The Faculty of Engineering and
Information Technologies magazine

OCTOBER 2013
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Information Technologies magazine

FROM LITTLE
THINGS BIG
THINGS GROW
CELEBRATING 130 YEARS OF
ENGINEERING EXCELLENCE
DEVELOPING FUTURE LEADERS

The University of Sydney
OPENING JANUARY 2014, APPLY NOW

Not all colleges are the same. Sancta Sophia College is a peaceful haven on the edge of the University of Sydney campus.

We know that postgraduates need an environment that is conducive to scholarly achievement, one that provides flexibility around their busy schedules. So in January 2014, we will open the first bespoke postgraduate building featuring a stylish, contemporary design, all ensuite rooms and common facilities that encourage social interaction and community.

Be one of the first to experience purpose-built residential living for postgraduate women and men on the campus at University of Sydney.

Postgraduate living at Sancta Sophia College is much more than just accommodation...

With 128 ensuite rooms featuring mini fridges and microwaves, the pursuit of academic excellence can remain your primary focus. Meal plans are flexible to suit your own preferences, from fully catered to minimal.

When the time comes for social interaction, the common areas and the rooftop terrace are the perfect place for a casual catch up.

As part of the Sancta Sophia College community, which has 160 undergraduate women and is currently home to a strong postgrad med cohort, you will be able to experience the cultural, spiritual, sporting and recreational activities that form the pulse of the College.

With easy access to Sydney University campus, buses to UTS, Notre Dame, ACU, the city and main train lines, Sancta Sophia College will be home to a vibrant postgraduate community from across Sydney, Australia and the world.

For more information see www.sanctasophiacollege.edu.au

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Cover photo by Maja Baska.
Associate Professor Fariba Dehghani

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IGNITE October 2013 3
Welcome to the inaugural edition of Ignite, a new magazine for alumni and friends of the Faculty of Engineering and Information Technologies. We hope you enjoy Ignite, and we welcome your input into future editions. Whether you graduated 50 years ago or earlier this year, we hope you take pride in your affiliation with the University, and in particular with the wonderful achievements our alumni continue to make in the fields of engineering, project management and IT.

This has been an outstanding year for the faculty, particularly as we celebrate 130 years of excellence in engineering education at the University of Sydney. We have achieved significant milestones in a number of areas this year, including record student enrolments, global excellence in research rankings and partnerships with industry on groundbreaking projects. For the first time we also exceeded $60 million in industry, research and philanthropic support.

In August we launched the most significant undergraduate leadership scholarship program in Australia. Partnering with us on this program are Laing O’Rourke, SMEC, AAPT and Thomas Technologies. We hope you enjoy Ignite.

Where Are They Now?

Sir David Higgins (BE (CIVIL) ’77)

From Farm To Knighthood

Sir David Higgins grew up on a north Queensland farm before following his brother to study in Sydney. In 1977, he graduated from the University with a Bachelor of Engineering (Civil). The beginnings of his career path saw him gem prospecting in Kenya before joining Australia’s Lend Lease Corporation in 1985. David was at the helm of Lend Lease when it oversaw construction for the Sydney 2000 Olympics.

After the Sydney games, Higgins settled in Britain working for British construction company McAlpine. Then, in 2006, as chief executive of the Olympic Delivery Authority, he headed the biggest construction project in Europe, the 2012 Olympic Park in London - a project that transformed East London and for which he received a knighthood.

In April 2010, he joined Network Rail as a non-executive director and has been chief executive since February 2011. Sir David now also acts as an advisory board member for the University’s newly established John Grill Centre for Project Leadership.

In recognition of his achievements on the world stage, the faculty honoured Sir David with the 2011 Alumnus of the Year award and invited him to speak at a Dean’s International Lecture Series event.

You can watch Sir David’s lecture ‘Innovation as a catalyst for growth’

Satveer Singh (BE (MECHATRONICS)(SPACE) 2013)

Flying High After Graduation

Recent graduate Satveer Singh realised early on in high school that a career in engineering was for him. A keen problem-solver and high achiever in mathematics, he settled on a Bachelor of Engineering (Mechatronic)(Space).

During a summer internship at Qantas, he encountered other University of Sydney students working there as part of the Major Industrial Placement Project Scholarship (MIPPS) program. Keen to complete a thesis and undertake further industry experience provided in the MIPPS program, Satveer applied for another placement with Qantas.

With a successful application, Satveer undertook a project in the Performance Engineering department based in Mascot. This placement helped Satveer develop project management skills and gave him valuable experience in teamwork and collaboration. After graduation, Satveer applied for a position at Qantas and is now working for them as an Aircraft Performance Analyst.

If you would like to have one of our students working on a research project, contact Keiran Passmore about our MIPPS program at keiran.passmore@sydney.edu.au

Professor Archie Johnston

VIEW THE DEAN’S PROFILE
In March 1883, 10 students squeezed into lecturer WH Warren’s small teaching room in the ‘main building’ of the University for its first engineering class. Now, 130 years later, the University’s involvement in engineering education has extended beyond teaching and research to include collaborating with industry leaders and producing, supporting and inspiring the global engineering leaders of the future.

Many of our alumni have gone on to become world leaders in their field. Among them are Sir David Higgins, chief executive of the UK’s Network Rail and leader of the biggest construction project in Europe, the 2012 Olympic Park in London.

Others have come full circle, returning in some form or another to the institution that launched their career to contribute to further developing the field of engineering. Civil alumnus John Grill is one of them. The current chairman and former chief executive of international resources company WorleyParsons, who has led several of the world’s largest mining and infrastructure projects, recently made a record donation to the University that resulted in the establishment of the John Grill Centre for Project Leadership, which is expected to become a world leader in its field.

Mechatronic and Aerospace alumnus Professor Salah Sukkarieh is another. He joined the University as an undergraduate student in the 1990s and is now a Professor of Robotics and Intelligent Systems, leading cutting-edge research at the internationally recognised Australian Centre for Field Robotics.

Ever since those early days the University’s engineering community has been attracting industry leaders as well as producing them. Currently these include Associate Professor Hala Zreiqat, a world leader in developing biomaterials and scaffolding for skeletal tissue engineering; Associate Professor James Curran, whose work in computational linguistics has seen him named as one of Sydney’s 100 most influential people; and Dr Greg Chamitoff, a NASA astronaut who brings the unique ability to share with students “on the job” insights that few people on the planet have experienced.

Today, we continue to provide an environment for students where anything is possible. Current PhD candidate Kate McDonell is working with carbon nanotubes, with one potential application being the development of an elevator to take people into space. She sums up perfectly the spirit of engineering education, research and scholarship at the University of Sydney: “It’s about [designing] things that don’t exist yet.”

If you would like to support us to continue achieving excellence in engineering, please contact Carson Walburn, Director of Development, at carson.walburn@sydney.edu.au.
DEVELOPING FUTURE LEADERS

Building on our successful Advanced Engineering program, the faculty has launched a first-of-its-kind engineering leadership scholarship that will provide intensive development, industry mentoring and practical professional experience to the next generation of engineering leaders.

Recipients of the new scholarship will develop their skills through professional experience placements with some of Australia’s leading engineering firms, immersion in the cutting-edge environment of the newly established John Grill Centre for Project Leadership, and time spent working at the Warren Centre for Advanced Engineering and Innovation with leading design researcher and Chair in Engineering Innovation Professor Andy Dong.

They will receive an annual stipend of $18,000 throughout their four-year degree, be assigned an industry mentor and participate in regular networking events with alumni, government and industry leaders.

The University has partnered with a number of companies, including global engineering firm Laing O’Rourke, SMEC Australia, Thomas Electronics of Australia and AAPT, to make the innovative new scholarship possible.

“The Engineering Leadership Scholarship is one of the most valuable undergraduate engineering scholarships offered in Australia in terms of financial support and leadership development,” says faculty Dean Professor Archie Johnston.

Laing O’Rourke’s Australia Hub Chief Executive David Stewart adds: “The students will not only gain the relevant academic experience, but they will also spend time working with us in the field, allowing them to graduate with a much more developed sense of what leadership and engineering practice mean in today’s work environment.”

BECOME A PROGRAM Partner TODAY

Would you like to play a vital role in our students’ future success and have the opportunity to recruit from a handpicked pool of highly talented graduates?

Contact Carson Walburn, Director of Development at carson.walburn@sydney.edu.au

Faculty Appointments

DR GREG CHAMITOFF
No stranger to the faculty, NASA astronaut Dr Greg Chamitoff has accepted the position of Lawrence Hargrave Professor of Aeronautical Engineering. Dr Chamitoff holds a PhD in Aeronautics and Astronautics from MIT in the US.

PROFESSOR JOE DONG
Power Engineering specialist Professor Zhao Yang (Joe) Dong joins the faculty as Head of the School of Electrical and Information Engineering. Professor Dong completed his PhD at Sydney and has since built up a strong track record in research and industry linkages, including being awarded 11 ARC grants, 10 EPRI USA grants and many other defence and industry grants for his work in power engineering. He joins us from the University of Newcastle, where he held the Ausgrid Chair of Intelligent Electricity Networks.

PROFESSOR JOHN LITTLE
Joining the School of Civil Engineering as Professor of Water Resources Engineering is Professor John Little, who will provide leadership to enhance our teaching and research in sustainable and environmental engineering. Professor Little holds a PhD in Civil and Environmental Engineering from the University of California, Berkeley, in the US.

KRISTY WHITE
Kristy joins the faculty as Alumni Relations Manager, and will focus on enhancing our alumni program and facilitating strategic engagement opportunities for the faculty and its extensive alumni community. She comes to us from Macquarie University, where she also managed alumni relations.
Known as BlueClover, the innovative new app will replace existing limited electronic solutions as well as the tedious logbook procedures otherwise required to manually record daily intake of food and drink.

“At the moment,” explains Andrew, “diabetes patients are required to manually record and calculate their levels. Our app includes a logbook function that electronically records essential information needed for the management of the disorder, such as blood glucose levels, amount of carbohydrates consumed at meals, and insulin levels.”

BlueClover has also been designed with additional functionality – including object recognition and barcode scanning – to allow automated input of nutrient information to the user’s electronic logbook.

“Instead of having to manually enter the information of the foods they eat,” says Andrew, “users can scan the barcodes of the products they consume.”

The app has already received significant recognition, having recently won the Microsoft Asian Cup and been showcased at the annual Board of Governors of the Asian Development Bank Forum in India. The forum is a major event where policymakers, industry leaders and non-government organisations discuss solutions to economic and development issues facing the region.

Plans are now underway to commercialise the app.
Chemical engineer Associate Professor Fariba Dehghani is achieving astonishing results in two very different areas of research using nanotechnology.

Based in the School of Chemical and Biomolecular Engineering, Associate Professor Dehghani’s research focuses on the processing of biomaterials, with particular emphasis on applications in tissue engineering and regenerative medicine.

The first project was initiated when she was approached by food manufacturer Agricure to help develop dietary supplements to improve the bone density of racehorses and poultry. Working with her colleague Dr John Kavanagh and a team of PhD students, she developed a cost-effective process for the production and extraction of super-vitamin MK-7, a naturally occurring compound that helps to reduce the risk of a number of common ailments including arterial calcification, cardiovascular disease and varicose veins.

While MK-7 is found in rich concentrations in natto, a Japanese food made from fermented soybeans, Associate Professor Dehghani and her team have developed a simple process of producing and recovering the compound in concentrations eight times higher than those found naturally in natto.

“The aim of this project is to minimise reliance on fossil fuels, and to address the current problems with commercial production of sustainable bioplastics – not just in Australia, but globally,” she explains.

“The clean technologies we develop will make it possible to produce environmentally friendly plastics using waste CO2 for food packaging and biomedical applications. Converting captured CO2 into products such as chemicals, plastics or other commodities is pivotal in our attempts to reduce the need for volatile organic compounds.”

The project is being jointly funded by the Australian Research Council and ASX-listed bioplastics company Cardia Bioplastics, manufacturer of the world’s first carbon dioxide and starch–based carrier bag, and is expected to have enormous benefits to both the environment and human health.

In terms of the environment the project could have an international impact, by assisting in the reduction of carbon emissions in countries where geologic storage of CO2 is not possible.

On the human health front, Associate Professor Dehghani says the resulting polymers could be used as alternatives for a range of biomedical applications including musculoskeletal tissue engineering and drug delivery, and in the treatment of bone diseases such as osteoporosis.

“The result is an efficient and cost-effective means of producing super-high concentrations of this health-enhancing compound, which will ultimately have applications beyond the originally intended beneficiaries of racehorses and poultry to benefit human health.

The second project aims to transform the biodegradable plastics industry by developing cleaner, greener, more cost-effective technology for the synthesis of polypropylene carbonate (PPC) polymers. Associate Professor Dehghani and her team are working on a process for creating carbon dioxide–based PPC polymers, which will be completely biodegradable and renewable and will have a wide range of applications from fully recyclable plastic shopping bags to restorative implants in the human body.

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“The aim of this project is to minimise reliance on fossil fuels, and to address the current problems with commercial production of sustainable bioplastics – not just in Australia, but globally,” she explains.
The faculty is proud to welcome internationally experienced project leader Marc Vogts as the inaugural executive director of the John Grill Centre for Project Leadership.
British-Australian businessman and University of Sydney alumnus Michael Hintze has been honoured with a knighthood in the 2013 Queen’s Birthday Honours. Sir Michael, a prominent financier, has also been appointed a Member of the Order of Australia for his philanthropic work, which includes his long-term support of the University.

He recently pledged $1 million to launch a flagship research and development incubator with the Charles Perkins Centre, and previously made contributions that allowed the establishment of the Centre for International Security Studies and the Michael Hintze Chair in International Security.

...
The program helped establish eight innovative start-up businesses over the 2012–2013 summer, with one receiving more than $1 million in funding. INCUBATE co-founder, program manager and School of Information Technologies alumnus James Alexander explains: “We started INCUBATE last year to encourage young people to be innovative in starting up new businesses, and to support them in developing their ideas and business strategies.” He expects start-up projects to generate even more funding in the future.

Current projects include vertical gardens, a career transition app and an online social network for beauty products that already has 8000 users.

“We select the top entrepreneurs from across campus,” says James. “We have talented students, alumni and researchers with backgrounds in engineering, science, arts and law. I’m excited to see how their start-ups develop.”

The start-ups receive free co-working space on campus at INCUBATE’s Startup Hub, as well as a share of $40,000 in equity-free funding to build and develop their business idea for presentation to potential investors. They also receive mentoring from industry experts, including Michelle Deaker, Managing Partner at venture capital firm OneVentures. “As a mentor for INCUBATE I was impressed by the achievements of the first cohort, with all going on to launch their businesses and several receiving first funding or trial partners,” she says.

MORE INFORMATION
Interested in learning more or mentoring a budding entrepreneur?

www.incubate.org.au
NEW SCHOLARSHIP FOR WOMEN IN ENGINEERING

The late Margaret Hamer, who passed away only last year, was the University of Sydney’s first female engineering graduate. A scholarship has now been established in her name to encourage female students with a strong academic record to follow her lead and pursue further studies in engineering.

Recipients of the Margaret Hamer Scholarship for Women in Engineering will be treading in the footsteps of a pioneering woman who embodied the inclusive spirit of the University, which in the 1880s was one of the first universities in the world to admit women on an equal basis with men.

Margaret graduated as an aeronautical engineer in 1948, a trailblazer in the discipline among Australian women. Before her degree was conferred she worked for six months for a Commonwealth research organisation, testing structural materials for aircraft construction.

After graduating, Margaret maintained a strong sense of affiliation with and support for the University. She believed that our female engineering graduates have the ability to lead and shape the future. Just as she did, they have made significant contributions to major projects around the world, creating new systems, structures and products that continue to support communities worldwide.

If you would like to support this scholarship, please contact Steve Knox, Executive Manager, Alumni and Development at steve.knox@sydney.edu.au

By the year 2050, Australian homes and businesses could be powered by up to 20 different energy sources. The University is leading a new multimillion-dollar project to prepare the electricity sector for this massive transformation.

The University has joined forces with the CSIRO and the universities of New South Wales, Newcastle and Queensland in the $13 million Future Grid project to plan and design the most efficient low-emission electricity grid possible for Australia.

Professor Tony Vassallo, leader of the program and Delta Electricity Chair in Sustainable Energy at the School of Chemical and Biomolecular Engineering, outlines the nature of the collaboration: “Each university will contribute specialist knowledge and expertise, and will work with the CSIRO to develop a new suite of tools to understand, develop and optimise energy grids of the future. This will assist decision makers in their choices about future grid development.”

CSIRO Energy Group Executive Dr Tom Hatton adds that the project will prepare the electricity sector for a transformation of a scale not seen since the industrial revolution: “We are facing unprecedented change in the electricity system over the next 20 to 30 years. We’re talking about change to a system that has seen stability for decades, and has used technologies and energy sources that are predictable and controllable. Moving away from that is going to require a great deal of effort and capacity building.”

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“I believe that our new research centre and work closely with industry to map teaching and research programs that will meet the future needs of the electricity supply. “The world will need more power engineers to design and deliver the next generation of electricity,” he says. “It’s an exciting time to work in the sector, as it is changing so rapidly.”

Faculty Dean Professor Archie Johnston says the appointment of Professor Dong will further strengthen the University’s position in electrical engineering, in which it is already ranked number one in NSW.

MORE INFORMATION
www.futuregrid.org.au

PLUGGING INTO THE FUTURE OF POWER

BRIGHT SPARK JOINS THE TEAM

Power engineering specialist Professor Zhao Yang (Joe) Dong (pictured above) has been appointed head of the School of Electrical and Information Engineering. Professor Dong will develop a new research centre and work closely with industry to map teaching and research programs that will meet the future needs of the electricity supply.

“IT’S AN EXCITING TIME TO WORK IN THE SECTOR, AS IT IS CHANGING SO RAPIDLY.”

Faculty Dean Professor Archie Johnston says the appointment of Professor Dong will further strengthen the University’s position in electrical engineering, in which it is already ranked number one in NSW.
The initial goal of the engineering precinct redevelopment was to transform not just our physical environment but also the way we conduct research, collaborate with industry and government, teach and interact with the community. It aims to provide a dynamic and stimulating physical and technological environment where educators, researchers, industry partners and government can work together on developing solutions that will shape our future, both nationally and globally.

The recent refurbishment of the Peter Nicol Russell Building has even been winning accolades, including Best Application of AV in Education at the 2012 Audio Visual Industry Awards, which recognises an application of audiovisual technology that pushes the boundaries of innovation in an educational environment.

Over the past two-and-a-half years the faculty has invested more than $25 million in the ongoing refurbishment of key state-of-the-art teaching spaces, including those for electrical engineering and project management.

Designed as a formal teaching space, the studio is integrated with state-of-the-art ‘pod’ technology to encourage collaboration and knowledge creation between teaching staff and students.

Over the next 18 months the faculty will continue its refurbishment work as part of a detailed 10-year master plan that focuses on creating appropriate spaces for projected growth in research activities, particularly in the areas of biomedical engineering, clean energy and complex systems.

The redevelopment will also include the continued outfitting of teaching labs and lecture spaces with the technology to support the very latest contemporary pedagogical approaches.

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1. The PNR Building Learning Studio
2. Student centric learning spaces
3. Lab 265 is equipped with the latest electronics test equipment
UPCOMING EVENTS IN 2013 / 2014

TUESDAY 29 OCTOBER
Sydney China Business Forum
The theme of this year’s one-day forum is sustainability, with a particular focus on energy, transport, agribusiness and water.
Contact susan.saretzki@sydney.edu.au

FRIDAY 1 NOVEMBER
Research Conversazione
This is the faculty’s annual research showcase, highlighting our students’ innovative applied research addressing current and future global challenges.
Contact keiran.passmore@sydney.edu.au or visit sydney.edu.au/engineering/engineeringsydney/conversazione

SAVE THE DATE
TUESDAY 5 NOVEMBER
End-of-year function for School of IT, USITAA and SUITS
This evening event is an opportunity for students, staff and alumni to network and revisit the school’s highlights and achievements of 2013.
Contact sit.alumni@sydney.edu.au

THURSDAY 7 NOVEMBER
Alumni Awards Reception
This cocktail reception hosted by the Dean recognises and celebrates the recipients of this year’s Alumni Awards.
Contact kristy.white@sydney.edu.au

SAVE THE DATE
JULY / AUGUST 2014
Short course: Chemical and Bimolecular Engineering Professional Development
This 2.5 day course focuses on technical incident investigation and organisational analysis of industrial safety management.
Contact skender.bregu@sydney.edu.au or visit sydney.edu.au/engineering/chemical/events/safety-management

STAY CONNECTED

There are many ways to stay connected to the University of Sydney, the Faculty of Engineering and Information Technologies and your fellow alumni.

VOLUNTEER
sydney.edu.au/alumni/programs-benefits/volunteer

SUPPORT US
sydney.edu.au/alumni_donors/

Update your contact details so you’ll always be kept informed:
sydney.edu.au/alumni_donors/

CONTACT US
If you’d like to provide feedback or offer suggestions for a future story, please contact:
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sydney.edu.au/engineering

Stay up to date:
@Eng_IT_Sydney
Sydney Port Botany Terminal 3, New South Wales

Hutchison Port Holdings awarded Laing O’Rourke the civil and rail infrastructure works contract for a new container terminal at Sydney’s Port Botany.

Laing O’Rourke is an A$8 billion global construction company dedicated to engineering excellence and to challenging and changing the face of construction worldwide. With operations in Australia for more than 50 years, the organisation delivers some of the nation’s largest and most complex building, oil and gas, railway, materials handling, marine and civil infrastructure projects and a range of support services to clients in the resources, transport, defence, health, commercial and industrial sectors.

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