



# Engineering Sydney

## Faculty & Alumni Newsletter



### Engineers run away to the Circus



An engineering student with spare time is an almost unfathomable concept. That's why Biomedical Engineering students JinJin Cong and Nadia Redelman from SURCAS (circus society) innovated and later produced "SURC DO SOLEDAY".

SURC DO SOLEDAY is an experiment in production aiming to create an entire circus show from just one day of writing and rehearsal thus allowing students to perform with limited commitment.

The performance had a cast and crew of 28 people, six of whom are engineering students. The final performance was the perfect balance of technical skills with humour that created a well rounded one and a half hour show (story continued p4)

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## Editorial

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## FACULTY

## Acting Dean's Message

January 2009 became a busy and challenging month full of tasks since I assumed the role of Acting Dean on Monday 19th January.



There was much action across all the schools in our faculty, from the selection of new students through the Universities Admission Centre (UAC) to the appointment of academic members.

The 2009 main UAC round of enrolments for first year students took place in the SIT building from Wednesday 28th to Friday 30th January. Thanks to the concerted effort of over 30 staff, enrolment went smoothly and we have now enrolled nearly 600 new students with minimum University Admission Index (UAI) higher than last year's. It is particularly delightful to note the remarkable 5 per cent increase in the number of students with a UAI over 98, and to see that the newly introduced combined degree of BE/BDesArch with the Faculty of Architecture, Design and Planning has been well accepted by students with high UAI.

Our Faculty has been awarded four large Teaching Improvement and Equipment Scheme (TIES) grants for the 2009 round by the University. The recipients and their project titles are, respectively, Dr Doug Auld, CUSP course and unit of study portal for Engineering & IT, Architecture and Health Sciences; Dr James Curran, an online environment for introductory programming; Dr Xiaoke Yi, establishing the first fibre optic teaching laboratory in the Faculty of Engineering & IT for student learning of broadband communications; and Dr Rafael Calvo, writing for engineering disciplines: supporting the development of student writing across curricula. The projects scope from the virtual to physical laboratory environment to the development of professional writing.

The year ahead of us will be busy. Our accredited degree programs are due for re-accreditation by Engineers Australia and Australian Computer Society - the accrediting agencies for engineering degrees and computer science degrees in Australia. We are preparing for the 2009 accreditation for our degree programs and look forward to achieving positive outcomes.

Professor Liyong Tong



## Engineers run away to the Circus (continued)

The rehearsal day was held in the PNR drawing offices kindly borrowed from the Faculty of Engineering. These rooms enabled the show to go on despite bad weather due to their high ceilings which are required for juggling and acrobatics.

The show began with a hearty welcome and warning from the ringmaster. The opening scene was a group of 'gangsta' jugglers who were "too cool for uni" with suave juggling culminating in a solo performance by Tom Allen, Mechatronics Engineering Student, that was both impressive and flawless.

The clowns burst onto stage tumbling in all directions in an attempt to build a human caterpillar. Next, the amazing strongman tossed his assistant in the air in a range of positions. Daredevil and Chemical engineer, Bevan Clouston, performed a devil stick routine with a lot of bounce. The clowns added some laughter in a misguided game of piggy in the middle. A puppet show made of hula hoopers entertained through rag doll antics. More clowns ran amok with silliness and giggles for all. The first half of the show culminated in a highly technical acrobalance routine that was chilling and invigorating.

The second half of the show began with a glow in the dark poi twirling routine where coloured lights streaked through the air in various patterns. The clowns wreaked havoc on stage using hula hoops. The contortionists twisted and bent their bodies in ways that did not seem humanly possible including 2nd year engineer Matt Anderson whose shoulder movements were mind boggling.

The amazing tightrope walkers were next to strut their stuff in a thrilling dance routine. The clowns caused fits of laughter with their slap stick humour. The contact juggler caused illusion beyond imagination. The last clowning scene was a musical number using various pieces of circus equipment to create a song. Ninja staff twirlers fought to all ends before a finale of an all cast human pyramid.

An unsung hero of this show was Biomedical Engineer Kayla Silvester who participated in six separate scenes despite having no prior circus experience. Kayla's inspiring performance shows that the dedication of an engineer is all that is required to succeed in life's endeavours.

The show was a huge success among both participants and audience. A similar structure will be used for next year's performance. We thank the Faculty of Engineering and IT and particularly Kay Fielding for their support during the project.

story by Nadia Redelman

images courtesy of Tweety Bui and Cameron Fong



# The 2008 Sydney Catapult Business Plan Competition

On Friday 17 October 2008 six teams presented their business plans to an experienced and diverse panel of judges. These presentations were given in a board room generously provided by the School of Information Technology in the Faculty of Engineering & IT.

The six finalists and their proposed ventures were:

- \* Oak Carbon: a nanotechnology start-up company specialising in the production of carbon nanotubes (CNTs).
- \* E-Succeed: the delivery of a complete and seamless emulation of a face-to-face tutoring lesson on the internet.
- \* Keevan: an alternative that is cheaper, lighter and simpler than the highly dangerous chain tensioning devices known as "dogs" that are commonly found in the transport industry.
- \* Marathon Robotics: a robotic system for live-fire training of elite military units in urban environments.
- \* Resource Energy Research: a proposal for a "bio-harvest co-generation" project for a two stage plan for a 30MW gas turbine generator and brick production plant close to a gold mine.
- \* Community.communication: a service bureau that addresses the need for effective communication tools in multi-tiered, hierarchical, community based organisations such as Lions, Rotary, Scouts and churches.

Each team presented to the Sydney Catapult panel for ten minutes, followed by a period of questions from the panel. These pitches supplemented a 20 page business plan submitted by the teams in advance of the presentations.

The winners of the inaugural Sydney Catapult Business Plan Competition and the prizes that they received were adjudged as follows:

1st place: Marathon Robotics

- \* \$5,000 cash
- \* Consultation with Lorne Wood-Roe, partner at Adams Pluck.
- \* Identity design by Colman Rasic Carrasco.

Runner-up & Best IBUS Entrant Prize: Resource Energy Research

- \* \$1,000 cash for runner-up & \$1,000 cash for IBUS Prize
- \* Consultation with Lorne Wood-Roe, partner at Adams Pluck.
- \* Identity design by Colman Rasic Carrasco.

Runner-up: Keevan

- \* \$1,000 cash
- \* Consultation with Lorne Wood-Roe, partner at Adams Pluck.

In addition, the NAB is working with some entrants on a micro-enterprise loan to get their business off the ground.

The competition was a great success, with the judging panel highly impressed with the calibre of entrants. The Catapult committee, with the help of the Faculty of Engineering, Economics & Business and corporate sponsors, looks forward to organising a bigger and better event in 2009. For more information please visit

<http://ietg.econ.usyd.edu.au/catapult>



[www.eng.usyd.edu.au](http://www.eng.usyd.edu.au)

## The 2nd Annual Tissue Engineering Network Symposium November 13, 2008

As human life spans creep closer to the centenary mark and beyond, maintaining a high quality of life is one of the biggest challenges for medicine. One way to achieve that is through the regeneration of diseased and damaged tissues and organs.

This complex challenge requires the coordinated efforts of biologists, physicists, chemists, pharmacists, engineers, computer engineers, material scientists, surgeons and physicians.

The Sydney University Tissue Engineering Network Symposium today (Thursday 13 November) will bring together experts in these fields from within Australia as well as overseas.

"The one day symposium will allow scientists to expand their intellectual horizons and build interdisciplinary partnerships," said Dr Hala Zreiqat, head of the Biomaterials and Tissue Engineering Research Laboratory at the University of Sydney.

"Trauma or cancer can cause the loss of bone or cartilage for example. At the moment, we have no drug that will help build that bone and cartilage. We are trying to invent a synthetic, non-biological material that can kick-start the process of the regeneration of that particular tissue," Dr Zreiqat said.

She adds that scientists around the world are racing to regenerate hearts using stems cells. With cardio vascular disease killing one Australian every 10 minutes, and donor hearts in extremely short supply, created heart tissue offers a potential solution.

From left to right: Prof Greg Hancock, Dr Rocky Tuan from National Institute of Health in Bethesda, USA, Dr Hala Zreiqat, Chancellor Marie Bashir, Dr Shulamit Levenberg from Technion, Israel and Dr Lisa Capriotti from Johns Hopkins University, USA



## The 2nd Annual Tissue Engineering Network Symposium November 13, 2008 (continued)

“That research is still in its infancy - no one has yet regenerated a whole organ from stem cells that can be functional for any period of time,” said Dr Zreiqat.

Speakers at the conference include Shulamit Levenberg who was named one of the world’s 50 leading scientists by Scientific American for her work in cutting-edge tissue engineering research. Dr Levenberg is a senior lecturer at the Technion-Israel Institute of Technology in Israel.

Dr Rocky S. Tuan is from the National Institute of Health in Bethesda. He established the USA’s first Cell and Tissue Engineering PhD program at Jefferson, with the mission of training the next generation of “cross-cultural” biomedical scientists committed to regenerative medicine and the development of functional tissue substitutes

Dr Shulamit Levenberg, Dr Rocky Tuan and Dr Hala Zreiqat are available for interview. Please contact the Editor (details page 2) for further details.



## Profile on TIES grant recipient: Dr Rafael Calvo

A grant totalling over \$100,000 from TIES for developing new technologies, systems and training, has been awarded to Senior Lecturer, Dr Rafael Calvo, from the School of Electrical and Information Engineering. The project will develop content for online and face to face delivery, in collaboration with the Learning Centre, and will integrate new tools for peer reviewing and automated feedback. The peer reviewing and feedback tools are based on "Glosser", a software developed by Rafael and his team with the support of an ARC Discovery grant. Part of the TIES grant project is to take Glosser out of the research environment and integrate it into real world scenarios.

The research project will continue with support from the Australian Research Council and in collaboration with Professor Peter Reimann of the Faculty of Education and Kalina Yacef from School of IT. A new ARC Discovery grant of \$270,000 over three years will fund two PhD scholarships for the next three years.

Rafael's impact in engineering education has been recognized by

the Australian Association for Engineering Education (AAEE) who in December 2008 awarded him a citation in recognition of his scholarly work in learning technologies. The award focused on his publications which explore the usefulness of these learning technologies on our students. Rafael acknowledged in his AAEE citation acceptance that his works are in collaboration with the Institute of Teaching and Learning, the Faculty of Education, psychologists, linguists and pedagogical researchers.

All of Rafael's projects are conceptualized around using data mining machine learning techniques to build systems that help people learn. The motto is "developing systems that learn and help people learn". As academics can learn about students from their assessments, computers can also aid in this project, learning about students from the work they submit.

On weekends to relax, Rafael likes to spend time with his family, babies Francisco and Eva and his wife Dorian. He enjoys morning walks (and occasional jogging) with his dog Fuchi.



left to right: Prof Greg Hancock, Dr Rafael Calvo, and Anne Gardner from the Australian Association for Engineering Education



left to right: Dr Rafael Calvo and Anne Gardner

## Interview with TIES grant recipient: Dr Xiaoke Yi

As mentioned in the Acting Dean's report, one of our TIES grant recipients was Dr Xiaoke Yi whose project is on establishing the first fibre optic teaching laboratory in the faculty of Engineering & IT for student learning of broadband communications. Engineering Sydney Newsletter editor, Ariel Riveros, speaks to Dr Yi regarding her project.

Ed: What background work is required to establish the laboratory?

Dr Xiaoke Yi: Australia is currently creating an environment which the Next Generation Broadband becomes a widespread reality, and the University of Sydney is currently developing a strong teaching stream in broadband communications based on fibre optics.

The Engineering Faculty offers several units of study about optical fibre communication devices, systems and networks. Such units of study need to be supported by practical laboratory programs to provide the students with essential hands-on experience of photonic components and systems and to reinforce experimentally the fundamental principles of such systems as taught in the lecture classes. We note that within the electrical engineering field, design, testing and experimental environments are central to engineering practice and are a centre piece of on-going research in the communication industry and universities globally.

By providing the new infrastructure, students will gain immediate exposure to engineering

practice and an appreciation for research in the field. As students can perceive a connection between what they are learning and their personal and professional lives, it will stimulate their interest in academic tasks and motivates them to learn. We form a strong project team to build the first fibre optics laboratory in the Faculty which includes Professor Robert Minasian, Dr. Xiaoke Yi and Associate Professor Javid Atai.

I am very keen to develop innovative materials to support interactive and project based teaching. All team members are aimed to build a unique laboratory that distinctly enhances student learning experience at the Faculty of Engineering & IT.

Ed: What will the laboratory's main functions be?

Dr Xiaoke Yi: The laboratory will be the first fibre optic laboratory in Faculty of Engineering & IT for teaching broadband communications based on fibre optics. The laboratory will be developed with a philosophy of introducing a design-implement teaching approach, a feature of the CDIO (Conceive Design Implement Operate) approach, pioneered by Massachusetts Institute of Technology. The new laboratory will integrate learning across different engineering curriculum. Students will engage in the engineering practice through problem solving and design exercises, individually and in teams.

Although the laboratory will have an emphasis on hands-on experimentation, it will also include components for lectures

demonstrations and tutorials as proposed by myself and Prof. Robert Minasian. The student-centered and design-implement laboratory will strengthen a foundation upon which deeper conceptual understanding of disciplinary knowledge can be built, and which will also help students to achieve a variety of generic educational objectives, such as the ability to function on a multidisciplinary team, to communicate effectively, to design and conduct experiments, to analyze and interpret data, et al.

Ed: What are the foreseen benefits for Faculty and students of this laboratory?

Dr Xiaoke Yi: The new laboratory will support the Faculty to offer experimental projects not only to undergraduate students but also to postgraduates, to produce graduates having high quality technical and generic skills, and to attract talented students via provision experimental projects with real world industry relevance. The infrastructure also presents numerous benefits for our students and their subsequent career. In particular, students' overall expertise (knowledge, practical experience, technical confidence) will become much deeper. Students will be exposed to the linkage between primary issues in various topics of the technologies under consideration. The laboratory to be established will meet the demand of the continuous growth of broadband telecommunications in the Australia and overseas by producing graduates with the experimental experience.



from left to right: Dr Xiaoke Yi, Prof. Robert Minasian and Assoc Prof Javid Atai.

## Obituary: Nancy-Bird Walton (1915-2009)

The Faculty mourns the passing of Nancy-Bird Walton, aged 93. Nancy-Bird was a pioneer in the field of aviation and forwarded the cause of women in aviation.

Nancy-Bird recently won the Engineering Sydney Alumni of the Year 2008 award for her services to aviation and the nation. We honour her life time contribution in the field of aviation, her courage, boundless energy and humility.

She will be deeply missed by family, friends and faculty.



## Obituary: Len Hibbard (1916-2008)

In his work, Hibbard married his training in physics and engineering as he worked on radar and radio in World War II, helped build the world's first high-energy particle accelerator, and built Australia's first atomic clock, which is still working and accurate to a millionth of a second.

Len Hibbard was born in Sydney, the youngest of three sons. He graduated from the University of Sydney with a Bachelor of Science in 1937 with first class honours and the University Medal in mathematics; and then in 1939 graduated with a Bachelor of Engineering, with first class honours and the University Medal in mechanical and electrical engineering.

Hibbard then lectured at the university in communications engineering and worked with the CSIR (now CSIRO) fitting and refining radar and

## Did you know?

We have initiated a section called "Reconnecting Sydney". If you wish to contact a past classmate we can place a small ad with your request.

If your request is reciprocated, the Editor of this newsletter will facilitate contact between the parties.

If you are interested in making contact with an old classmate, please contact the Editor on [ariveros@usyd.edu.au](mailto:ariveros@usyd.edu.au) submitting a brief biography of your post-university activities. and the details of what years you attended the Faculty.

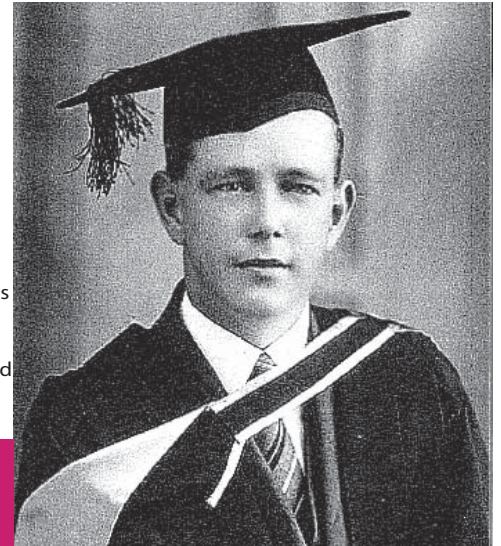
radio equipment to cargo ships, which ultimately led to the scuttling of the marauding German battleship Admiral Graf Spee in the Battle of the River Plate.

After the war Hibbard fell in love and married Joan Single in England. He then continued studies in a PhD at Birmingham graduating with Mark (later Sir Mark) Oliphant, whose radar work during the war helped to defeat the German U-boats. Hibbard stayed on to work with Oliphant, building the first proton synchrotron high energy particle accelerator.

With the Hibbards returning to Australia, Len set to work with Oliphant on the design and construction of the world's largest homopolar generator in Canberra. After many difficulties, the generator was completed and Hibbard was then recruited by the CSIRO's national standards laboratory where, among other projects, he built the atomic clock.

Len's interests apart from engineering and physics were world affairs and human rights. Len was an avid supporter of Amnesty International, Mediciens Sans Frontieres and the Fred Hollows Foundations.

Len Hibbard is survived by his daughters, Nicola and Wendy, his son Paul's partner, Colleen, and his grandchildren Ruben and Lennard. Joan died in 1994 and Paul in 1998.



## In Memoriam: Jamie Stephen Wood 10/08/79 - 09/01/08

Jamie Wood was a student in the Bachelor of Engineering (Aero – honours) between 1998 -2001. Jamie dealt with depression for 12 years. As well, he loved to play cricket and football.

After graduating, Jamie first dedicated himself by working for a medical operating imaging company- Brainlab. This technology had Jamie on the front line within Australian hospitals. Then followed civil engineering work at Heggies. He enjoyed the challenges of the F7 Sydney motorway with his workmates.

Jamie's aeronautical ambitions came to fruition with the Amce group working from the RAAF base at Richmond. Then more success came when Jamie was snapped up by the Australian based Nova company.

Jamie's sisters Leah (BComm BA) and Tanya (BLArch) farewelled Jamie with a truly outstanding requiem mass ministered by Father Chris Riley at St. Patrick's Sutherland, where Jamie was dux. Jamie's coffin was covered with 500 white roses from his mother and his NRL Sharks cap and Army Reserve hat placed by his dad.

Jamie's ashes were laid to rest at the Woronora- Henry Lawson gardens and also flown over Jervis Bay, 1,000 feet off HMAS Creswell.



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