonia, he received his Bachelor's degree in Civil Engineering from the University of Skopje, in 1982. He then began his career in earthquake geotechnical engineering, first working for the Institute of Earthquake Engineering and Engineering Seismology (IEE&ES) in Skopje. Whilst at IEE&ES he received an MSc degree in Earthquake Engineering in 1989. In 1990 he headed to Japan for further studies. "Japan was an obvious place for investigating earthquakes and their effects on structures and communities," says Misko. After receiving his PhD from the University of Tokyo in 1993, he worked as a principal researcher with the Technology Research Center of Taisei Corporation, and also with Kiso-Jiban Consultants, in Tokyo. Throughout his 15-year spell in Japan prior to coming to New Zealand, Misko was involved in a number of benchmark research projects with top Japanese institutes and universities, as well as with several large international projects and numerous earthquake reconnaissance missions.

"It was the strong earthquake-engineering drive in my career that eventually attracted me to Canterbury," says Misko. "I'm looking forward to continuing my research in the field of geotechnical earthquake engineering, with a particular focus on soil liquefaction, seismic response of earth structures and soil-structure interaction." Misko teaches courses in geotechnical and earthquake engineering.

He has moved to Christchurch with his wife, Aneta, and their daughter, Iliana who is pursuing her dream of first becoming a Canterbury student and then "a famous researcher in zoology." Misko says of their first months here, "We are all are excited about the outdoor, sports-intensive life in New Zealand, still struggling to understand cricket, but definitely starting to believe in the magic of All Blacks!"

# People



## Massimo Fragiacommo

Massimo Fragiacommo joined the Department in May, 2005 as a Senior Lecturer in Timber Structures, and the Carter Holt Harvey Fellow in Wood Structures. This is 3-year fixed term position, sponsored chiefly by Carter Holt Harvey, a leading Australasian producer of Laminated Veneer Lumber (LVL). His main areas of expertise are in Earthquake Engineering, Timber, Steel and Composite Structures. He is the author of 14 international journal papers, and has another 44 papers published in international and Italian conference

proceedings, and in Italian journals.

Massimo was born in 1967 in Trieste, at the very north-eastern end of Italy, bordering the former Yugoslavia. "New Zealanders have a very good reputation in this city on account of the role played by NZ troops at the end of World War 2," says Massimo. "The New Zealand troops were the first of the allied forces to enter the city after the downfall of the Third Reich and they protected the people from Yugoslavian partisans who entered the city at the same time. The Kiwis established a good relationship with the population and the citizens of Trieste still retain good memories of them."

Massimo completed his first degree in Civil (Structural) Engineering at the University of Trieste in 1992, graduating with the maximum score. After finishing his compulsory military service as a midshipman in the coastguard, he started working as a civil engineer with the local city council, gaining experience in administration, design, construction supervision and building management. After 5 years in this job, he enrolled as a postgraduate student in the Faculty of Architecture of the University of Venice. In 2001, he completed his PhD in Design and Conservation of Structure, with a thesis on long-term behaviour of timber-concrete composite structures. Following this he worked for 6 years as research engineer at the University of Trieste, where he also taught steel design at the Faculty of Architecture. He has also spent 6 months at the UK Building Research Establishment and one and a half months at Colorado State University (USA), where he worked on timber-concrete composite structures.

In his spare time, Massimo enjoys running, tramping, skiing, mountaineering, and ski-mountaineering. He is married to Paola, with whom he shares a love of travelling, art, hiking and good food. "However, if you wish to have some advice about cooking, refer to Paola, and ask me only about structural engineering," says Massimo.

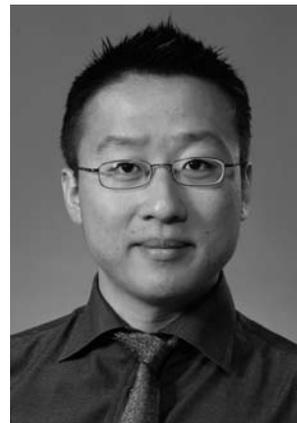


## Lis Bowman

Dr Elisabeth (Lis) Bowman joined the Department in September 2005 as a Senior Lecturer in Geomechanics. She received a BA degree (in Engineering) in 1994 from Cambridge University in the UK, before working for four years as a design civil engineer with consultants Gifford in Southampton and London. During this time she worked on a variety of projects, both in the office and on site – from structural bridge design to road widening, along with geotechnical design and geoenvironmental monitoring.

But her main interest was always in soil behaviour, so she returned to Cambridge University to undertake a PhD in Geomechanics in 1998. Here, she studied the effects of time on construction activities that involve the densification of granular materials (e.g. pile driving, blast densification and vibrocompaction) to determine why it is that disturbed soils "age" – or alter their mechanical behaviour over time. She completed her degree in 2002 and stayed in Cambridge – having been awarded a prestigious Royal Academy of Engineering Research Fellowship to investigate the mechanics of large mass movements in granular materials. She developed an interest in rock avalanches and debris flows from this research, which (amongst other things) caused her to sit up and take notice when a position opened at the University of Canterbury in New Zealand.

Lis enjoys tramping, cycling and anything to do with water. She also loves a glass of wine and talking cricket and music with anyone else remotely willing. She arrived with her cat, Tizwas (somewhat spooked by the 40 hour trip-in-a-box, but now settled) and will shortly be joined by her boyfriend Doug, from the UK. Despite her rather anglicised accent, she is Australian.



## Pedro Lee

Pedro Lee joined the department in November 2005 as a Lecturer in Fluids Engineering. Originally from Hong Kong, Pedro has lived in Australia for the past 16 years prior to coming to New Zealand. He received his Bachelor of Civil and Environmental Engineering, along with the University Medal, from the University of Adelaide in 2000. He started his PhD at the University of Adelaide in 2001 on a national scholarship, investigating new methods for detecting problems in pipelines using water hammer waves – employing principles similar to those of a radar system. The research project

involved both laboratory and field testing of transient behaviour in collaboration with the local water authority—United Water International. During this time Pedro lectured the third year fluids hydraulics course in Adelaide, was peer advisor for overseas students and was also appointed as a Physics Lecturer for Bradford College.

Pedro took up a Project Engineer position with Tonkin Consulting in July 2004, where he was involved with the design of a national pipeline project (\$500 million)—the Wimmera Mallee Pipeline Project in Victoria, Australia. The project involved the design of an extensive trunk and distribution pipeline system, consisting of 7 separate pump stations and spanning an area of over 30,000 hectares. Working in a talented group of 5 engineers, Pedro was responsible for the design of water hammer mitigation and water resource allocation strategies for the system. He was also involved in the integration of GIS with the steady/unsteady state hydraulic models.

Pedro completed his PhD in August 2005, having published 8 peer reviewed articles with a further 4 journal articles under review. Pedro's current research interests include steady/unsteady state pipeline hydraulics and critical transition in open compound channels.

In his free time, Pedro enjoys hiking with his wife Patricia (who currently works as a traffic engineer in the Christchurch City Council), photography and video editing.

Supertech bounces back after a hard day in the labs and workshops.





## Structural Dynamics in Pavia

As announced in the February, 2005 issue of CE News (#18), Athol Carr was invited to present a course on Structural Dynamics at the Rose School at the University of Pavia in May, 2005. Athol reports on his visit as follows.

"I arrived in Pavia with a feeling of great trepidation a week before the course was due to start. Previous courses had been given by world-renowned academics and my version was to be somewhat different, with an emphasis on numerical time-history methods, and much less emphasis on modal- and frequency-based approaches. The course involved 30 hours of lectures and 30 hours of tutorials spread over four weeks, with an examination the week after the course was completed, and graduation shortly after that. Lecture sessions lasted two and a half hours on Tuesday, Wednesday and Thursday mornings, with tutorials in the afternoons. This left the students 4 days to cover all the problems and homework before the next week's lectures commenced. (All courses at the Rose School are of one month, or less, duration and the students take no other courses at that time).

The 21 postgraduate students attending my course came from Italy, Portugal, Greece, USA, Columbia, Pakistan and Sri Lanka, and I quickly became aware that I was the only one whose native language was English! However, the Rose School students are carefully selected and although some had no dynamics in their undergraduate training, they were all very eager to learn. In my nearly 40 years of lecturing I do not think I have ever enjoyed teaching a class as much as I did with this group of enthusiasts. Although the tutorials were scheduled for two and a half hours, it was often after 4 hours that I was turning the lights out in the lecture room for the night.

By now, Rose School students must be getting used to a New Zealand flavour in their earthquake engineering studies. The Reinforced Concrete course that preceded my Dynamics course was given by Mike Collins from Toronto, and the Bridge Engineering course that was to follow, was given in part by Nigel Priestley. John Berrill has also given courses on Geotechnical Engineering at the Rose School.

It was not all work however, and we made the most of the long weekends, with one spent in Venice, one in Florence, and one at a European Lacemakers convention in Ballaria on the Adriatic Coast, with a visit to San Marino on the way home. On the last weekend we walked both ways along the Cinque Terre (the five villages)

just south of Genoa. This was something not to be missed, the scenery was spectacular and the exercise was needed. We have yet to visit Milan, as marking examination papers took precedence when the opportunity presented itself - Milan, although just 30 km away, will have to wait for another time."

Supertech will pass on knowledge of the practical to shed light on the theory of the lecture room.

T

## Home and Away – sabbatical tales

Andy Buchanan was on study leave for all of 2005, spending the first five months in Christchurch, in a quiet office in the School of Forestry. He then travelled to the UK where he was based for the remainder of the year. During his time in Christchurch, Andy moved back into research activities, mainly in his key areas of timber construction and fire safety, especially the overlap between these two. Anticipating the new carbon tax, he wrote an article for the New Zealand Timber Design Journal entitled "How will timber buildings help New Zealand meet Kyoto Protocol commitments?" later shortened for a popular piece in the Christchurch Press.

To assess how well the structural teaching in the Department is meeting the needs of the profession, Andy made visits to the structural engineering offices of the Holmes Consulting Group in Christchurch and Auckland. Another major job during this time was negotiating funding for a new government-funded chair in timber structures with the Ministry of Agriculture and Forestry. In preparation for this activity the University invited Hon Jim Anderton, Minister of Forestry to visit in February, 2005. The funding was later announced as part of the government's Forest Industry Development Initiative.



The UK visit was based at the University of Bristol, which has built up a strong relationship with Canterbury over the years. Andy's main project was producing a third edition of the Timber Design Guide in collaboration with many NZ contributors, due for publication late 2006. The Bristol experience included many useful discussions on all aspects of teaching and research in civil engineering, attending a project-based student field trip to Wales and writing a set of personal notes on "What makes a good course?"

Local visits from Bristol included Arup Fire in Bristol, and the University of Bath and Buro Happold offices in Bath. In London Andy spent a day each at the Building Research Establishment and the Arup offices. At both venues he talked to both timber engineering people and fire engineering people. Canterbury graduates were met at many locations. In Edinburgh he visited the Centre for Timber Engineering at Napier University and the Centre for Fire Safety Engineering at the University of Edinburgh.

Several other international visits were made during the year. In Beijing, Andy attended the 8th International Symposium on Fire Safety Science with colleagues Peter Moss and Tony Parkes. The paper on "Fire Performance of Continuous Reinforced Concrete Beams" was well received. Karlsruhe, Germany was the venue for the CIB Working Commission on Timber Structures, followed by visits to Stuttgart and Dresden.

The UK time was cut short by a serious traffic accident in late October. While out early-morning jogging Andy was hit by a bus. The accident resulted in five weeks in hospital with a serious head injury, clearly putting an end to all teaching and research at Bristol. Andy is now back in Christchurch making a strong recovery, and he hopes to be back at work full-time by mid 2006.

Photo above, left to right: George Hadjisophocleous (Carleton University), Andy Buchanan, Tony Parkes and Andre Dantas on the Great Wall of China, September, 2005



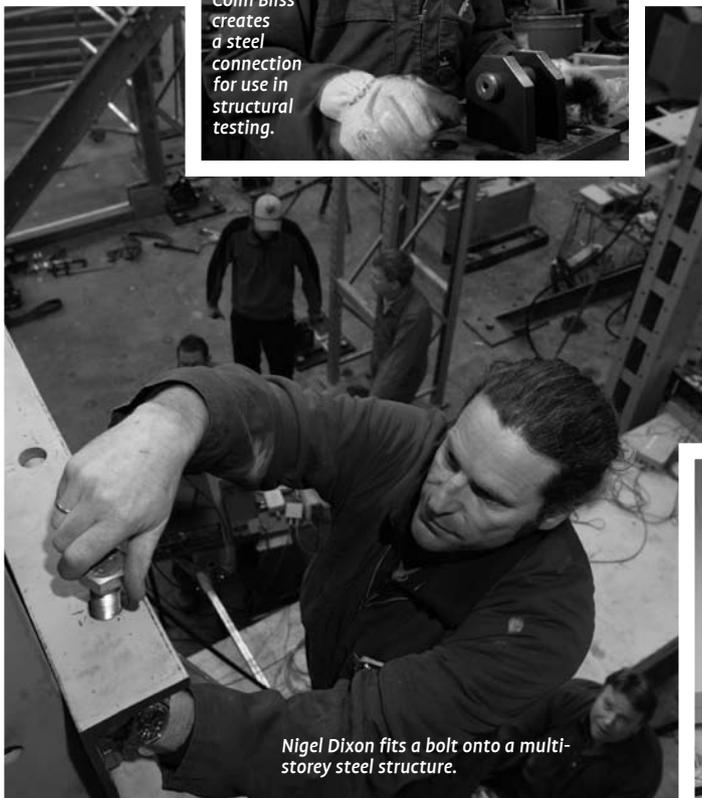
Bob Wilsea-Smith cuts through stainless steel.



Colin Bliss creates a steel connection for use in structural testing.



Frank Greenslade monitors a triaxial test on basecourse material.



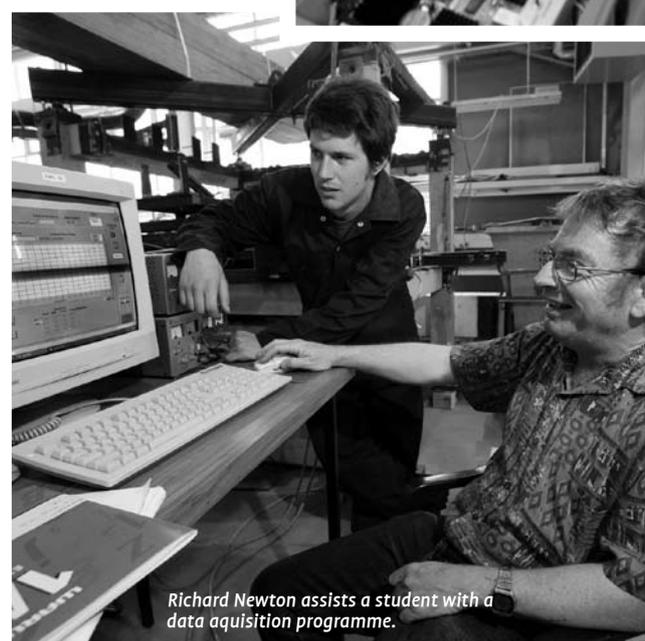
Nigel Dixon fits a bolt onto a multi-storey steel structure.



Peter Coursey adjusts a CUSP accelerograph.



Stuart Toase creates a metal component on a milling machine.



Richard Newton assists a student with a data acquisition programme.

# Technicians at work



*Ian Sheppard demonstrates a fluid dynamics experiment.*



*Ray Allan sets up a lathe.*



*Michael Weavers checks out an electronic circuit.*



*Siale Faitotonu adjusts a triaxial soil testing rig.*



*Nigel Dixon arc welds a structural steel floor.*



*Russell McConchie supervises instrumenting of a beam for structural testing.*

# Farewells

## Bruce Hunt

Dr Bruce Hunt has been a valued member of the staff of the Civil Engineering Department, with a speciality in fluid mechanics, since 1973. Originally from Pennsylvania, USA he arrived in the Department from a position at Washington State University, immediately taking up a Senior Lectureship, and was promoted to Reader (Associate Professor) in 1979.

Bruce's research record is outstanding. His mathematical ability has enabled him to contribute in many areas, including Dam Break problems, Seismic Response Reservoirs, Water Waves and Thermal Calculation for Bridges. However, his greatest love was the mathematics of groundwater and approximately two thirds of his 75 journal publications are in this area. I believe Bruce has only taken one sabbatical leave in his 33 years with the Department and rarely goes to overseas conferences. In spite of this, he is well known and respected internationally and in 2005 he was given the best paper award by American Society of Civil Engineers Journal of Hydrologic Engineering for his paper entitled 'Spring Depletion Solution', at the World Water and Environmental Congress in Alaska, USA.

He was an excellent teacher. His students remember him for his patience and rigour, and clarity of presentation. Julian Weir (a relatively recent student) recalls that, although he had taken Bruce's undergraduate course, "I did not fully appreciate Bruce's skills and wisdom until I took his post-graduate groundwater paper." Bruce gave many postgraduate courses in the groundwater area and some of the students were geologists, with less mathematical background. Peter Callendar was one of these and comments:

"Coming from a geological background, the mathematical content of the course was daunting. However, this was compensated by Bruce's commitment and dedication to helping students understand his lectures. In my case this extended to a demonstration of Bruce's exceptional patience as he spent many hours outside of the formal lectures explaining the mathematical basis for his approach to characterising groundwater flow."

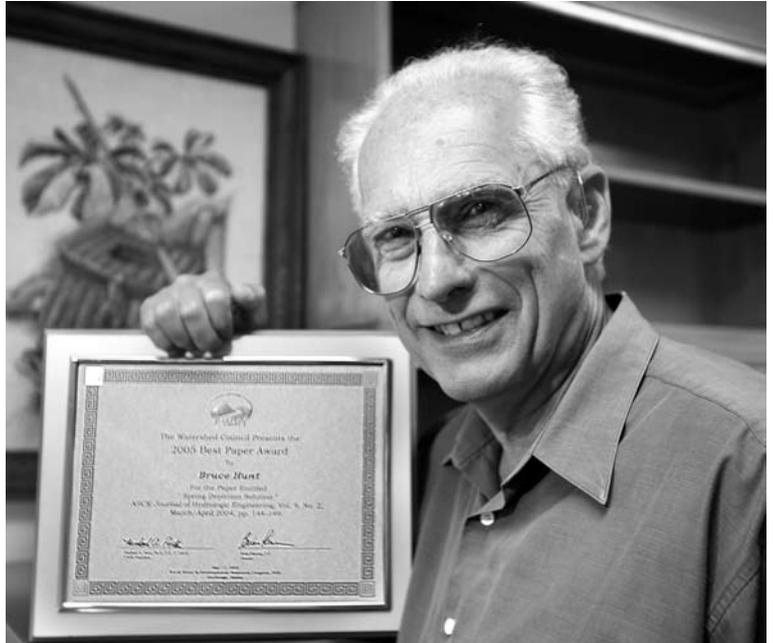
Bruce has had a strong influence on the development of many of the careers of people now working in the New Zealand groundwater industry. One of the founding partners of the consulting firm I now work with had been one of Bruce's early Master's students. At that particular time there were only two students doing his Master's course and Bruce told me of his dismay one day when he turned up to the regular scheduled lecture time to find that, on account of the weather, his two students (the entire class) were absent. He later found they had gone skiing for the day. However, he recalled that one of the students broke his leg on that particular skiing expedition, which demonstrated there is some justice in the world if appropriate respect is not shown to the mathematics of groundwater flow!"

Bruce's contributions to the profession are reflected by David Scott of Environment Canterbury, who has worked on groundwater for over thirty years:

"Since working with Environment Canterbury I have appreciated Bruce's interest in solving practical problems such as his development and refinement of analytical solutions for well interference and stream depletion of pumping. In particular, his recent interest in providing these solutions as Excel macros have made them accessible to a much wider range of users - people who may have been intimidated by partial differential equations have been able to gain a sense of how the solutions work through the use of these tools. I've recently had the pleasure of collaborating with Bruce on the evaluation of some of these solutions and have been impressed by his tenacity when confronted by a difficulty."

Through his teaching, project supervision and research Bruce has made a very significant contribution to the development of the capacity to understand the behaviour of groundwater systems. I hope that, in retirement, he will be able unable to resist the lure of a difficult problem and that his contribution and collaboration will continue."

In the department, Bruce was a strong advocate for the fluid mechanics syllabus. Where changes were discussed he always did his homework, forming and expressing his sometimes traditional, sometimes controversial, views, extremely well.

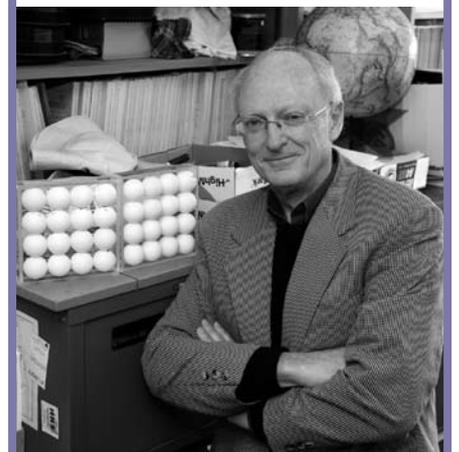


Apart from his dedication to mathematics, Bruce has been known for his great love of fishing. The staff of the department all wish Bruce a long and happy retirement, with a lot of time for fishing, but do hope we will continue to see him around the Department from time to time, working on solutions to new groundwater problems.

Ian Wood

## John Berrill

John Berrill (Reader in Geomechanics) retired on 3 March 2006 after 29 years as a valued member of the department. We wish him well in his retirement, and hope to bring you more on his career in a future issue of CE News.



## Bruce Steven

When I completed my ME in 1992, the opportunity came up to start work as a full-time researcher at the Canterbury Accelerated Pavement Testing Indoor Facility (CAPTIF), a full-scale pavement testing facility owned and funded by Transit New Zealand but operated under contract by Bryan Pidwerbesky on behalf of the Department of Civil Engineering and the University of Canterbury. The first few years were very enjoyable as I was based at the McLeans Island site along with the operations manager, Alan Fussell, getting my hands dirty helping to construct test pavements and collect data. When the facility underwent a major upgrade in 1996/7 I moved back to the Ilam campus, and started working on other pavement related research projects, in addition to the CAPTIF work.

Not long after I started, the facility was awarded part of a major OECD international research project investigating the relationship between heavy vehicles and pavement deterioration. This research contract has been one of the highlights of my career as it gave me the chance to work with leading pavement and vehicle researchers from around the world. After

visiting other testing facilities around the world, people are amazed that we could produce high quality results with such a (comparatively) small budget and workforce - a view endorsed by overseas researchers we have hosted. This could be put down to the efforts of Alan, Bryan, Frank Greenslade and other technical staff, and the way they have built pavements and developed the required instrumentation over time.

When I relocated back to the campus I became involved with laboratory testing and some teaching, along with starting a part-time PhD. My PhD work was an attempt to assemble a larger number of small pieces of information that had been collected over several projects into a numerical model that could be used to predict the response of a non-linear, mostly elastic, solid otherwise known as a pavement. Now that I have completed my PhD, the opportunity has come up to work as a Project Scientist at the Partnered Pavement Research Centre, located at University of California, Davis, USA. The program is a long-standing multi million dollar per year program funded by the California Department of Transportation. There will be three major changes for me to make - i) switching from a circular testing machine to two linear machines (Heavy Vehicle Simulators from South Africa), ii) working in a team of 14 researchers rather than as a "sole practitioner" and iii) the not so small task of relocating my family to another country!

One of the best things about working here has been the atmosphere of openness and congeniality that exists throughout the Department. Despite my non-permanent employment status, people have always been interested in what I was working on and have usually had the time to answer impromptu questions about both their own work and mine. Part of me will be sad to be leave UoC, especially as the pavements team has expanded significantly in the last few years, along with the growth in Transportation Engineering, but when exciting opportunities arise, it pays to take them as you never know what other doors may open as a result. Good luck and good health to everyone.



## Alan Williman 1914-2004

It is noted with regret that Alan Williman, who joined the Department of Civil Engineering in 1952 and retired in 1979, died in December 2004, shortly after his 90th birthday.

Alan gained a BSc (Eng) from London University in 1936 and worked as a Civil Engineer until World War II, during which time he served in the Royal Engineers doing bomb disposal and road upgrading in France and Germany. He joined the University of Manchester Institute of Science and Technology (UMIST) as a lecturer in 1949, gaining an MSc (Eng) in 1951, before emigrating to NZ with his wife, Barbara, and their three children. During 1954/55, Alan applied his engineering skills to the building of his own house (one of the first houses in Christchurch with a concrete slab floor). Alan married Joan Lester in 1966, a few years after Barbara had died after a long illness.

During the 1950's Alan taught Drawing and Design, as well as Surveying, before finally settling into Highway and Traffic Engineering. He was the driving force behind the development of NZ's first (and only) pavement testing facility, known then as the 'Willywheel'. This facility was first used by Bill Patterson (now a Pavement Engineering specialist with the World Bank) for his PhD study, and was subsequently developed by Phil Seddon, who had been a student of Alan's at UMIST and had joined the Civil Engineering Department in 1975. The facility, now known as

the Canterbury Accelerated Pavement Testing Facility (CAPTIF), has subsequently been used for numerous research projects, including a major international study for the OECD on the performance of pavements under dynamic loading.

Alan was the main instigator and organiser of the Christchurch Transport Study Group. This group, which was established in 1966, comprised several University of Canterbury academics plus senior City Council and Regional Planning Authority staff. That group subsequently developed into the Transportation Group of the NZ Institution of Professional Engineers.

During his 27 years in the Department, Alan impressed his colleagues with his cheerfulness and friendliness, his ready wit and impish sense of humour, and his understanding of transport matters. He was also an innovator (viz. the pavement testing facility, and the series of studies of staff and student travel to/from the University during 1960-76). Such studies are now becoming more common, as large employers develop travel strategies and plans, in an effort to manage travel demand.

I got to know Alan in 1971 when I was a postgraduate student. He asked me to write a computer program for analysing number plate data collected by groups of students and City Council staff before and after implementation of the one-way street system. Alan subsequently assisted in the supervision of my PhD research. I took his position when he retired, and was pleased to be able to continue his efforts to raise the profile of transportation engineering.

Alan is survived by his wife, Joan, his three children, Dick, Jeni and Brin, and his stepson, Allan.



## Team Italia

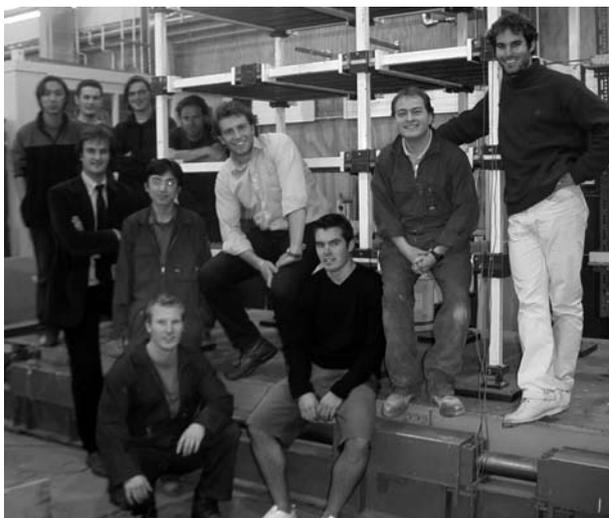
If you think that "Team Italia" sounds like the name of a sporting franchise you'd be close to the mark. In this case however, the "players" are all civil engineers, who like to think of themselves as competing on the world structures circuit in a series of intense, but friendly, games. The team was "founded" in 2004 by current chief coach Stefano Pampanin from Italian club, Pavia, and assistant coach Alessandro Palermo (in New Zealand for the 2004-2005 season), from Milan. They took their name from a suggestion made by 3rd pro local player Alistair Boys, and now boast a truly international line-up. Current and immediate past players come from New Zealand, Italy, France, Germany, Turkey, China, Colombia, Malaysia, and Taiwan. Present membership allows for a full line-up of 11 players to be fielded, with varying numbers of short-term visitors available as substitutes.

In 2005, Alessandro's club wanted him back, so unfortunately he returned to Milan in August (see accompanying article). Adopting fresh tactics, the club welcomed technical manager and researcher Dr. Uma Ashok, "bought on the market for an excellent fee," according to Dr. Pampanin. In fact, the team has been very active in the transfers market. Didier Pettinga travelled to the ROSE School in Pavia in 2004 for Masters and PhD degrees (supported by full scholarships). Didier has also been busy playing a series of world tour "exhibition matches" and honing his skills, travelling back to the University of Canterbury in 2004 and 2005, also spending four months in Toronto, Canada and presenting his work at a conference in Greece. Another exchange player from the ROSE school is Mario Galli, who "came over to New Zealand to train for 3 months during the NZ summer season - thereby avoiding the Italian winter!" Romain Laffont from France spent six months with the club in 2005 ("actually a really good soccer player too," says Stefano). A recent Kiwi graduate Mike Newcombe, will be "on loan" to the ROSE school in Pavia for ME training in 2006, again on a full scholarship. New player Simon Weselmann from Germany has transferred

to work on laminated veneer lumber (LVL) at the suggestion of former exchange player from Germany, Philip Lock. The team also "covered" successfully for Alejandro Amaris who was married in Colombia during 2005.

Team Italia performed particularly well in qualifying for the 2006 New Zealand Society of Earthquake Engineering conference, with all seven papers submitted being accepted for oral presentation. Other successes, in 2005, include the NZ Timber Society prize awarded to Philip Lock, for research carried out in collaboration with Andy Buchanan, Stefano Pampanin and Alessandro Palermo, and the NZ Concrete Society Fellowship given to Dion Marriott. The team's good performance has also generated funding for investment in new players, specifically a targeted doctoral scholarship, awarded to Umut Akguzel, following extensive international trials.

So what of the future? Chief coach Stefano Pampanin says that several new players will be featured in 2006. "We have lined up guest appearances from Dr. Sonia Giovinnazzi from the University of Genova, who arrived in January for 3-4 months, Gabriele Attanasi, a top student from Pavia who will be here for 6 months and are expecting further PhD exchanges from Italy, Germany and Japan. With our expanding player base, collegial atmosphere and good technical support, we are looking forward to a great season in 2006".



Team Italia members who turned up for a practice session during winter, 2005: Back: Eric Hertanto, Matthew Ireland, Philip Lock, Nigel Dixon; Middle: Stefano Pampanin, Liu Cong, Alessandro Palermo, Alejandro Amaris, Romain Laffont; Front: Dion Marriott, James Jensen.



Alessandro and Mariagrazia

### Alessandro Palermo

On 31 August 2005 the department bid "arrivederci" to Alessandro Palermo on the occasion of his return to Italy, over a fittingly bicultural evening of beer and pizza. Alessandro's departure was occasioned by the impending commencement of his tenure as an Assistant Professor ("ricercatore") in civil engineering at his old school, the Technical University of Milan (TUM). The word impending is used advisedly here, since Alessandro was due to start work on 1 September. However, we believe that he made it on time, if only due to the existence of the international date line.

Alessandro spent 12 months in the department as a fixed term lecturer in structural and seismic engineering, following on from the successful completion of his PhD, co-supervised by Stefano Pampanin, during a previous visit in 2004 (see CE News #18). During his appointment at the University of Canterbury, Alessandro was a key player in the development of a research team environment ("Team Italia"). He was involved with a number of research topics, including precast concrete, beam/column joint connections, seismic connections for laminated veneer lumber buildings and new metal alloy construction materials. He plans to continue collaborative research with the University of Canterbury from Milan.

Whilst in New Zealand Alessandro enjoyed soccer, windsurfing, skiing and travel. He admits to being shocked on arrival at the pizza toppings used in this country, not to mention cappuccino and chips! "I really enjoyed the Asian food in New Zealand though," said Alessandro, "especially the Japanese cuisine." In June, 2005 Alessandro was joined here by his partner Mariagrazia Di Pilato, also a structural engineer and also following in his footsteps by studying for a PhD in seismic engineering under joint University of Canterbury and TUM supervision, in this case involving Athol Carr at Canterbury.

Supertech will readily cope with the space restrictions caused by the fluctuating number of other projects occupying any given workspace.



# Grads speak

## Bruce Fairless

Where do our graduates go after engineering school? In this article we trace the story of Bruce Fairless from the BE Civil class of 1982, now residing just outside Boston, USA. After finishing at the University of Canterbury and a 3 month stint as a structural checker in Hamilton early in 1983, Bruce went on to the University of Colorado at Boulder, USA, for a Masters degree in Geotechnical Engineering, at the suggestion of John Berrill. "It seemed like a good choice, given that my job as a structural checker was going nowhere fast," says Bruce. "At Boulder, I could earn the same equivalent salary as a Research Assistant - and also satisfy the wanderlust." Bruce reports having a great time in Boulder with a very international group of graduate students. He met his American wife there and they were married in 1986 after Bruce graduated.

The couple returned to NZ in 1986 and stayed for just over a year in Auckland. Then it was back to the USA. "We drove from New York City to Boston in our \$275, 1965, dodgy, Plymouth Valiant, found an apartment in one day and have been here ever since," explains Bruce. "I then started with GZA GeoEnvironmental Inc. in November, 1987. I'm still here - and now a partner."

Of his current work Bruce says: "I mainly do building foundations with some construction-related environmental work. I have just finished an interesting job on an urban site involving a 7 story building (plus basement). The soldier pile and lagging excavation support walls there moved up to 4 inches (100 mm) and the 72 inch (183 mm) sewer the secant piles were protecting settled 1 inch (25 mm) - so plenty to worry about! Early next year, we're going into construction on a nearby 27 story building." Since 1987 he has project managed the geotechnical aspects of over 13 major construction jobs in the Boston area, involving major hotels, residential complexes and industrial buildings.

Bruce acknowledges the positive influence of both Rob Davis and John Berrill whilst at the University of Canterbury. "The suggestion of Boulder from John was seminal. I love the dirt life, particularly construction. What's next? Maybe NZ again? But, I have a building or two to do first!"

## Kate Medicott

Kate Medicott is a BE Environmental (Hons) graduate from the class of 1997, whose career to date has involved working in several interesting parts of the world. Following graduation and travels in Latin America, Kate spent 3 years with consultants Beca, Carter, Hollings and Ferner in New Zealand, before setting off for the Peoples Democratic Republic of Laos. "I was interested in development work, and on the advice of a friend took up residence, and presented my CV to various development organisations in the area," says Kate. Over the next 3.5 years Kate worked on community development projects involving planning, management, water supply and sanitation issues, with WHO, UNICEF and the UNDP. Then in 2003 she returned to New Zealand to take up the position of Water and Emergencies Programme Manager, with international aid agency Oxfam.

Since then, Kate's environmental engineering skills have been put to particularly good use whilst managing Oxfam's water and emergencies programme. More recently her field skills were

put to the test in the disputed north-east region of Sri Lanka, following the tsunami of December, 2004.

"In the first days after the tsunami, local Oxfam staff assisted with ferrying the injured to hospital, and distributed cooked food," writes Kate. "They were also able to distribute a stock of water tanks to many camps - because they had these in hand from responses to a drought and a flood that also happened in 2004. These were then filled and chlorinated each day."

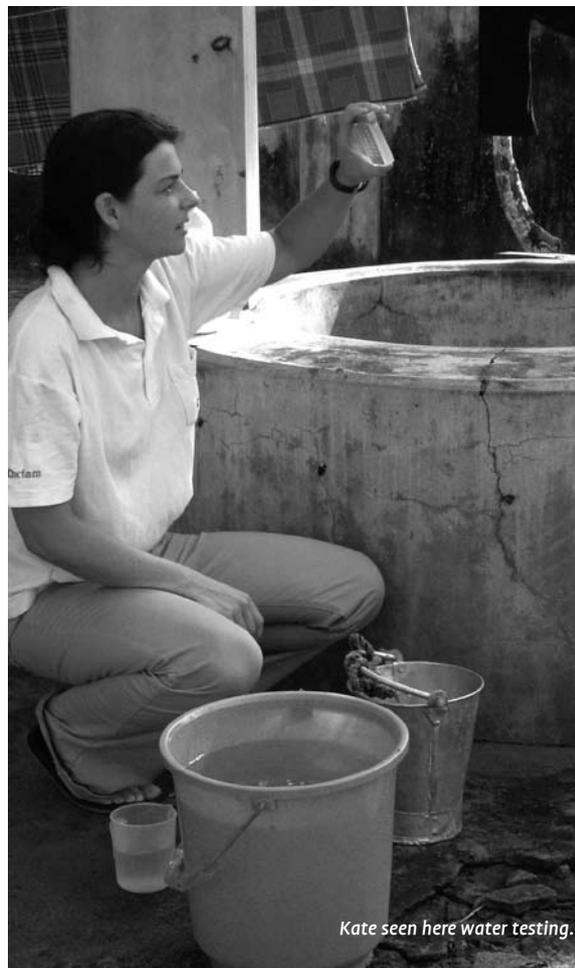
"We were working in 9 temporary camps with local organisations working on water and sanitation. I was leading Oxfam's team there to build temporary toilets and arranging sufficient water to be trucked to meet daily needs. We also needed to construct bathing cubicles to provide privacy for women while washing, and to install rubbish bins and arrange daily collection. Work in temporary camps was vital to ensuring a healthy living environment and dignity for survivors. Huge challenges also lay in assisting people to move home and in preparing permanent relocation sites for those who were unable to return home. Part of this work involved

cleaning wells and testing water quality for those going home and planning permanent facilities with communities in their new locations. Throughout, making sure we could provide enough water of adequate quality was a real challenge. We were monitoring residual chlorine, but trying to ensure there was not too much or it would put people off and they would use unsafe wells, or the lagoons instead."

Days were long and exhausting. "Initially there was very little food - certainly no fish - but always the Sri Lankan staple of rice and curry and a sugary bun for breakfast. The tea was excellent," says Kate.

In terms of job satisfaction Kate says, "By working with local people we were able to make a huge difference in people's daily lives and health, but there were also real reminders of the longer-term psycho-social work ahead to mend the scars."

For professional engineers interested in working in developing countries Kate recommends a post-graduate course in development studies. "It makes for a really effective combination between the technical and the social aspects - both of which are essential in this type of work," she says.



Kate seen here water testing.



Supertech has skills in a wide variety of disciplines.

# Transportation Engineering

## Peddling Pedal Power

Transportation engineering Lecturer Glen Koorey likes his bike. As well as being a nationally regarded expert in planning and design for cycling, he is also chair of the local cycle advocacy group "Spokes Canterbury." So it's perhaps no surprise that he's active in promoting the cycling message to his colleagues. A great opportunity to do this arose as part of the nationwide Bike Wise Week 2005, held from 12 –20 February, which promoted biking as a fun and healthy means of transport and recreation for all ages.

Glen entered the department in the Bike Wise Business Battle 2005. The "Battle" involved



On a recent conference visit to Melbourne, Glen took the opportunity to explore the city via his favourite means – bike!

getting as many people within the department riding a bicycle at some time during the week for a distance of at least 2km - be it commuting to work, or recreational riding at the weekend. Nationally, there were prizes up for grabs for the highest percentage of employees who biked during the week and for the highest percentage of "rookie" participants. Glen was able to persuade 25 out of 54 members of the department (46%) to hop on their bikes during the week, including at least three cyclists who considered themselves "rookies" plus a few more who were not regular cyclists. In the "large business" category, that was in fact the fifth best performance nationally. "Unfortunately," said Glen, "the two top teams nationally were engineering firms in Christchurch, so we missed out on a prize. However, if we'd been in Auckland, we would only have needed 12% of our department biking to win the regional prize!"

"We've always had a pretty sizeable cycling contingent within the department, but the response was really fantastic for a first try," said Glen. "In fact, it's interesting that so many places where our graduates end up, like councils and consultants, did so well in the Battle – obviously engineers know a thing or two about sustainable transportation!" As an easy way to meet the requirements for the Business Battle, Glen encouraged his team to ride to the Go-By-Bike

Breakfast held in Victoria Square on Wednesday 16 February. Nine Department members joined about 500 other cyclists in town for a free breakfast, hosted by Christchurch City Council and featuring spot prizes and entertainment.

Glen is also a member of the University Transport Working Group, which oversees car parking management and the promotion of sustainable transport to and from the campus. On the cycling front, initiatives by the Group have included the provision of four secure bike parking facilities on campus (allowing cyclists to lock their bikes behind electronic gates using their Canterbury Card for access) and a university Go-By-Bike Day with free goodies and spot prizes for cyclists on that day.



Department members (from L to R) Hugh Thorpe, Alan Nicholson, Belinda Jemmett, and Aisling O'Sullivan enjoy some free breakfast at the Go-By-Bike Breakfast.

## CAPTIF Update

In 2005, work continued on the Transfund funded research program "Fatigue Design Criteria for Low Noise Surfacing." While the University is no longer responsible for the operation of the CAPTIF facility; academic, research and technical staff and students of the department are still making significant contributions to the research program. MET student Ben Hayward installed additional instrumentation in the last pavement to gather data for his research work looking at the shear strength of granular materials. Visiting Post-Doctoral Fellow Sabine Werkmeister, has also been contributing to the research program as well as using previously collected data to validate



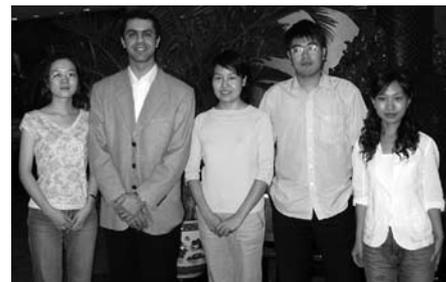
her own research. PhD student, Alvaro Gonzalez, has been preparing for his testing program investigating the properties of foamed bitumen mixes later in 2006. The first half of 2006 will be spent building and testing a pavement as part of FRST funded research looking at improving the strength of low volume roads by reinforcing the pavement shoulder. Mofreh Saleh and Bruce Steven are contributing to this four year project (2003-2007) which is being led by Opus Central Laboratories.

Bruce Steven

## Planning for the Beijing Olympic Games

Dr. Andre Dantas and Associate Professor Alan Nicholson were invited to visit Beijing during 2005 as part of a research project entitled "Urban Transportation Network Reliability Assessment Techniques in Beijing," being conducted by the Beijing Transportation Research Center (BTRC). The initial contact arose as a result of the involvement of Andre and Alan in organising an international symposium on transport network reliability, which was held at the University of Canterbury in 2004. The objectives of the BTRC project include looking at ways of improving the

Beijing transportation system in preparation for the Olympic Games in 2008. Andre was consulted on a range of issues including the organisation of an upcoming international workshop designed to explore ways in which network reliability theory could be adapted to managing the problems BTRC staff expect to be facing during the Olympics. "Using public transport to get to the various meetings gave me a useful insight into the existing system and how it could be eventually altered in order to improve both travel time and cost reliability," says Andre. Alan Nicholson travelled to Beijing in December 2005 to attend an advisory board meeting for the project.



In Beijing (left to right): Kun Chen, Andre Dantas, Dr. Wen Huimin, Sun Jianping, Yong Gao

# Environmental Engineering

## CSG in the USA

Mauricio Taulis is currently completing his PhD studies on the environmental impacts of Coal Seam Gas (CSG) wastewater, and associated treatment methods. As part of his research he travelled to the USA during April-May, 2005 for a first-hand view of the situation in two mid-western states, Montana and Wyoming, followed by a conference in Alabama. Mauricio writes:

“CSG waters are a by-product of natural gas recovery from underground coal seams, which is a new energy source here in New Zealand. I've carried out most of my literature review using papers from the USA. However, reading about environmental problems is not the same as experiencing them first-hand. Luckily, I was able to travel to the USA in 2005 to meet academics, industry personnel, and environmental officials involved in the mining industry. My travels took me to Montana, Wyoming, and Alabama.

While in Montana, I met with Professor James Bauder and other researchers dealing with the environmental impacts of CSG mining, at Montana State University (MSU), located in Bozeman. It turns out that MSU and the University of Canterbury are sister universities, which helped in facilitating my visit. I then took

off by car and went to Helena (the state capital), where I met with an engineer who is treating CSG waters using ion exchange resins. This was a very interesting experience, and has helped me tremendously with my research. My next trip was to Wyoming where I met with an environmental officer who flew me around on a small plane to check out CSG developments from the air. Unfortunately, this trip only lasted 15 minutes, as I started to get motion sickness and the particularly bumpy ride was not helping things much either (later on the ground the pilot assured me he had never seen anyone turn so yellow

before!). We continued the trip by road and fortunately I was still able to see most of what I wanted to see. Then it was back to Bozeman, where Prof. James Bauder and his team took me to meet with ranchers and other stakeholders who were very concerned with certain aspects of CSG development. Meeting these people was probably the best part of my trip. It reassured me of the importance of my research in trying to prevent similar problems occurring here in New Zealand. Finally I travelled south to Tuscaloosa in Alabama, where I attended the 2005 International CSG Symposium.

My trip to the USA was a great experience. It was very refreshing to meet people with similar research interests, and I was quite surprised to find out they were equally interested in what is going on here in New Zealand. I was able to get a real taste of the environmental problems arising from CSG water issues, and have made important and helpful contacts. Special thanks to all the people who made this possible including Mark Milke, FRST, CRL Energy, and Professor James Bauder.”



Mauricio on solid ground at the Yellowstone National Park, Wyoming, USA

Supertech will assist the inexperienced student to obtain a wider understanding of the practical aspects of a project by example, guidance and mentoring.

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## Publish and have lunch

The Environmental Engineering Journal Club, formed in 2005, met on two occasions during the year to celebrate refereed journal publications emanating from amongst their membership. At the first meeting, which was held in the Café Marco Polo, Mark Milke proudly announced the appearance of his latest paper in the *Journal of Naan Technology*. David Wareham reported that he was pleased to see his work finally appearing in the *Proceedings of the Rogan Josh Society* and Ian Mason expressed much satisfaction in getting two papers into *Acta Chimica Masala*. Visiting Erskine Fellow David Stevens said he had no plans to emulate his colleagues in these areas, but confessed, under pressure, to having previously published in the *Journal of the American Society of Thin Film Dahl Engineering* (formerly *Poppadom Research*).

Mark Milke (centre) discusses his findings with fellow club members David Wareham (right) and Ian Mason (left).



## Compost standard published

Ian Mason was part of a 16 strong expert committee convened by Standards NZ in 2005 to develop a New Zealand standard for composts, soil conditioners and mulches. The committee included representation from composting companies, local authorities, biodynamic farming interests, vermi-culture and soil health groups, Federated Farmers, the seed industry, the Ministry for the Environment, the Ministry of Health, Crown Research Institutes, and the university sector. “The standard provides a minimum benchmark for commercial compost quality in NZ and should be of great assistance in helping our organics recycling industry to move forward in the future,” says Ian. The document, NZS4454:2005, was published on 16 December, 2005 and is available from Standards NZ.

# Updates

## Natural Resources Engineering

It was a busy and exciting year for all in Natural Resources Engineering (NRE) during 2005. Staff expanded by 50% with Dr Tom Cochrane joining the NRE group as a lecturer. Student numbers grew substantially, with 1st Pro enrolments reaching the limitation of entry of 25. At post-graduate level, 1 new PhD and 2 Master's students arrived to commence studies. New research collaborations were established with the coal mining sector, NIWA, LandCare Research, the hydroelectric industry and ESR. The job front has also been excellent for graduating students, with most having had several offers as early as August.

### Visitors

Allan Konopka from Purdue University, USA visited the department in 2005 as an Erskine fellow. He shared his expertise with NRE students and staff on how microbes act in our natural environment and how they could be used for remediation of contaminated sites. Other visitors included Dr Howard Williams from Pattle Delamore Partners giving a lecture on storm water groundwater issues in Canterbury, Dr Kate Hewson, the University of Canterbury's Environmental Projects Coordinator, giving a wonderful presentation on responsibility for environmental sustainability, Bridget O'Brien giving a lecture on the resource management act, and Pierre Hovelt from the Danish Hydraulic Institute demonstrating the latest technology for modelling water resources.

### Field trip

In April, 2nd and 3rd Pro students and staff went on a 5 day field trip around the northern half of the South Island. At the Strongman coal mining site on the West Coast the group learned about the challenges of mine site rehabilitation to the accompaniment of intense rainfall. Further north, visits were made to a salmon fishery (no fishing allowed!), the Cawthron institute in Nelson, the Takaka milk factory (before it burned down), and various irrigation schemes in the Marlborough region. On the way back to Christchurch, students were greeted by the former mayor of Kaikoura who explained the zero waste initiative implemented by the community. Needless to say, this captivated the more fervent "green" students. It was an exciting trip for students, who expressed their feelings in several articles (and a poem) written for NRE ENews (see below).

### Student project topics

Final year student projects kept 3rd Pro students busy in the second semester of 2005. The projects spanned a wide range of topics, including energy budgets in milk factories, production of algae for bio-fuel, using coal seam gas to treat acid mine drainage, river sediment transport and using compost for erosion control. Three water related student projects were carried out for the Waihora Ellesmere Trust.

### NRE ENews

To keep track of events taking place in NRE, an electronic newsletter was launched in 2005. It can be viewed at: [http://www.civil.canterbury.ac.nz/natres/News/NREENvol1\\_gen.shtml](http://www.civil.canterbury.ac.nz/natres/News/NREENvol1_gen.shtml)



Natural Resources Engineering staff and students, 2005.

## Fire Engineering

### Visitors

Prof. David Purser and Dr Jenny Purser from the Building Research Establishment, UK, visited us through the University's Erskine Fellowship scheme in 2005. Dave taught the "Human Behaviour in Fire" paper to a class of 27 students, and also gave a highly successful one-day workshop to fire engineering professionals in association with the New Zealand Chapter of the Society of Fire Protection Engineers. Courses were held in Christchurch, Auckland and Wellington with over 200 participants attending the three sessions. Dave and Jenny also had discussions with several research students regarding their work on human behaviour and fire product toxicology. We also welcomed exchange students Martin Nilsson and Johannes Bjerregard from Lund University, Sweden.

### Laboratory developments

The laboratory continues to develop with the help of our two laboratory technicians, Grant Dunlop and Bob Wilsea-Smith. This year we constructed and calibrated our Lateral Ignition Flame Transport (LIFT) apparatus as part of the thesis research undertaken by Geoff Merryweather. Geoff also constructed a Reduced scale Ignition and Flame spread Technique (RIFT) addition for our cone calorimeter. Our small-scale furnace used for testing structural connections under fire conditions has been upgraded.



Geoff Merryweather observes flame spread tests over timber samples in the LIFT apparatus



Supertech has the vision and depth of experience to solve problems arising during a project's journey.

### Scholarships and awards

The ME (Fire Engineering) programme attracted two new scholarships in 2005. Firstly, the Arup Fire scholarship, valued at AU\$2,500, which is awarded 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 and the UK. The inaugural recipient of the Arup Fire scholarship was Anthony Ng who is presently investigating the fire design of transformer rooms in buildings.

The second scholarship was provided by the New Zealand Chapter of the Society of Fire Protection Engineers. The scholarship is open to all full-time thesis research students who are enrolled in the ME (Fire Engineering) programme. This scholarship is worth NZ\$2,000 to the student plus an additional award of up to NZ\$500 is available to fund the costs of carrying out the research work.

Keryn Goble and James McBryde were both awarded University scholarships to undertake their studies in the ME (Fire Engineering) programme. Keryn Goble was also awarded a Freemasons University Scholarship. Roger Harrison was awarded a BRE Publications runners-up prize for his thesis research paper presented at the Interflam 2004 conference on "Thermal spill plume studies for the design of smoke control systems".

### Dr Spearpoint

Congratulations to Mike Spearpoint on the successful completion of his PhD studies in December, 2005. Mike's thesis was entitled "Integration of building product models with fire simulation software" and looked at the relevance of the Industry Foundation Classes (IFC) model for describing the life-cycle of a building in electronic form, to fire engineering. A repository of fire growth information was created, and software developed to enable IFC documents to be imported into fire simulation software. The thesis discussed limitations of the current IFC model for use by fire engineers and the challenges in developing IFC interpretation software for fire engineering applications.

### Workshop and laboratory facilities

The department has ten well equipped workshops and laboratories, which support a wide range of teaching and research activities. The major equipment present and/or services available in each area are as follows:

**Workshop:** lathes, milling machines, radial arm drills, welding equipment and other machinery for use in the fabrication of metal and wood components

**Structures:** one shake table and a range of universal testing machines, with capacities from 100 kN to 10,000 kN. Strong floors to support the testing of full-scale concrete and timber building elements. Concrete manufacturing equipment, concrete viscometer.

**Structures extension:** one large shake table for the testing of full-scale concrete and timber structures.

**Model structures laboratory:** one universal testing machine (250 kN capacity).

**Fluids laboratory:** open channel flumes supplied by a recirculating water system, pumps, particle tracking and imaging instrumentation; fabrication of experimental equipment.

**Fire laboratories:** small and large scale calorimeters for testing the burning characteristics of materials.

**Geomechanics laboratory:** cone and seismic penetrometer equipment (including a truck mounted rig), triaxial testing machines plus a range of other soil classification and testing equipment.

**Transport laboratory:** one programmable triaxial cell for the testing of basecourse materials; bitumen and asphalt testing equipment; asphalt and foamed bitumen manufacturing equipment; traffic flow, speed and classification equipment, including video imaging, radar and laser instruments.

**Electronics workshop:** design and fabrication of hardware for process control and data logging; software development

**Environmental laboratory:** wet chemistry and instrumental analyses, controlled temperature rooms (2).

Our facilities are available for limited commercial testing and trial work, subject to availability. To discuss your testing requirements please contact David MacPherson, Technical Manager, email david.macpherson@canterbury.ac.nz.



### Bridge Building 2005

The 2005 bridge building competition was the biggest yet with 36 teams competing for \$2000 worth of prize money from Laserframe. The competition was also the toughest yet with bridges having to span 4.1m, while safely carrying two people but breaking when carrying three students. Teams were encouraged to be competitive and to keep bridge weights to an absolute minimum to improve the likely power to weight ratios of their structures. This produced some very light bridges and many sleepless nights before the bridge testing.

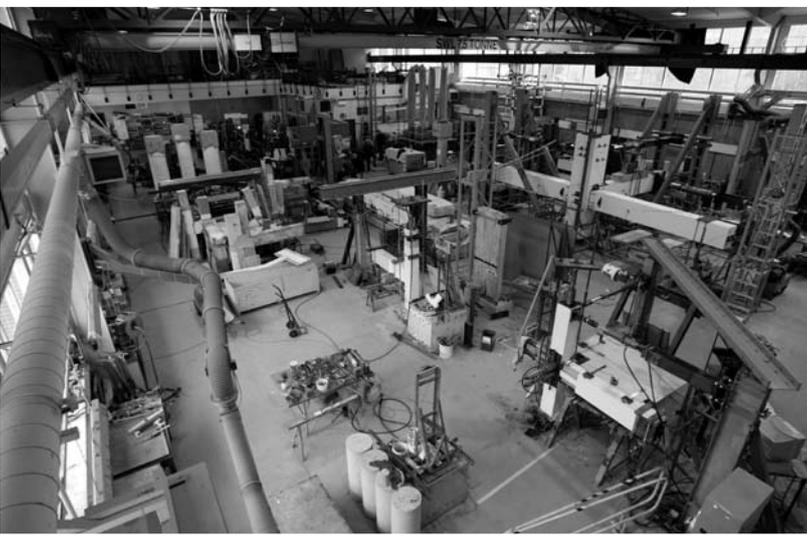
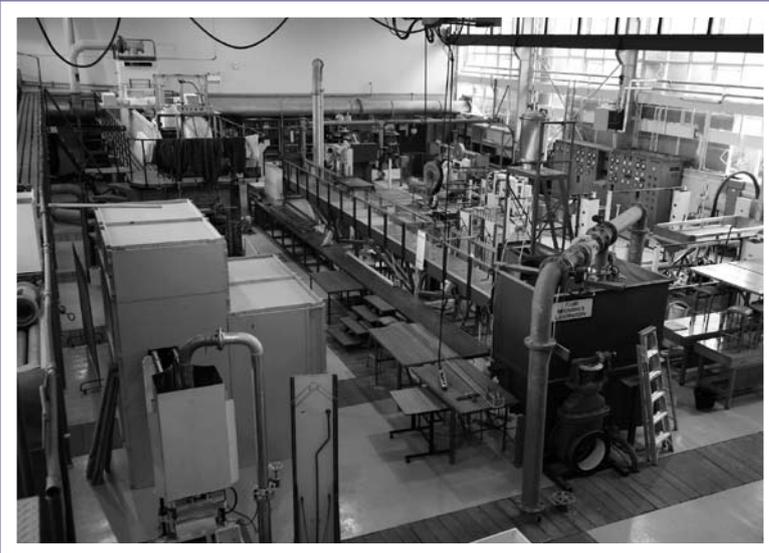
A large crowd turned out to watch the event across the Avon River outside the Student Association buildings. The high risk approach adopted by most groups lead to some spectacular failures (some rather premature) but also produced the best result in the history of the competition, with a very light bridge winning the event. Given that we learn more from our failures than our successes, the event was a great learning experience and enjoyed by all.

James Mackechnie



Does Supertech exist?

Well - no one has been seen wearing a cape and their underpants on the outside of their overalls as yet! But collectively, yes - each technician has many of these attributes, and working together, they help to make the mission possible.



Workshop and laboratory facilities  
Department of Civil Engineering  
University of Canterbury  
[www.civil.canterbury.ac.nz](http://www.civil.canterbury.ac.nz)



From top down: fluids laboratory, environmental laboratory, workshop and structures laboratory, geomechanics laboratory, transport laboratory.