



Faculty of Engineering Newsletter



Message from the Dean

We hear so much today about telecommunications revolutions, such as replacement of copper with optical fibre, the new ultra fast broadband networks being rolled out around the world, 3G mobile phone networks, real time 'back to base' monitoring of infrastructure using mobile phone and other networks, and so on, that it is easy to assume that such revolutions only occur in the modern world.



But there have been revolutions in the past, even in telecommunications, and engineers with vision have often driven them, sometimes against all the odds. For example in the early 1800's the only way Australia gained information from the rest of the world was via sailing ships, carrying newspapers and letters with news many months old. The first port of call which had a telegraph link to most of Australia's population for these ships was Adelaide, in the then new and struggling State of South Australia. In fact it could be said that Adelaide hosted Australia's first communications 'hub', with newspapers employing teams of journalists in Adelaide to digest the news from the latest sailing ship, and then to fight to get access to a limited telegraph link to get their 'scoops' to the Eastern States. But this industry was put under severe threat when the Queensland Government planned to build a new telegraph link to an underwater cable being laid from London via Asia shortly to reach Darwin, the Northernmost Australian city. If this happened South Australia's communications industry would be completely destroyed.

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First Combined CHoPS and ICBMH Conference

For the first time ever a combined CHoPS Conference (6th International Conference for Conveying and Handling of Particulate Solids) and ICBMH Conference (10th International Conference on Bulk Materials Storage, Handling and Transportation) was held. This provided a unique opportunity to integrate academic/scientific research and industry issues and requirements. ICBMH Conference is run every 3 years alternating between University of Wollongong and University of Newcastle. It was Wollongong University's turn but this event was too big for Wollongong, and it was decided to move it to the "world-class" Brisbane Convention and Exhibition Centre. The conference was held from the 3rd – 7th August. Peter Wypych Chaired CHoPS+ICBMH with David Hastie as the Co-Chair. The conferences were attended by 195 Delegates from 29 Countries. Over 140 Papers were presented including PhD students David Hastie, Andrew Grima, Jose Humberto Dominguez Davila and technical staff member Wendy Halford. Peter Wypych presented a paper by past PhD student Soumya Sudda Mallick. The Opening Address entitled "Integrating Scientific and Industry Communities" was delivered by Prof. Judy Raper, Deputy Vice Chancellor (Research).

Papers covered a range of topics in 12 major tracks:

- Storage, Flow & Handling
- Environmental & Dust Hazards
- Mechanical Conveying & Feeding
- Pneumatic & Hydraulic Conveying
- Computer Simulations & Validations
- Segregation & Mixing
- Particle Design, Production & Processing
- Fluidisation
- Measurement, Control & Instrumentation
- Modelling & Fundamentals
- Particle & Bulk Characterisation
- Particle & Powder Technology.

On conclusion of the conference only positive feed back from delegates has come in. Some even said it was the best conference they had ever attended. The conferences were held in conjunction with Asia-Pacific Bulk Materials Handling Exhibition BULKEX (with more than 6,000m² of exhibition space). Bulk Materials Handling Australia (BMEA) was involved with an exhibitors stall. Over the course of BULKEX there was much interest in BMEA, the University and the new SMART facility.



Inside . . .

Women in Engineering Lunch	2
Centre for Medical Radiation Physics	2
The Materials Student Society Field Trip	3
IIWE Experience	3
Graphene Flower Adorns Cover of Carbon Journal	3
David Sudgen's Award Winner	4
Asia Nanotech Camp	4
Paper Presentations	4
Australian Young Geotechnical Professional Competition 2009	4

Continued from Page 1...

A visionary engineer in South Australia, Charles Todd, wrote in 1855 of his vision of a telegraph 'extended to join the several seats of commerce in Australia and also, it is no idle dream in the present age of wonders.....connecting Asia via submarine cable then via Calcutta to London'. Todd took charge of constructing a 2,900 kilometre telegraph line from South Australia to Darwin, North to South across the entire Australian continent; mostly desert, in only 18 months. Only one explorer, John McDouall Stuart, had ever successfully made this return trip alive, and this after four unsuccessful attempts. Even his 5th successful attempt was a near death experience, with extraordinary suffering from lack of water and food. Yet the determination, planning, technical talent, motivational and negotiating skills of Todd made it happen. He organised teams of blacksmiths, carpenters, storekeepers, linesmen, surveyors plus huge amounts of equipment, stores, and hundreds of horses and bullocks. He inspired his people to work as a team, in the most arduous conditions, eventually overcoming all barriers to the successful construction of the line.

This telegraph link then provided Australia, via Adelaide, with news from as far away as Europe in only 48 hours, what was then an incredibly short time compared with sailing ships, and a technical advance with substantial economic, political and cultural importance. The internet and broadband have had similar revolutionary impacts on today's society, but it's interesting to occasionally reflect on previous revolutions and the part that engineers play in them. We certainly hope and expect that the education we are giving our students will ensure that engineers continue to play key roles in future 'revolutions'.

Women in Engineering Lunch

On 26 August the second "Women in Engineering and Physics Network" lunch for this year was held, which was attended by 29 students. Three students, Suzie Blom, Ashley Davies and Jing Zhang, who attended the IWE program (International Institute for Women in Engineering at the EPF) in Paris in July gave a lively presentation of their 3 weeks there. (See the article on page 3). It was a fabulous opportunity for these students to network with other engineering students from all around the globe, during summer in Paris! Lenka Kuzmikova then gave an insight into what it is like to be a PhD student at UOW: she spoke about the time involved, income, problems, direction and more such as information about her study in her home country. It was very much appreciated by the students to hear such an account from someone who is studying for a PhD. These lunches are a good way to inform female students about such programs and hear personal accounts. At the next lunch we may invite a student who has left UOW and is now working in the field.



Prof Peter Metcalfe, Prof Wolfgang Tome, Prof Judy Raper, Prof Anatoly Rozenfeld, Prof Morten Hoyer and Prof Thomas Kron



Centre for Medical Radiation Physics
School of Engineering Physics
Faculty of Engineering
University of Wollongong NSW 2522

On Wednesday 26th August 2009 CMRP in conjunction with Illawarra Cancer Care Centre (ICCC) held a successful one day international workshop at Wollongong Hospital. The subject for the day was Advanced Radiobiological Planning in IMRT and Tomotherapy and Advanced Stereotactic Radiotherapy. International guest speakers were Prof Wolfgang Tome Ph.D., Wisconsin University, USA and Prof Morten Hoyer, M.D., Arthur University Hospital, Denmark.



A/Prof Martin Carolan, Prof Wolfgang Tome, Prof Morten Hoyer, Dr Chris Fox and Prof Anatoly Rozenfeld



From the left to the right: Genny Gordon, Business Development Manager, Cairns Convention Centre, Prof Anatoly Rozenfeld, Director CMRP, Prof Tom Lewellen, Prof of Radiology Medical School, University of Washington and Chair of Site Selection Committee of IEEE NSS MIC 2013, Jenny Graham, Director of Sale of, Cairns Convention Centre

On Friday 28th August 2009, Thomas K. Lewellen, Ph.D. Professor, Radiology, Electrical Engineering Department of Radiation, University of Florida, USA gave a seminar on 'Designing detector systems based on GM-APDs - the University of Washington experience'. In addition, Prof Lewellen is the chair of the site selection committee for the IEEE NIC MIC 2013 conference. Prof Rozenfeld is in the running to hold this conference in 2013. Location of this conference, if successful will be the Cairns Convention Centre.



From the left to the right: Prof Steve Meikle, University of Sydney and CMRP, A/Prof Roger Fulton, University of Sydney and CMRP, Prof Brian Hutton, Director of Medical Physics University of College London and CMRP, Prof Tom Lewellen, University of Washington, Prof Anatoly Rozenfeld, Director CMRP, A/Prof Michael Jackson, Director of Radiology, Prince of Wales Hospital, A/Prof Vitas Anderson, Brain Science Institute, Swinburne University

The Materials Student Society Field Trip in July

MetSoc President Nicholas Theodossiadis and Treasurer Phillip Drain organised a week long field trip for their material's student members to a number of industrial/primary materials processing plants. The places visited included Penrith Lakes Quarry, OneSteel (at Rooty Hill and Newcastle), Hydro Aluminium Smelter at Kurri Kurri, Rio Tinto's North Parkes Copper/Gold mine, Newcrest Copper/Gold mine at Cadia/Ridgeway, Clarence Coal Washery and Berrima Cement Works. It was quite a journey! Much was learned and a lot of fun was had. The students got to experience and learn about a number of important Australian industries that are not necessarily covered in detail in their undergraduate degree. It is important for the students learning that they visit such plants, even if it is just to appreciate the scale of operation of these industries, something very difficult to achieve in class.

As can be seen by the picture, all enjoyed the experience and as a result of this trip some may make the journey again in their employment travels after they graduate.

The Trip was sponsored by the Association for Iron and Steel Technology, AusIMM, the School of Mechanical, Materials and Mechatronics and BlueScope Steel. Special thanks go to Ray Tolhurst (AusIMM) and Craig Nealon (BlueScope Steel) for volunteering to be the drivers and all the companies who took the time to show our students round the plants.



Right to Left: Louise Hodges, Daniel Cadwallen, Craig Nealon, Peter Kroek, Ray Tolhurst, Alice Patterson, Nishara De Silva, Thiyagu Shannui-garaj, Adam Rounsley, Raymon Drysdale, David Scimone, Jennifer Norwood, Phillip Drain, Nicholas Theodossiadis, Amber-Rose Crowley (absent).



IIWE Experience

Jing Zhang, who is currently completing her Master of Engineering Management attended the "International Institute for Women in Engineering 2009" held in Paris last July. "It was a great experience and it combined both academic learning with practical workplace skills. Although the program only runs for three weeks, it is very well organised and combines lectures with poster workshops, project work, area presentations as well as site visits. It's an international program which meant I had the opportunity to meet people from other countries who are studying engineering. Group work provided extensive networking opportunities and also helped me to learn about other cultures. I quite enjoyed the site visits as I had an opportunity to see the manufacturers' operations and learn how these companies manage their supply chain and production. Some of the companies we visited were IBM, Coca Cola, SOCIETE Generale and L'OREAL. On our free days we visited famous museums and sites, experienced French cuisine, and even went to Europe Disney Land and a pub as well.

Finally, I really appreciate the Faculty of Engineering for providing me with such an awesome opportunity. Thanks to my course coordinator Peter Gibson, Virginie Schmelitschek and also Anji Phillips, who have encouraged and helped me all the way. "

Graphene flower adorns cover of Carbon Journal

Mechanical, Materials and Mechatronics Engineering and the Institute for Superconducting and Electronics Materials have had their research on graphene material selected as the cover for the journal, Carbon. It has been selected for issue 10 this month for this high-impact journal which publishes original research on carbonaceous materials.

The title of the paper is "Graphene nanosheets for enhanced lithium storage in lithium ion batteries". Graphene is a newly-discovered single layer of carbon atoms in a two-dimensional (2D) honeycomb lattice, and exhibits many unusual and intriguing physical, chemical and mechanical properties. Graphene has the potential to revolutionise areas such as electronics as well as energy storage and conversion.

For the first time, Professor Wang has revealed that loose graphene nanosheets agglomerate and crumple naturally into shape, resembling flower-petals through high resolution field emission electron microscope observation. Professor Wang and his team have successively published four papers in Carbon in 2009. The titles of the other three papers are "Synthesis of enhanced hydrophilic and hydrophobic graphene oxide nanosheets by a solvothermal method", "Synthesis and characterisation of hydrophilic and organophilic graphene nanosheets", and "Highly efficient and large-scale synthesis of graphene by electrolytic exfoliation".

Professor Wang said this clearly demonstrated UOW's great achievement into graphene research.

An ARC Queen Elizabeth II Fellow, Professor Wang is also the Co-ordinator of the Energy Storage Materials Research Program for the Institute for Superconducting and Electronic Materials.





David Sudgen's Award Winner

David Oliveira, a PhD student in the University of Wollongong's Faculty of Engineering, has won the David Sudgen's Award of 2009. The award, granted by the Australasian Tunnelling Society (ATS), rewards young professional engineers who are under 35 and have reached a demonstrated level of achievement and involvement in the field of tunnelling engineering. For his prize, David will attend the 2010 World Tunnelling Congress in Vancouver, Canada.

David won the award for a paper based on his research (under the supervision of Professor Buddhima Indraratna and Dr Jan Nemcik) into the implications of clay-infilled rock discontinuities on tunnelling and slope stability. He has developed a new model that takes into account particular mechanisms of these planes of weakness, and can be used in the design of tunnels, underground excavations and slope stabilisation. "The

outcomes of my research indicate that the use of some of the existing design procedures may be potentially misleading and special attention should be given to the effects of clay-infilled rock discontinuities." said David.

"The desire for a high quality city environment often conflicts with development and redevelopment projects in densely built-up inner-city areas. In this sense, a more efficient use of the underground space for urban infrastructure is a vital need."

David was awarded the Peter Schmidt Memorial Scholarship for best postgraduate performance of 2008 in UOW's School of Civil, Mining and Environmental Engineering. He was also a runner-up at the AGS NSW Research Award and a second prize winner at the Young Geotechnical Professional's Night, both in 2008, which are a prestigious geomechanics award from the Australian Geomechanics Society and Engineers Australia. David's PhD thesis has been submitted for external examination, and he has recently started at Coffey Geotechnics (Sydney).

Asia Nanotech Camp (ANC 2009)

Congratulations to Javad Foroughi, a PhD student in the Faculty of Engineering and ACES/IPRI node, who has been selected to attend the Asia Nanotech Camp (ANC 2009) being held in Taiwan from September 28 to October 12. Javad was one of just three young scientists selected to represent Australia at the Camp and his flights, costs and attendance at the camp will be covered by the organisers of the camp. Initiated by the Asia Nano Forum, ANC 2009, is a continuous effort in fostering young nanotechnology leaders in Asia. It is also a platform for young aspiring researchers to communicate, inspire and learn from each other.



Paper Presentations

Muhammad Hadi participated and presented two papers in the 9th International Symposium on Fiber Reinforced Polymer Reinforcement for Concrete Structures, (FRPRCS-9), which was held in Sydney 13-15 July 2009. Both papers were about the use of carbon fibre reinforced polymers (CFRP) to strengthen reinforced concrete members. One paper was coauthored by PhD student Mr Veysel Yazici and the other was coauthored by Mrs Yuliarti Kusumawardaningsih who completed her ME (Prac) in July 2009.

Australian Young Geotechnical Professional Competition



Gyanendra Regmi, an Endeavour PhD scholar in the school of CME, won the Runner-up award at the Australian Young Geotechnical Professional Competition 2009 for his contribution to "Design and Performance of a Permeable Reactive Barrier using recycled concrete for the remediation of acid sulphate soil problems". The winner was Jamie McIlquham, a senior Geotechnical Engineer from Golder Associates, who designed the heavy loads transition system at Port Botany over very soft clays.

The Competition was held recently in Chatswood at IEAust Auditorium. Many young professionals from many industry organisations and Universities have submitted their papers and the shortlisted candidates had to present their work orally, and both the papers and presentations were evaluated by a panel of 4 judges.

Gyanendra is currently in second year of his PhD working in a project of Acid Sulphate Soil. He is being supervised by Prof Buddhima Indraratna and Dr. Long D. Nghiem. The award follows on from the young professional awards already won by Dr Price, Dr Sathanathan, Dr Cholachat, Dr Behzad, David Oliveira, all members of the Geotechnical Group, since the inception of this competition several years ago.

Diary Dates

2 Sept	Senate
8 Sept	Faculty Committee
15 Sept	CME Safety Committee
15 Sept	PHYS Safety Committee
15 Sept	MMM Safety Committee
22 Sept	WAC Committee
30 Sept	Senate Standing