Message from the Dean

We are now into Session 1 of 2013 with well over 400 new undergraduate students starting their studies in our different Engineering and Physics disciplines. About 12% of these are students from many different countries, particularly from Asia, China and India. These are joined by about 100 more senior students studying our postgraduate coursework Masters degrees, particularly our Master of Engineering Management. These students also come from all over the world including Asia, Europe, the Middle East and Latin America. So the Faculty has a diverse and rich body of students, making studying here in Wollongong a unique experience, hopefully assisting all our students in gaining a greater understanding of the international global nature of engineering and science.

We also welcome about 20 new Higher Degree Research students, mostly enrolled in PhD’s, joining our large research contingent of nearly 550 PhD students throughout Faculty. Again, these students are from many parts of the world, and are involved in research which is internationally recognised. Much of this research is funded by companies and Industries which are multi-national, and which have international operations and job opportunities.

Our ‘Scholars’ undergraduate program for very high achieving incoming students continues to be popular, with about a 25% increase in numbers over our 2012 intake. These students are able to become involved with our research and development activities as part of their studies. Our research is very highly regarded internationally, and much of it is funded by Industry, so our scholars’ students benefit by becoming involved with state-of-the-art work even as undergraduates. We also offer many of these students scholarships in our research laboratories during the summer vacations throughout their degree so they can get a practical taste of high quality research work.

You may remember past editions of this newsletter discussing our successful competitive bid to enter the international Solar Decathlon competition-see http://www.illawarraflame.com.au/. This competition involves building a house, with zero net energy use and many unique design features, disassembling it in order to transport it to China, and then re-erecting it to join with all the other entries from around the world for final judging to determine the winning entry. Our house, which involves students from every discipline from all over Faculty, and also from other Faculties such as Creative Arts and Commerce, is now nearly completed. Many suppliers and individuals from outside University have also made major contributions, and we are very grateful for, and impressed by, all the help we have received.
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Our colleagues from TAFE (Technical and Further Education) have also made major contributions, including providing their very comprehensive premises allowing the house to be built indoors, substantially assisting progress. Though this has been a huge effort by all concerned, and meeting all the deadlines can be very difficult, we’re confident of making a very competitive bid in this year’s competition. It’s certainly been a most rewarding, if strenuous, experience for our students, and we wish them all the best for the future as they shortly disassemble the house and then rebuild it in China later this year.

The 2012 MMND and IPCT Workshops

The University of Wollongong’s Centre for Medical Radiation Physics (CMRP) recently played host to world-leading experts discussing the latest developments in the treatment of prostate cancer.

The 2012 Mini-Micro-Dosimetry (MMND) and International Prostate Cancer Treatment (IPCT) workshops are international biannual workshops bringing together multidisciplinary researchers, industrial partners and students. In attendance were experts in radiation physics, radiobiology and radiation detection technology as well as clinicians, radiation oncologists and medical physicists.

Professor Anatoly Rozenfeld, from CMRP, officially opened the two workshops.

The primary aims of the workshops are to consolidate efforts to address development of solid state microdosimetry instrumentation and its applications in medicine and space, and to improve prostate cancer treatments through advanced quality assurance instrumentation and methods.

Since the first MMD IPCT was held in Sydney in 2003, the workshops have become an international forum for the discussion of advanced QA dosimetry instrumentation for radiation therapy and space, and advanced technologies for prostate cancer treatment. The fact that radiation therapy became the most accurate for cancer treatment with the introduction of IMRT, IGRT, RapidArc and SBRT, the demand for sophisticated dosimetry methods and instrumentation for QA is increasing. Continuous growth of charged particle therapy technology and its spread throughout the world during the last decade demands a better understanding of radiation damage of molecules with ions on the DNA level and an application of them for radiobiological planning and space dosimetry, as well as new methods and instrumentation for proton and heavy ion radiotherapy QA.

New challenges were reflected in the modification of the name of the MMD workshop to Mini Micro Nanodosimetry (MMND), adding the theme of nanoparticle science for the improvement of radiation therapy.


![MMND & IPCT 2012](image)

_Pictured at the start of the conference are from left: Dr Claude Le Sech, Associate Professor Reinhard Schulte, Professor Lawrence Pinksy, Professor Anatoly Rozenfeld, Professor Katia Parodi, Professor Paul Lecoq, Professor Ben Tsui and Professor Tom Llewellen_
Postgraduate Engineering Courses for the Rail Industry

Close to 40 people attended the Faculty’s second Rolling Stock Engineering, Rail Industry Alumni/Networking event held at UOW’s Sydney Business School on March 4th 2013. The Rolling Stock Engineering program is now in its eighth year and has produced many graduates who are shaping the future of the rolling stock industry both in Australia and overseas. Dissertation topics have included Mainline Fuel Cell Locomotives: A study of the feasibility of fuel cell technology for the prime mover of mainline locomotives in Australia, A study into the possible response of RailCorp to the Energy Efficiency Opportunities Program, and Implementing High-Speed Rail in Australia: - Vlocity 250, to name just a few.

The alumni/networking event was also an opportunity for the Faculty’s industry course coordinator Associate Professor Richard Dwight to introduce our new postgraduate degree Master of Engineering (Electrical Traction Networks), which will complement the Faculty’s existing online/flexible delivery postgraduate degrees (Graduate Certificate and Master programs) for the rail industry in Rolling Stock Engineering and Engineering Asset Management.

The Faculty’s new Master of Engineering (Electrical Traction Networks) is due to start in Spring Session, (July) 2013. This is a distance/online education program for engineers moving into or working in the specialist area of electrical traction network engineering and will address the critical shortage of traction engineers within Australia. The new degree is the result of a scoping study for a traction engineering course (commissioned under CRC for Rail Innovation Project P4-112) to facilitate the professional development of traction engineers to work in the rail industry. The course development has been funded by the CRC for Rail Innovations and has been developed as a partnership between UOW, CQU, and the industry partners of the CRC, in particular RailCorp, Queensland Rail, and Metro Trains Melbourne.

The Engineering Asset Management program has been servicing the rail industry for more than 10 years. Contracts for in-house delivery to RailCorp and MTR Hong Kong, as well as regular on-campus and online/flexible delivery have ensured that graduate engineers, professionals and their companies operating in the asset management sectors of rail, mining, manufacturing, utilities and other industries have benefited from this program. The latest in-house delivery of the Master of Engineering Asset Management for MTR Corporation in Hong Kong commenced early this year and includes twelve engineering managers from MTR. The course is delivered via distance delivery supported by workshops conducted at MTR Head Quarters in Kowloon Bay Hong Kong. Richard Dwight and Khaled El-Akruti are delivering the first subject, due for completion at the end in early April.

For further information about these and other industry training degrees in Electrical Power Engineering and Continuing Professional Development (CPD) short courses in Energy Efficiency, please contact Rachel Weine, phone: 02 4221 4566, email: rweine@uow.edu.au.
Women in Engineering Summit

Women make up nearly half of the population and less than 10% of engineers. UOW aims to encourage young women with strengths in mathematics and science, with an interest in how things work and a desire to make them better, to consider a career in engineering.

To encourage and inform women about a career in engineering the Faculty of Engineering hosted a four day summit in January for around 60 girls currently in high school. The summit was opened by Vice Chancellor Professor Wellings and by the Member of Cunningham Sharon Bird.

Students attended presentations by Faculty of Engineering academics and female engineers and were given the chance to explore a range of engineering disciplines including environmental, civil, mining, electrical, mechatronics, materials, computer and telecommunications engineering as well as the University’s world-class engineering facilities.

The group also enjoyed field trips to major engineering sites around the region including Bluescope Steel’s Port Kembla Steelworks, Port Kembla harbour where the students visited Railcorp’s rail freight facilities and looked at other developments and the iconic Seacliff Bridge in Wollongong’s northern suburbs.

The girls also visited the Science Centre and Planetarium, and a fun day at the beach.

Special thanks to the chair of the organising committee Dr Laura Banasiak from the School of Civil, Mining and Environmental Engineering, Tim McDonald, Monste Ros, Yenguang (Sunny) Yu, Marina Evans, Ana Heitor, Sandra Crum, Ashleigh Dewar plus many of our HDR and other students who contributed to the event. Also a big thank you to all of the Industry partners that contributed to make the summit a success. For the full article visit: http://media.uow.edu.au/news/UOW396669.html

Australia Day Hospital Bed Run

Each Australia Day, Illawarra Rotoract organises the Hospital Bed Run as a fund-raiser for Wollongong Hospital.

The Bed Run involves competing teams pushing their hospital beds along a 100m street circuit. The team with the lowest time wins, with prizes awarded to placing teams. Teach team consists of four runners and a patient who rides on the bed.

For a number of years, Engineering Teams sponsored by Bob Wheway have competed in the annual event.

This year, two teams competed, UOW F SAE and UOW Mechanical Engineering Society. After a series of timed events UOW F SAE finished second to Thomas & Coffey (one of our High Schools Competitions’ Sponsors), while UOW Mechanical Engineering Society finished third, beating Hatch (another one of our High Schools Competitions’ sponsors).
UOW Engineering Students Visit China

A group of students from the Engineering Faculty and five other faculties from UOW have joined forces with TAFE Illawarra Institute to form ‘Team UOW Australia’. Competing in the Solar Decathlon China 2013, they believe they hold the answer to achieving sustainability in Australia’s housing market.

In a series of firsts, Team UOW is the first Australian team to be selected to take part in a Solar Decathlon. The Team’s ‘Illawarra Flame’ entry demonstrates the idea of transforming a typical Aussie ‘fibro’ house into a sustainable, net zero-energy home – the first team in a Solar Decathlon to ever demonstrate how to retrofit a existing home. The Solar Decathlon is now celebrating 10 years of competition, but it is the first time the event will be held in Asia.

The Solar Decathlon competition, hosted by the Chinese National Energy Administration and U.S. Department of Energy, will take place in August 2013 at Datong, China.

Project Manager and Mechanical Engineering student Lloyd Niccol said: “the ‘Illawarra Flame’ provides an example of how the Australian housing sector can address issues of environmental degradation and growing electricity costs through the application of innovative technologies and creative thinking”.

“Since only 1-2 per cent of Australia’s housing stock is replaced each year, improving the performance of our existing buildings provides the greatest potential for immediate environmental improvement,” he added.

“We are looking into how we can modify our houses with new and existing technologies, such as Photovoltaic Thermal systems and water treatment systems, to provide the housing sector with examples of how we can future-fit our houses for a more environmentally focused future,” Mr Niccol said.

“Our team is truly diverse. We are working with students from various faculties – Engineering, Commerce, Arts, Creative Arts, Science and Informatics; all from various backgrounds, which I think adds another unique element to our team.”

Eleven members of Team UOW recently attended the China International Solar Energy Summit and the SD China 2013 Design Development and Review Workshop in Datong.

At the Solar Energy Summit, the team heard presentations by speakers from across the globe on issues such as expanding solar energy deployment, as well as technology feasibility and economic analysis for solar technology innovation.

“It was exciting to visit the competition site and see where we will build our house next August. There is a tremendous amount of construction going on at the moment, which I think is real evidence of the importance the Chinese Government is placing on this competition. The site where the competition will take place is actually bigger than the Beijing Olympic Park!” Mr Niccol said.

“The design review workshops were valuable as we can now refine our plans and begin construction soon.”

“Visiting Datong really opened our eyes to the enormity of the task ahead. We are excited for the challenges that face us over the coming months and look forward to representing UOW – and Australia – on the world stage.”

Team UOW will begin construction of the Illawarra Flame at the TAFE Illawarra campus in January. The house will then be packed up and shipped to Datong in May. Team UOW will then reassemble the house over a 10-day period, ready to compete against a host of leading university teams from around the world and the arrival of hundreds of thousands of visitors.

To track the progress of the team or find ways you can become involved, head to www.illawarraflame.com.au
Florence Taylor Award for Emeritus Professor Druce Dunne

Last year marked the 16th year of publication of the Welding Research Supplement of the Australasian Welding Journal. For all of this period, the Supplement has been edited by Professor Druce Dunne and, in recognition of this and other contributions to the Australian welding industry, he was presented with the Florence Taylor Award for 2011 by the Welding Technology Institute of Australasia (WTIA) in May 2012.

The Florence Taylor Medal was presented to Professor Dunne by Mr Arun Syam, the President of the WTIA. The award citation acknowledged “…contributions to the advancement and welfare of the Institute as Editor of the Welding Research Supplement of the Australasian Welding Journal, and also notable academic contributions to the advancement of the science and art of welding through research and education”.

The introduction of the Research Supplement in 1997 was an initiative of the CRC for Materials Welding and Joining to establish an Australian journal for publication of peer-reviewed, welding-related research papers of international standard. The publication of the results of welding research generated by the CRC, and other national and international research groups, was designed to satisfy a core aim of the CRC to transfer up-to-date technology to the Australian welding industry. Druce accepted the invitation to edit the Supplement as part of his contribution to the CRC for Materials Welding and Joining and, subsequently, to the CRC for Welded Structures. He played major roles in establishing both of these CRCs and, through his participation, he contributed to welding research, graduate welding programs and technology transfer to Australian industry. These two Centres had a dramatic impact on the quantity and quality of welding research activity in Australia over a 14 year period from 1992. Druce’s individual contributions included setting up and managing the Education Program and research activity that involved supervision and successful completion of 9 PhD and 5 ME projects concerned with materials aspects of the welding of steels.

As well as his editing role, he continues active involvement with the WTIA as the Australian Delegate to the International Institute of Welding (IIW) Commission IX Behaviour of metals subjected to welding. As such, he maintains Australian academic and industrial linkages to this technical working unit of the 56-member country organisation, facilitating technology transfer and research networking.

The award of a Florence Taylor medal is also common to the Australian Institute of Building and the Institute for Materials Engineering Australia. These awards honour the impressive contribution of Florence Taylor to the publication and editing of technical professional and trade journals over nearly five decades from the early 1900s. She was the first woman to qualify and practice as an architect in Australia and her entry into publication of journals in a wide range of building and construction disciplines blended with her objectives to promote improved urban planning and building practices, and better construction methods and materials. One of her early journals, the Australasian Engineer, lives on as a prominent testament to her foresight.

Learning Labs

The Learning Labs were again held in the school holidays for 250 high-achieving students from Years 7-10 from the Illawarra and surrounding areas. The workshops, part of the third series of the ‘Learning Labs’ program, gave students exclusive access to the University’s vast array of experts and materials. The workshops cover a range of academic disciplines such as engineering, law, robotics, creative arts, history, philosophy and sciences.

The Faculty of Engineering ran three innovative workshops, aimed at challenging and stimulating the interests of the students.

Brad Stappenbelt ran a workshop on Sustainable Energy Engineering where the students were able to explore various renewable energy technologies utilising wind, solar thermal, hydropower and ocean energy sources including wave, tidal and marine currents. Working individually and in small teams, the students were able to explore and apply the engineering method, hydrostatic and dynamic stability analysis of floating structures, forces and moments, aerodynamics of aerofoils, wave hydrodynamics, insolation and much more.

The Energy, climate change and your chaotic world workshop was presented by Dr George Takacs from the School of Physics. His workshop applied the fundamentals of physics to address why some systems can behave in a chaotic and unpredictable ways. Is this important, and should you be concerned? How is this related to climate change? The workshop aimed to answer these questions by computer modelling of simple non-linear systems that exhibit chaotic behaviour. Students then explored the importance of energy to human society, and examined some of the physics behind climate change.

The Industrial Robotics Workshop hosted by Nathan Larkin introduced the students to the world of robotics. The students interacted with typical industrial robots, learning how they worked and how to program them to create robot programs to complete fun and practical tasks.
The SIPS Project Visit Albury

In 2012, the Faculty, through the efforts of Bob Wheway and others, attracted $20,000 Social Inclusion Scheme Program (SIPS) funding for the Project “Engagement and Support of Indigenous Rural High School Students to Encourage their Transition from High School to University". The major thrust of the Project is the development of a “travelling technology roadshow”. This roadshow, consisting of five hands-on activities with a F SAE car as a draw card, was successfully trialed at Corrimal and Warrawong High Schools in late 2012. The plan for the first half of 2013 is to visit 10/12 NSW rural centres with the roadshow.

The 2013 Program is being very generously funded jointly by Professor Chris Cook and Professor Paul Chandler.

The five SIPS activities are:

- An introduction to beams
- An introduction to water flow
- Cleaner coal – the separation of coal and shale
- An introduction to gearing and friction – Delta Initiative milkshake-making bike
- The F SAE driver simulator

The first of this year’s SIPS visits was to Albury High School. In a morning and afternoon session, a total of 70 students took part in the activities. A preliminary analysis of the students’ survey forms indicates that the event was an outstanding success.

The next visit is to Maitland Grossmann High School in East Maitland on 26th February while so far invitations have been received from Broken Hill, Kiama, Moruya, Dubbo, Mudgee and Vincentia High Schools. The plan is to visit these schools before their Year 10 students choose their Year 11 subjects in preparation for the High School Certificate.

UOW Discovery Days

More than 5,100 students from 129 high schools visited UOW for the annual Discovery Days held at the beginning of February.

The aim of Discovery Days is to provide an opportunity for Year 12 students to experience, first-hand, what university life is like for a day.

The Faculty of Engineering got involved by giving prospective students a taste of what to expect at UOW. Students attending the Art of Engineering, hosted by CME and MMM, got involved in a Design and Build Competition with the Capture and Transport of Styrofoam Beads activity. As an added incentive, students were awarded prizes for the most amounts of beads transported.

The School of Physics held an interactive session titled “Photonics: putting Light to Work”. The students had the opportunity to learn about photonics – the transmission, storage and processing of information.

The Centre for Medical Radiation Physics were also involved in Discovery Days. Their workshop was to inform potential students about MRP courses and careers from past and present students, and to also hear about current research by the Centre for MRP and its worldwide partners.

The day also gives students an insight into student life including services and facilities on campus, subject selection as well as the experience of attending classes in their areas of interest.
WELCOME TO ENGINEERING
Autumn Orientation – Soar to great heights with Engineering & Physics