3D BREAKTHROUGH FOR SKULL INJURIES

REDUCING INFANT MORTALITY

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Cover: Jeremy Kwarcinski in the lab creating a bone replacement template on a 3D printer
DEAN’S MESSAGE

There is little doubt that our graduates are one of our greatest assets. It is extremely pleasing to see their continued success on the global stage as inventors, innovators and business leaders.

The faculty’s outstanding global rankings for teaching and research are indicators of excellence – and are relatively easy to quantify. But the extensive success of our alumni is more difficult to measure as it is constantly evolving.

Throughout the pages of this issue of IGNITE you will read about the amazing achievements of our alumni from young PhD students to senior executives in companies across Asia and the Americas.

Over the past six months we’ve made a significant effort to engage more with our alumni, create opportunities to engage with us and possibly do business with each other. This engagement provides us with the opportunity to share, first hand, the leading edge research and amazing student projects conducted on campus.

One standout project includes the 3D printing of tailored skull implants. Young Jeremy Kwarcinski was a major part of this project when studying his undergraduate degree. Realising the significance of his work, he decided to undertake a PhD. It’s this sort of commitment and passion that is driving our younger researchers and inspiring high school students to become technical innovators.

On a final note, thank you to our alumni community for the positive feedback on IGNITE and our communications in general. To bring you more current and interactive stories, and reach our international alumni, we will be going digital later in the year.

We look forward to sharing the world-changing stories of our young students and your fellow alumni as well as showcasing what’s happening within the faculty on the domestic and international stages.

Professor Archie Johnston

CAMPUS IMPROVEMENT PROGRAM

The University of Sydney’s Campus Improvement Program Stage 1 proposal was approved in February by the NSW Government. The proposal will now become the official framework for planning, designing and building new infrastructure on the Camperdown-Darlington campus.

“Our vision is to create a vibrant and engaging campus that meets the recreational, cultural, research and educational needs of those who work and study here, and for those who live in the surrounding communities,” says Vice-Chancellor, Dr Michael Spence.

Part of this project involves the multimillion-dollar revitalisation of the Engineering and IT precinct, including new multidisciplinary learning and research spaces that reflect our culture of innovation and scholarship.

“This precinct revitalisation will transform not only our physical environment, but also improve our ability to collaborate and engage with students, researchers, industry, alumni and the broader community,” says the Dean, Professor Archie Johnston.

Overall, six campus precincts will be transformed, adding capacity for an additional 10,000 students and creating almost 1,500 construction and 400 administrative jobs that will help stimulate the local economy. It will also provide additional affordable student accommodation and improved transport and traffic management across campus.

WE ARE LISTENING

You’ve told us you want less printed and more digital communications. So, we are making changes in the way we communicate with you.

To ensure you receive future digital communications from the faculty please update your contact details:

Alumni
sydney.edu.au/alumni/contact-us/

Faculty partners and friends
sydney.edu.au/engineering/industry
Participants at the aptly named Silicon Valley Connections event explored new trends in technology innovation and entrepreneurship. They discussed how to foster greater collaboration in this area between Australia and the US, and showcased some of our world-leading student and alumni start-ups.

Hosted by Professor Andy Dong, the Warren Centre for Advanced Engineering’s Chair of Engineering Innovation, the event connected some of our top entrepreneurial students with alumni who are leading technology-based ventures in the United States.

Participants included Jeffrey Bleich, former special counsel to President Obama and former US ambassador to Australia; alumnus Dr Craig Barratt, Google Senior Vice-President (Access and Energy), alumnus Mick Johnson, Director of Product Management, Search and Language at Facebook; and senior representatives of Austrade and NSW Trade and Investment.

During the event, outstanding student-led start-ups pitched their innovative business ideas to attendees. One such start-up, Tzukuri, has developed ‘the world’s first unloseable sunglasses’. Co-founder and product architect Allen Liao, who is studying a Bachelor of Electrical Engineering and Bachelor of Commerce degree, explained: “Tzukuri sunglasses are almost impossible to lose, thanks to the combination of Apple’s iBeacon technology and the world’s smallest solar panel that allows the glasses to be tracked via an iPhone app. Tzukuri uses Bluetooth low energy, a new technology that draws very little power. This means the solar cells can keep it charged and using the app won’t drain your iPhone’s battery.”

Co-founder Michael Sutton, a Bachelor of Arts and Bachelor of Commerce student, says the University’s support for their initiative through events such as this and the Sydney Accelerator Network will help them move their fledging wearable tech business to the next level.

Feedback on all of the student pitches was extremely positive, with a guest noting that one of the pitches was “the highest-quality pitch I have ever seen.”

Event host and head of the faculty’s new Invention Studio, Professor Dong, noted that “there’s a real culture of innovation and entrepreneurship growing amongst our student community.” This was clearly demonstrated at the Silicon Valley event and through the high number of students utilising the Invention Studio to turn their ideas into reality.

Find out how you can support our entrepreneurial students through the Sydney Accelerator Network sydney.edu.au/engineering/it/innovation-hub
ALI FATHI
MPE (CHEM & BIOMOL) (2011)
The outcome of Ali Fathi’s PhD project was a novel class of injectable biomaterials whose applications include cartilage regeneration and biomedical implants. Initial entrepreneurship training through the University’s Incubate program prompted Ali to generate a business plan and form a venture to commercialise the invention. More intensive business training followed through the NSW government-sponsored Medical Device Commercialisation Training Program. Already the holder of multiple national and international patents for the invention, Ali is in the process of gaining an exclusive licence for its production, use and marketing so he can gain seed funding for further work.

DENIS MARS
BE (MECH) (HONS) (2002)
On graduating from Sydney in 2002, Denis promised himself he would not get a job; instead he would start his own company, find problems to solve and learn from the experience. More than a decade later he has remained true to his word, having established numerous start-ups to tackle problems from reverse-engineering overseas vehicle standards to monetising online embedded videos and developing a video conferencing tool that enables multiparty HD video meetings within a standard web browser. Denis now lives in San Francisco, where he advises and invests in other start-ups – and is about to start another one of his own.

STEPHEN MERITY
BIT (HONS) (2012)
The University of Sydney was vital to Stephen Merity’s early introduction to computer science. While still at high school he attended the University’s National Computer Science School course in programming, going on to gain a Bachelor of Information Technology with first-class Honours and the University Medal. After graduating he worked with a number of Australian start-ups, including Freelancer and Grok Learning, before being awarded a Fellowship from the American Australian Association to complete a Master of Science in Computational Science & Engineering at Harvard. Stephen is now the lead data scientist for Common Crawl, a non-profit organisation that democratises access to web information. He returns to Sydney every summer to tutor at the National Computer Science School.

JOY BISSELL
Joy is currently working to transform health care through decentralised testing with advanced nano-biosensors at US start-up Nanomix. In a role that includes leading business development and marketing as well as some product development, a major achievement has been taking a technology from infancy to use with real patients to address critical gaps in health care today. Joy’s previous roles have included leading business development at ANSTO, working on medical devices with consulting firm Brandwood Biomedical, and completing internships at Resmed and China Lighting & Power.

DR CRAIG BARRATT
Currently based in Silicon Valley in the US, Craig Barratt joined Google in 2013 and now serves as its Senior Vice-President, Access and Energy, leading a wide range of projects bringing innovation to internet access and energy around the world. Previous roles have included president of Qualcomm Atheros, and director, president and CEO of Atheros. Craig holds 34 US patents in a variety of wireless and medical technologies, and has co-authored a book (Linear controller design: limits of performance), various technical publications and open-source software.

JAMES ALEXANDER
BCST (HONS) (2013)
A passion for helping like-minded innovative and entrepreneurial students to succeed saw James co-found award-winning start-up accelerator Incubate at the University of Sydney on completing his computer science degree with Honours. Incubate brings together students, researchers and alumni with experienced entrepreneurs, mentors and potential investors to provide funding, guidance, mentorship and working space to help launch high-potential start-ups with a focus on technological innovation. As program manager, James says, “I strongly believe in thinking about technology as the enabler for creative and innovative solutions to the world’s largest problems. I’m passionate about tech innovation and making sure smart people do good things that could have a big impact on society.” James has also worked with companies including Deloitte, Atlassian, Posse and Freelancer.
A team of our biomedical engineers has developed a game-changing method of treating severe skull injuries by creating patient-specific bone replacement implants using a 3D printer.
The breakthrough technique will have profound implications for both surgeons and patients, with its faster and cheaper production process, far greater customisation potential and improved patient outcomes.

Project supervisor Dr Philip Boughton, head of the faculty’s cutting-edge Implant Design and Manufacture laboratory, explains: “The current procedure requires a surgeon to stretch and stitch excess skin around the wound and wait until a suitable implant can be produced.” Currently, implants can take weeks to produce, cost thousands of dollars and be difficult for surgeons to modify to suit the individual patient.

The new process uses a CT scanner to create images of the individual patient’s skull, from which a 3D printer produces a model. From this, a mould is created and a tailored implant cast – all within days. The entire process is faster and cheaper and allows far greater customisation than previous methods.

Dr Boughton and his team worked with Liverpool Hospital’s lead neurosurgeon Dr James Van Gelder, who says: “I was particularly interested in working with biomedical engineers to create implants that could be customised based on radiology and my specific requirements for the patient. Anatomical matching of the patient’s skull bone is important for improving a patient’s quality of life post-operation.”

Dr Boughton agrees that the collaboration was worthwhile: “It’s been really exciting to work on this project with students and clinicians, and to see not just concepts develop but those concepts actually develop into ways that have an immediate clinical result for patients.”

Team member and PhD candidate Jeremy Kwarcinski adds: “As a student it is very, very exciting to work on such a project, which actually has a real impact and where you’re interacting not only with leading researchers and clinicians, but also with real patients to actually provide a tangible benefit.”

The pioneering technique has already been successfully used on several patients, and is set to benefit many more the world over.

REDUCING INFANT MORTALITY

Electrical engineer Dr Alistair McEwan is being backed by the Bill and Melinda Gates Foundation to develop a device with the potential to save the lives of millions of babies worldwide.

Dr McEwan has been working with international maternal and child health expert Professor Heather Jeffery AO and others to develop an inexpensive, battery-operated unit that uses highly accurate ‘near infrared’ technology to assess an infant’s body composition. Its multiple wavelengths can distinguish between internal human body components such as melanin, water, muscle and fat.

While other devices that carry out this task exist, they are expensive, bulky and unsuitable for use in areas with limited electricity and technical expertise. The machine developed by Dr McEwan and his team will be able to be used in remote communities and developing nations – the very places where infant mortality is highest.

Professor Jeffery, senior staff specialist in newborn care at Royal Prince Alfred Hospital, explains the enormous global significance of the development: “Low fat body composition in newborns, reflecting under-nutrition, exposes them to an immediate risk of increased mortality and morbidity, and to obesity, diabetes and cardiovascular diseases in early adult life.”

The pioneering global health project first caught the attention of the Bill and Melinda Gates Foundation’s US$100 million Grand Challenges Explorations initiative in 2012, when it was granted Phase I funding in recognition of its real potential to solve problems faced by people in the developing world. It has now won Phase II funding, which is reserved for those ideas that have made significant progress towards implementation.

NEW MASTER OF HEALTH TECHNOLOGY INNOVATION

A new Master of Health Technology Innovation (MHTI) has been launched that recognises changing healthcare practises. Designed with support from industry, the degree will nurture the complementary skills of professional groups such as doctors, scientists, information technology experts and engineers, and bring them together to work side-by-side.

“We recognised an overlapping need in biomedical innovation and clinical practice and through this course we are aiming to create leaders in this emerging field where engineering and biotech innovation are working hand-in-hand with those in the medical profession,” states Professor David Lowe, Associate Dean (Education).

For more information about the process watch the video: sydney.edu.au/news/84.html?newsstoryid=14567

MORE INFORMATION sydney.edu.au/engineering/mhti
ALUMNI AWARDS
HONOUR OUR BEST

The 2014 Alumni Awards celebrated the extraordinary achievements of some of our most successful alumni around the world.

Due to the high calibre of nominations, the faculty also awarded a Dean’s Commendation for the first time.

At the reception held in their honour, recipients shared their unique and inspiring stories with alumni, faculty staff and industry partners. Award winners were as follows:

ALUMNI AWARD FOR COMMUNITY ACHIEVEMENT
Robert Leece AO, RFD
BE (Civil) 1969, MEng Sc 1974, UNSW, MBA 1985 MGSM, FIEAust, CPEng
Recognised for his impressive breadth of service across the public and private sectors through the development and guidance of major infrastructure projects.

“To be recognised by highly esteemed academics from the University of Sydney makes me honoured and proud and gives me a genuine sense of professional achievement.”

ALUMNI AWARD FOR INTERNATIONAL ACHIEVEMENT
Sir Michael Hintze AM
BSc 1975, BE (Elec) 1977, MSc (Acoustics) UNSW, MBA Harvard Business School, MBA (Business) (honoris causa) UNSW
Acknowledged for the impact and broad scope of his philanthropic work on the international stage.

ALUMNI AWARD FOR PROFESSIONAL ACHIEVEMENT
Dr Craig Barratt
BSc 1983, BE (Elec) 1985, MSEE 1987 Stanford, PhD (Elec) 1992 Stanford
Acknowledged as a global industry leader and innovator in wireless technology and communications.

YOUNG ALUMNI AWARD FOR ACHIEVEMENT
James Alexander
BCST (Hons) 2013
Recognised for his leadership and vision in fostering innovation, creativity and entrepreneurship.

“Leadership for good is the act of identifying like-minded people and inspiring them to help accomplish a common goal – a goal that will positively progress the world, pushing society forward in the long term.”

YOUNG ALUMNI AWARD FOR ACHIEVEMENT
Christine Chen
BE (Elec) 2010 Chiao Tung University Taiwan, BE (Elec) 2010 University of Illinois, ME (Elec) 2011
Acknowledged for the significant role she plays in protecting members of the Australian Defence Force.

“I’m extremely proud to be an engineer, and even more proud to be part of the work that protects our soldiers. To wake up every morning knowing what you’re building protects and improves lives – it gives you a tremendous sense of responsibility and desire to do things right. And to me, that’s the best reason to be an engineer.”

DEAN’S COMMENDATION
(VGiven at the dean’s discretion to a highly deserving candidate across any of the four award categories)

Vince Graham
BE (Civil) 1972, Grad Dip (Management) NSW Institute of Technology
Acknowledged for his professional leadership and service to the NSW community.

“The opportunity to be recognised for a contribution to community, and for improving the lot of New South Wales citizens, is an honour.”

NOMINATE
To nominate someone for the 2015 Alumni Awards, contact:
Kristy White - Manager, Alumni Engagement
kristy.white@sydney.edu.au
Civil engineering alumnus Doug Price is remembered as the ‘Father of the Snowy Mountains Engineering Corporation’.

As the former Chief Executive Officer and managing director of Snowy Mountains Engineering Corporation (SMEC), Doug Price is credited with building the organisation into a successful multinational engineering consultancy.

After graduating with a degree in civil engineering from the University in 1950, Doug was invited to join the then new Snowy Mountains Hydro-Electric Authority. He then rose to the rank of assistant commissioner in 1966, with experience working on several overseas aid projects in Thailand.

SMEC was formed in 1970 and shortly after, in 1972, Doug became Chief Executive Officer. As CEO and later managing director, Doug led the company until his retirement in 1988.

Peter Humphreys, Regional Manager of SMEC Sydney, said Doug will be remembered with deep affection by all those who worked under him.

“Doug Price will be remembered as an inspirational leader, a brilliant engineer and a devoted servant of the public good. Doug’s kind-hearted, yet firm and highly professional leadership style shaped SMEC to become the highly successful multinational, multidisciplinary consultancy it is today.”

Recognising his contribution to engineering in Australia, in 1984 Doug was awarded Engineers Australia’s most prestigious medal, the Peter Nicol Russell Memorial Medal Career Achievement Award in Engineering.
Private Kenneth Knowlton Saxby was a promising young electrical engineering student who was killed in action while serving as an ambulance stretcher-bearer in World War I. His grieving maths-teacher father chose to honour his son’s memory by establishing the KK Saxby Prize for Mathematics with a gift of £150 – the amount of military pay owed to his son. The prize continues to be awarded annually to this day, supporting other talented maths-loving students and ensuring that Private Saxby’s memory lives on.

27th January 1917 - battlefield diary: “Every time we got out of the trench, Fritz saluted us with a few whiff bangs. Luckily his shooting wasn’t very accurate,” Private Kenneth Knowlton Saxby.

The story of the Saxby family, along with those of many others, is told in a new interactive biographical database of University of Sydney students, staff and alumni who served in the first World War, titled ‘Beyond 1914: the University of Sydney and the Great War’.

more information
beyond1914.sydney.edu.au
ALUMNI

“PAY IT FORWARD”

Two new scholarship funds have recently been established by alumni with very special links to the faculty.

The Frances Marion Smith Scholarship, established by Richard and Robyn Smith honours Richard’s mother for her support and encouragement of her children’s education even though the family struggled financially. The youngest of nine children raised during the Great Depression – two of whom suffered from polio and so required extra medical treatment – Mr Smith (BE Civil, 1961) wanted to attend university but was unable to secure a much-needed entry scholarship. The family could not afford to pay the fees on the wages of his hard-working carpenter father, who had served in both World Wars, so his mother took matters into her own hands. “Mum said, ‘OK, I’ll pay your fees for the first year, but you’ll need to get a scholarship in second year’ – which I did,” he explains. “So Mum put me through that first critical year. She was pretty proud of me. She was the one who made sure I got through.” Mrs Smith also believed in donating money to charities she supported, her son says, despite the family having little to spare. Mr Smith says his gift to the faculty is intended “to help other people in similar circumstances, and continue on the lessons my mother taught me.” His generosity ensures that his mother’s loving legacy will live on, by supporting other talented undergraduate civil engineering students as she supported her son.

Another alumnus, who wishes to remain anonymous, has established the Undergraduate Scholarship in Aeronautical/Aerospace Engineering. The donor, a scholarship recipient himself who graduated in the 1970s with a Bachelor of Engineering (Aeronautical), wanted to give back to the institution that changed the course of his own life. This gift is his way of “paying it forward”, by supporting other highly capable first-year students within the broader disciplines of aeronautical and aerospace engineering who might not otherwise have an opportunity to pursue further study in this field.

Gifts such as these have a tremendous and very tangible impact on the life trajectories of a large number of highly promising students from diverse social and cultural backgrounds. To play your own part – whether big or small – in “paying it forward”, please contact us for a confidential discussion.

CONTACT

Holly Miller
Associate Director of Development
holly.miller@sydney.edu.au

Donors of the Frances Marion Smith Scholarship, alumnus Richard Smith with wife Robyn and the dean
The National Computer Summer School (NCSS), created to provide a fresh environment for bright young high school students wanting to learn about computer-programming, celebrated its twentieth anniversary in January with a black-tie dinner at The Ivy Ballroom in Sydney.

NCSS, the brainchild of two of the University’s information technologies specialists, Professor Judy Kay and Honorary Associate Professor Bob Kummerfeld, has attracted thousands of students over the past two decades.

Professor Kay says the school has given young students an opportunity to immerse themselves in the world of computer science, learn how to write or improve their programming skills for software design and development.

“Many of our graduates have gone on to work with tech giants such as Google, Atlassian and IBM,” Professor Kay says.

And a number of these successful past participants returned to help celebrate the 20 year milestone, along with representatives from industry sponsors Wisetech Global, NICTA and Freelancer.

Since its inception NCSS has increased its scope and reach and now includes two other programs: The NCSS Challenge – a five week online programming competition for secondary school students; and the Girls’ Programming Network (GPN) – a program developed and run by girls, for girls.

For more information about NCSS visit ncss.edu.au

A round 100 China-based alumni participated in a University hosted networking and panel session event in Beijing held in March this year.

A joint initiative between the faculty and the University of Sydney Business School, the event featured an interactive panel session led by young entrepreneurial alumni.

With lively discussion focusing on how to embrace disruptive change and whether entrepreneurialism is innate or can be taught, the panellists demonstrated their diverse paths to entrepreneurial success.

Panellists included Head of Markets for the Australian Financial Markets Association, Michael Go and Olivia Jingshu Ji, President of CEBEX Group and Founder of China Entrepreneurs.

Named by Business Week as one of the top entrepreneurs in China and having incubated multiple start-ups, Olivia articulated the growing desire in China to innovate and succeed on the international stage.

Co-panellist Daniel Shi, founder of 23Seed – a platform for seed and angel stage investors and startups in China – looks forward to more opportunities to network with fellow alumni in China: “I welcome this type of connection opportunity and access to some really thought provoking dialogue.”
UPCOMING EVENTS IN 2015

SATURDAY 18 APRIL
Reunion of the Class of 1964 Chemical Engineering
School of Chemical and Biomolecular Engineering (J01)
Contact: Alumnus Peter Lansdown - peter.lansdown@trade.nsw.gov.au

SATURDAY 18 APRIL
Reunion of the Class of 1975 Civil Engineering
Sancta Sophia College, the University of Sydney
Contact: Alumnus John Kauter - john@emcworks.com.au

FRIDAY 26 JUNE
Reunion of the Class of 1957 (all disciplines)
Engineering Precinct, Darlington Campus
Contact: Alumnus John Doherty - jdo@bigpond.com

TUESDAY 18 AUGUST
Annual Faculty Dinner
A formal celebration for the faculty’s alumni, industry partners and friends, which will become our faculty’s annual Flagship Event
More information to follow in the coming months
Contact: kristy.white@sydney.edu.au

SEPTEMBER
Silicon Valley Connections in Sydney
Join us for a discussion around technology innovation and entrepreneurship
Contact: kristy.white@sydney.edu.au

FRIDAY 30 OCTOBER
Reunion of Class of 1965 (all disciplines)
Royal Sydney Yacht Squadron, Kirribilli
Contact: Alumnus Paul Lin - lin.paul@optusnet.com.au

AMME DINNER
Seeking expressions of interest
Would you like to organise a reunion for your year?
Contact: Alumnus Dr John Kent - john.kent@sydney.edu.au

STAY CONNECTED
There are many ways to stay connected with your university, your fellow graduates and give back.

VOLUNTEER YOUR TIME AND EXPERTISE
sydney.edu.au/alumni/programs-benefits/welcome-to-sydney

SUPPORT OUR STUDENTS VIA OUR FACULTY PLACEMENT PROGRAM
sydney.edu.au/engineering/industry/partnership

SUPPORT US
inspired.sydney.edu.au

CONTACT US
If you’d like to provide feedback or offer suggestions on future stories, please contact:
Kristy White
Manager, Alumni Engagement
T +61 2 9036 9760
E kristy.white@sydney.edu.au

GET LINKEDIN
The faculty’s LinkedIn group provides a platform for professional networking. It connects graduates and industry leaders, offering industry-specific content including information on emerging trends, relevant articles and industry events.
linkedin.com/groups/Faculty-Engineering-Information-Technologies-University-936547
Support our future engineering leaders

Our Engineering Leadership Scholarships provide talented students with the leadership development, professional experience and financial support they need to become Australia’s next generation of engineering leaders.

To support their future, why not become an Engineering Leadership Scholarship partner today?

sydney.edu.au/engineering/industry/scholarships