Message from the Dean

Engineers have often been at the forefront of the world’s most iconic projects. Many of these still exist from very ancient times and continue to inspire people today. For example the ancient Romans left a legacy of viaducts, amphitheatres, cities, roads, bridges, fortifications, and even holiday resorts, which are marvelous engineering feats even by today’s high tech standards. With no modern surveying equipment or technologies such as lasers, GPS, or computers the Romans were able to support their civilisation with water, transport and built infrastructure which would be a challenge to replicate even now. Their viaducts for example could carry water over 100's of kilometres of valleys and hills, while maintaining a consistent and uniform fall of only a few metres, to supply water to a major centre. And all built from solid stone blocks so accurately cut that they did not even use mortar to hold them together.

Of course many other even older civilisations have similarly impressed, with pyramids, cities cut into mountains, ancient temples, and so on. In the modern world we continue to deliver some amazing feats of engineering such as iconic buildings, massive dams and irrigation systems, bridges, tunnels and transport systems. In Australia the Sydney Harbour Bridge and the Sydney Opera House are well known icons internationally. The building of the Sydney Harbour Bridge in particular was ferociously driven by an engineer Dr. John Bradfield, who over

PhD Student Wins CRC Research Students Competition

PhD student, Shiran Gunasena from the Faculty of Engineering’s Geotechnical Group, was the well deserving winner of the CRC for Rail Innovation Research Students Competition which took place on the 30th of September in Brisbane. The competition was hosted by the Australian Cooperative Research Center for Railway Engineering and Technologies. Shiran’s presentation was based on his PhD research and was conducted at the Sebel Citigate Hotel auditorium in Brisbane in front of an audience of more than 150 people.

The CRC hosted a showcase event to highlight the outputs of its many ongoing research projects. During the event, there was a training session for all the CRC for Rail Innovation students which took place from the 29-30th of September. Of the 28 student participants 12 were selected to take part in the student competition portion of the showcase. The students selected were from six universities and the judging panel consisted of several academics and industry colleagues.

Shiran’s PhD research is focused on the “improvement of the shear strength of soft soil by native tree root suction and reinforcements.” His research outcomes will be necessary for engineers to use native vegetation as an environmentally friendly, cost effective and flexible ground improvement method; especially in the construction of railways in the vegetated coastal areas.

Shiran’s main research supervisor is Prof Professor Buddhima Indraratna and his co-supervisors are Dr Cholachat Rujikiatkamjorn and Dr Vinod Jayan Sylaja. Shiran’s research is financially supported by the Australian Cooperative Research Center for Railway Engineering and Technologies.

In photo from left: PhD student Shiran Gunasena with one of his supervisors Professor Buddhima Indraratna.

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came technical, political, financial and social issues to get the Bridge constructed, and not always with the acclamation of the people of the day, as is not uncommon with large projects.

A new current proposed and potentially iconic project being considered in Australia is the ‘Very Fast Train’ (VFT) on the East Coast of Australia. This would link at least our two largest cities, Sydney and Melbourne, with possible extensions to Brisbane and links with our capital city Canberra and two of Australia’s other large cities, Newcastle and Wollongong. Though Melbourne and Sydney are large cities by world standards, and the density of air traffic between these cities is in the world’s top 5 aeroplane routes, previous feasibility studies have shown that the economics of the VFT based on passenger revenue alone will not pay the cost of building it. However, like many other major activities throughout history people can be motivated by much more than money. The VFT has recently come back onto the political agenda because it has captured people’s imaginations by promising more than revenue. For example, there may be huge social benefits if the volume of passenger traffic carried by the VFT renders a second airport in Sydney unnecessary, and reduces what will otherwise be a huge growth of environmentally more costly road and air traffic.

Also in common with most other countries around the world Australia is in the grip of an apparently unstoppable trend of population drift into major cities. The VFT will make country towns now many hours drive away from the services, employment opportunities and attractions of cities, within only half or one hour from our two major cities, perhaps opening up by many orders of magnitude the area of Australia people are willing to live in, thus reducing congestion (and cost) of city living, and breathing new life into country towns. Perhaps if we discover ways of convincing enough people about the non-economic benefits of such projects, we may be on the verge of harnessing engineers, the community, politicians and business people to build our own modern day VFT iconic project.

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**Engineering PhD Student Wins 2010 Young Professional Geotechnical Competition**

Ana Heitor, PhD student from the Faculty of Engineering’s Geotechnical group won the 2010 Young Professional Geotechnical Competition. The competition was held in Sydney on the 8th September and was hosted by the Australian Geomechanics Society and the Institute of Engineers Australia.

Ana captivated the Engineering Australia’s (IEAust) Auditorium’s packed audience with a presentation based on her PhD research. She won the competition for her innovative non-destructive testing method for evaluating the compaction efficiency of reclamation fills using seismic waves (without having to auger soil samples). Her research has direct application to the Penrith Lakes development.

Ana’s PhD research supervised by Buddhima Indraratna and Cholachat Rujikiatkamjorn is part of an ARC-Linkage project in collaboration with University of Western Sydney, Penrith Lakes Development Corporation and Coffey Geotechnics.

Professor Indraratna said that Ana faced close competition with excellent presentations three other finalists, which included a PhD student from University of Sydney, and two young professionals from Coffey Geotechnics and Arup. The candidates were shortlisted from many submissions from both academia and industry.

The judging panel consisting of several academics and industry colleagues considered both the written paper submissions (to be published in the *Australian Geomechanics Journal*) and the oral presentation in selecting the winner of the competition.

Ana praised her supervisors saying they played an important part in her competition success through their “advice, support and patience”.

This is the 3rd time that a UOW geotechnical PhD student has won this competition since its inception several years ago.

11th International Congress on Engineering Geology

Professor Robin Chowdhury and Dr Phil Flentje participated in the 11th International Congress on Engineering Geology (11th IAEG) which was held in Auckland from the 5th-10th of September 2010. Robin presented a paper, co-authored by Phil, about recent developments, achievements and challenges related to slope stability analysis.

Phil himself presented another paper, co-authored by Robin and a colleague from outside the University of Wollongong, about an important case study of slope monitoring and management. The papers were well received and there was strong interest from several international colleagues about the on-going research work on hazard and risk assessment of landsliding and about real-time slope monitoring work undertaken by the team at the University of Wollongong.

Robin participated in a mid-congress field trip concerning the Engineering Geology of Auckland. Phil participated in a post-congress field trip concerning engineering geology and geological hazards of the North Island of New Zealand.

Among the many technical the exhibitors at the Congress was Taylor Francis Group, a leading international academic publishing house. They had on display the recent book by Robin and co-authors entitled “Geotechnical Slope Analysis”. A strong interest in the book by delegates was noted.

The IAEG Congress is organised by the International Society of Engineering Geology every four years and the previous one was held in Nottingham England in September 2006. At that Congress, Robin and Phil had a paper and Robin chaired a session. Moreover, a theme paper resulted from that Congress which was published as a Book Chapter in 2009; it was co-authored by Professor Robin and Dr Andy Gibson from the UK.

UOW: a Key Destination for Indian High School Principals’ visit to Australia

A group of twelve High School Principals from India recently visited the University of Wollongong to receive an overview of the Australian University environment. The aim of this visit was to give the Principals a positive view of what it would be like for their students to study in Australia.

During their visit, the principals received a tour of the University of Wollongong’s campus, and were provided with detailed information about the variety of degrees offered at UoW, and about the many different benefits of studying an undergraduate degree in Australia.

Included in the University of Wollongong campus tour was a tour of the Faculty of Engineering’s robotics and geotechnical high bays. The Faculty of Engineering also organised for the visitors to observe a first year physics lecture, and they were also presented with information about the SAE Formula One racing project.

There was a lot of positive feedback and comments received from the Indian Principals about their visit to Wollongong; they expressed that they were especially impressed by the University of Wollongong’s quality facilities and approach to safety and security.

A special thanks is extended to Dr David Martin, Mr Ian Bridge, Mr Alan Grant and Dr Stephen Van Duin for offering their specialist expertise, which helped make the day a great success.
Engineering Students Receive Best Poster Presentation Award at IUMRS-ICEM

PhD student Chao Zhong and Master by Research student Xuanwen Gao, both from the Faculty of Engineering’s Institute for Superconducting & Electronic Materials, received the Best Poster Presentation Award at the 2010 International Union of Materials Research Societies – International Conference on Electronic Materials (IUMRS-ICEM 2010) held on the 22nd-27th of August in Korea. This is a very competitive award, and only 22 poster presentations awards were received among the 923 candidates.

Chao Zhong and Xuanwen Gao study in the area of advanced materials for lithium-ion batteries. The students’ academic supervisors, Prof. Huakun Liu and Dr. Jiazhao Wang commented about their students’ recent achievement;

“Our research outcomes have once again attracted the world’s attention in such a world-class professional symposium; they study very hard and have done very interesting research work on CuO-carbon composite materials for lithium-ion battery anodes.”

The IUMRS-ICEM2010 provides an international forum for reporting progress and recent advances in the development of electronic materials, as well as their processing and applications. The symposia are concerned with a variety of electronic materials and processing technologies related to semiconductor processing and devices, solar cell and light-emitting diode (LEDs) materials, thin film science and technology, molecular/organic electronics, and nanomaterials.

The Faculty of Engineering extends its congratulations to Chao Zhong and Xuanwen Gao on such an outstanding achievement!

In photo from left: Master by Research student Xuanwen Gao and PhD student Chao Zhong with their winning poster.

UOW’s International Co-operation on Terahertz Science and Technology

PhD students; Daniel Schoenherr (Technical University of Darmstadt, Germany) and Elise Pogson (UOW) recently participated in the International Conference on Infra-red, Millimeter and Terahertz Waves conference held in Rome, Italy. A collaboration between Darmstadt and Wollongong has been funded over several years through an ARC-LX project headed by Professor Roger Lewis.

The conference was held from the 5th-10th of September 2010 and attracted over 600 delegates from more than 30 countries. The International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz), originally began in 1974, and is the oldest and largest continuous forum specifically devoted to the field of ultra high frequency electronics and applications. The multidisciplinary nature of this conference makes the event an outstanding forum to gather together scientists from different fields and exchange information on different methodological and scientific approaches.

In photo from left: PhD students; Daniel Schoenherr (Technical University of Darmstadt, Germany) and Elise Pogson (UOW).