DEAR ALUMNI

Your School continues to grow and flourish. There were so many highlights this year it is hard to choose which ones to share.

Certainly one highlight was the visit of the new UNSW Vice-Chancellor Professor Ian Jacobs to the School in April. You may be aware that UNSW has recently launched an ambitious ten year strategy. The UNSW 2025 Strategy is based on three priorities: academic excellence in research and education; a commitment to social engagement, and achieving global impact. We look forward to an exciting decade ahead.

Our own international rankings continued to rise – in 2015 the School was awarded the number one spot in Australia – and placed as number 14 in the world by QS World University Rankings.

The School had a record breaking year in achieving Australia Research Council (ARC) grant funding – to the total of 4.88 million involving 28 staff and several industry partners. These grants are extremely competitive – it is to our staff’s great credit, and their proven expertise, that they continue to win such high level funding and support from government and industry.

In October ARC Laureate and Scientia Professor Mark Bradford won a NSW Premier’s Prize for Science & Engineering, while the indefatigable engineering research team led by Dr William Glamore at our Water Research Laboratory were awarded a NSW Government Green Globe, yet another great example of the depth of the School’s industry engagement and real-world practice. Congratulations also to Associate Professor Stuart Khan for his inclusion in EA’s Top 100 for the first time in 2015 for his academic, government and community engagement on topics relating to water quality and treatment.

On the teaching side, Stephen Moore and Professor Richard Stuetz co-ordinated an inspiring Year 4 course ‘Planning Sustainable Infrastructure’ where students worked with a real-life client, the community of Mer Island in Torres Strait. We are always working towards development of courses and projects which can offer our students such engaging real-world issues and challenges.

In 2015 our student societies CEVSOC, SURVSOC and the newly formed Women in Engineering Student Society organised several internal community-building as well as industry networking and mentoring events. Many of our alumni featured strongly in these events and I thank you for your generosity in doing so, and look forward to your continuing support of our wonderful students.

STEPHEN FOSTER Head of School

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WRL GREEN GLOBES WINNERS

Staff at the School’s Water Research Laboratory were awarded the ‘Natural Environment Sustainability’ award for their project, Big Swamp Recovery – Evidence Supporting Innovation at the NSW Government’s Green Globe Awards, the leading environmental awards in NSW, celebrating excellence, leadership and innovation in sustainability.

Accepted by Dr William Glamore, Principal Research Fellow, the project was recognised for research innovation and on-ground excellence. The award was shared with industry partners Greater Taree City Council. Engineers from UNSW’s Water Research Laboratory (including Mr Jamie Ruprecht and Mr Duncan Rayner) worked, in collaboration with Greater Taree City Council, to research methods and develop innovative plans to restore Big Swamp, a degraded site recognised as one of the worst acid hotspots in the country.

The Big Swamp Recovery Project is a great example of collaborative evidence based decision-making supported by cutting edge research to correct a major environmental problem. Team leader Dr William Glamore said, ‘This award recognises the high level of innovation that can be achieved when researchers partner with forward thinking government partners. We are very lucky to collaborate with the staff at Greater Taree City Council who are willing to work at the frontier of restoration science. The on-ground results are incredible!’

ARC GRANTS SUCCESSES

In July, the School won seven Australian Research Council (ARC) Linkage Grants – working with industry partners across the spectrum of civil, environmental and geospatial engineering. Our partners for 2015 Linkage Projects included Boral Concrete; China Construction Steel Structure Corp. Ltd; China University Of Mining And Technology; Jiangsu Crelead Information Technology; Mincarb Pty Ltd, NSW Office of Water, OneSteel Reinforcing P/L; OzHarvest; and Tsinghua University, Beijing;

In October School staff won six ARC Discovery Project grants and one LIEF (Equipment and Facilities) Grant. It has been a truly remarkable year for the School, with more than half our academic staff involved in achieving these highly competitive ARC grants - totalling $4.9M.

ARC GRANTS SUCCESSES

We know that many alumni will be saddened to hear of the passing in April of Emeritus Professor David Pilgrim – truly a gentleman and a scholar. David graduated with a first class honours degree in civil engineering in 1953 – in only the second year of UNSW graduates, and started in the School as a lecturer in 1958. He retired as Professor and Head of Water Engineering in 1993. David had many achievements throughout his career; to list just one he was the Editor of the 1987 Australian Rainfall and Runoff, which had a major impact on water engineering practice in Australia. David's service to science, especially hydrology was recognized by the award of Member of the Order of Australia (AM), in 1988.

The School notes with sadness and affection the passing of alumnus Dr Ronald John Fitch at the age of 105. He had been awarded a PhD from the School at the age of 92 for his thesis entitled: “A Critical Study of the Operational and Financial Performance of the South Australian Railways 1900 to 1970. His award was recorded by Guinness World Records Ltd as the oldest person to be awarded a doctorate (PhD).
CVEN4701 PLANNING SUSTAINABLE INFRASTRUCTURE

Over two and a half thousand kilometres away to the north of Sydney is a tiny island in the outermost reaches of the Torres Strait called Murray (Mer) Island. On the island live a community of 400 people who rely on diesel for electricity, desalination for water and import their food by barge from Cairns, eight hundred kilometres away. The water supply is intermittent, fresh food is prohibitively expensive and the only waste disposal method currently is burning off in the small open landfill, plastics and all. If you were an engineer, what would you do to try and improve the quality of life of the community and the impacts on the environment of this infrastructure?

This question formed the core of our fourth year environmental engineering course, CVEN4701 Planning Sustainable Infrastructure. The course, designed by senior lecturer Stephen Moore, and co-coordinated with Professor Richard Stuetz, required students in their final year to engage in a project that simulates the work they will do in professional practice. By applying the knowledge gained in applied 3rd year courses to a realistic problem, it enabled them to integrate previously separately taught infrastructure components as well as recognizing and incorporating the broader concepts of sustainability that includes social, economic and environmental perspectives.

At the end of Semester, students and their design posters were interrogated by industry, client and academic judges at a well-attended public Showcase Event held at Nura Gili, the UNSW Centre for Indigenous Programs. The winning group was then able to present their solutions in person on Murray (Mer) Island, marking the start of a long term relationship between UNSW and Mer Island, and deepening the dialogue about moving towards sustainable infrastructure.

NEW PROGRAM FOR CIVIL ENGINEERING AND SURVEYING

In 2015 the School developed a brand new five year dual award program for Civil Engineering and Surveying. This BE Civil/ BSurv will give graduates accreditation as both engineers and surveyors, offering great flexibility in their future careers. The program will be available in 2016 – UAC Code 425402.

MEngSc IN SUSTAINABLE SYSTEMS

The Faculty of Engineering is offering a new coursework program in 2016 - the MEngSc in Sustainable Systems. This new discipline will explore how engineers can discover and implement holistic and effective solutions to unsustainable practices. The program structure strongly encourages holistic thinking and multidisciplinarity, working across a range of disciplines. Associate Professor Tommy Wiedmann, Convenor of the School’s Sustainability Engineering Initiative, says that the degree is taking engineering to the next level.

ELITE STUDENT BREAKFAST

It was a beautiful morning in Sydney’s Botanical Gardens, when representatives from 14 companies – all industry supporters of the School - came to meet thirty of our top students - drawn from the Elite Student program, Dean’s Award winners, and the leadership of our student societies. Everyone enjoyed the opportunity for networking, recruiting and mentoring – as well as the excellent breakfast.
It’s an idea reminiscent of Harry Potter and his magical Marauder’s Map which reveals every classroom, secret passage and corner of the castle, but also pinpoints, with a moving dot, the exact location of every person on the grounds.

Now imagine if that same capability were possible, deep underground in a complex and ever-changing mine environment. Imagine if every chamber and corridor was accurately mapped and every person and piece of machinery accounted for, in real time, all the time.

This is exactly what Chris Rizos, Professor of Geodesy and Navigation in the School of Civil and Environmental Engineering; aims to achieve with a recently awarded Australian Research Council (ARC) Linkage Project.

“Accurate positioning underground is critical to ensuring the safety of mine workers if there is an emergency, but it is also a key technological capability in resolving mine productivity bottlenecks,” says Professor Rizos. “Knowing exactly where the trucks, machines and people are will assist decision-making about excavating and mining in the most efficient way.”

Professor Rizos is working with colleagues at the School of Mining Engineering, Associate Professor Serkan Saydam and Dr Binghao Li; and industry and academic collaborators at Crelead Information Technology (Crelead) in China; and the China University of Mining and Technology (CUMT).

The objective is straightforward but the challenge is considerable because normal above-ground positioning methods, such as GPS, don’t work underground. The project team will explore how a variety of technologies might work together, including WiFi based positioning, proximity sensors, radio frequency identification, inertial navigation systems (which can track motion and the direction in which something is moving) and an Australian technology called Locata, which is based on terrestrial signals similar to the satellite signals.

For Professor Rizos, the most critical part of the research will be the ability to undertake tests in a real-life mine environment. That’s where their industry partners come in. CUMT and Crelead will not only provide access to mine sites in China, but will bring a host of other benefits including technological expertise, equipment, complementary skill sets, financial and other ‘in-kind’ support to the table.

Crelead will provide their existing mine tracking technologies, equipment and will open up their 4D Virtual Mine System and Disaster Pre-warning and Emergency Rescue System to the researchers. “To build a robust, high accuracy, real-time geospatial positioning system for underground mine environments is core to our business and new technologies and novel methods must be developed,” says Dr Qiang Wang, Chief Investigator from Crelead.

“Choosing UNSW as our collaborator was an inevitable choice” continues Dr Wang, who learnt much about UNSW capabilities as an exchange PhD student from CUMT in 2008. “It will maximise Australia’s competitive advantage in mining and the geospatial positioning industry and deepen the ties between the two countries. It is also a good chance for Australian technology to enter the Chinese market.”

Improving safety, efficiency and sustainability are key motivators for CUMT but they are also keen to deepen their relationship with researchers at UNSW. Professor Li Wei from CUMT’s Academy of Science and Technology is optimistic about the research. “We have a long history of collaboration with UNSW, including several research projects and I believe this project will lead to a successful outcome.”

“The Linkage program is a highly successful scheme that encourages academics to undertake industry-focused research or industry-initiated research. The most successful linkages allow you to leverage the linkage relationship, with the result of doubling or tripling the value of the real dollars you get...”

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**Mapping the Underground**

Safety, sustainability and efficiency drive research into accurate underground positioning

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**AT A GLANCE:**

- **Project partners:** UNSW Civil and Environmental Engineering, UNSW Mining Engineering, Crelead Information Technology (Crelead) in China, and the China University of Mining and Technology.
- **ARC grant:** $353,000
- **Aim:** Research a robust high accuracy positioning system for underground mining environments to improve worker safety and mine efficiency.
- **Timeframe:** 3 years
- **Did you know:** This Linkage grant is one of seven successful ARC Linkage partnerships won this year by academic staff at the School. For details on the others please see [http://www.engineering.unsw.edu.au/civil-engineering/news/best-performing-school-at-best-performing-university](http://www.engineering.unsw.edu.au/civil-engineering/news/best-performing-school-at-best-performing-university)
Garry Mostyn discusses the benefits of sponsoring a UNSW academic

Garry Mostyn is a Chief Engineer at Pells Sullivan Meynink (PSM) which provides specialised design and investigation services for engineering in rock, soil and water. PSM is a longstanding partner and supporter of the School of Civil and Environmental Engineering (CVEN) and has sponsored the PSM Senior Lecturer of Rock Mechanics academic position for the last 9 years. Garry couldn’t be more enthusiastic about the benefits to his company of teaming up with the University, so we caught up with him to find out more.

How has your connection to UNSW evolved over time?

I started my undergraduate studies at CVEN in 1970 and followed with my Master of Engineering Science in 1974. After working in consulting for a few years I rejoined the University from 1986-1997 as a senior lecturer. I returned to industry to work at PSM but remained in close contact with the School in a number of ways. There is the academic position we sponsor, the geotechnical engineering graduates we recruit and, of course, some close and enduring friendships. I’ve also been on the School’s Industry Advisory Committee since it was formed over 10 years ago now.

PSM generously sponsors the PSM Senior Lecturer of Rock Mechanics position held by Dr Kurt Douglas. How did that come about and how does it work?

Professor Nasser Khalili, the most senior geotechnical academic in the School, approached PSM with the idea first. We saw it as a great collaborative opportunity so we were happy to agree. The first funding ran for five years and now we’re on the second round of funding.

Kurt comes to our office two or three times a month and might stay for several hours. Although he is often doing his own work, we benefit from his informal interactions with our staff. He’s an expert we can consult if needed.

What made you sign up for a second round of funding?

Essentially, we’re incredibly happy with the access it provides – as industry partners - to the School’s best students. We’re able to recruit brilliantly at graduate level, which is the level we like to recruit at. This is a key benefit which I think will keep us wedded to the University forever, to tell you the truth! The vast majority of our engineering graduates come from the School.

Are there any other benefits?

Most definitely. The industry/academic collaboration is good and we really value being able to use the School to easily source information and advice in other areas of engineering outside of our expertise. We’re geotechnical engineers, and there are a lot of geotech people in the School, but we have also talked to the structures people and the water people at different times. Stephen Foster, Head of School, is an excellent facilitator of this, as were his predecessors. Being able to ring up and talk to an academic, with certainly national if not international standing, and get the good oil on different things is a fantastic benefit.

What would you say to another company who was interested in linking with UNSW in a similar way?

Do it! Excellent people, bright and happy to contribute.

CONTINUING NATIONAL AND GLOBAL RESEARCH LEADERSHIP

In 2015 Professors Chris Rizos and Brian Uy were appointed to the Engineering and Environmental Sciences Research Evaluation Committee (REC) for Excellence in Research for Australia (ERA). Professor Rizos was also elected Bureau member of the International Union of Geodesy and Geophysics (IUGG), a major honour. Professor Ashish Sharma was elected President-elect for the International Commission on Statistical Hydrology (ICSH). Professor Mark Bradford won a NSW Premier’s Prize for Science and Engineering. A/Prof Stuart Khan was appointed to the UN Water Quality and Health Technical Advisory Group (WQTAG) of the UN’s World Health Organisation (WHO). Dr William Glamore was appointed to the NSW Government’s Williamtown Expert Panel and to Chair the Water Working Group.
Rachel McVittie aims to be our first Indigenous woman graduate.

Rachel McVittie didn’t finish high school. She didn’t seem to belong in the system. A system that didn’t seem to understand that disengaged behaviour in young folk is a sign that something is amiss; that more, not less attention is needed.

With a strongly agile mind Rachel found her way back to education, first through her love of photography. While preparing to study photographic theory she encountered mathematics for the first time in years. She fell in love with it. She discovered an aptitude that had gone unrecognised in her disrupted secondary schooling. At TAFE, where she completed her Tertiary Preparation Course, she won a Student Excellence Award for commitment to her studies and her academic achievements.

Rachel is now bringing that same commitment and achievement to her new place at the School of Civil & Environmental Engineering and aims to be our first Indigenous woman graduate.

Initially it was environmental engineering that attracted Rachel as a way of strengthening her cultural and spiritual connection to the land. But around the time of enrolment at UNSW, and after extensive discussions with staff at Nura Gili, the UNSW Centre for Indigenous Programs, she realised that civil engineering offered so many options, in so many interesting engineering areas that she jumped into a double degree, of civil and environmental engineering. Four years later she is even getting Distinctions in some of her courses. This from a young Indigenous woman who says “five years ago I couldn’t really read or write”.

But it has not always been easy. At first being on such a huge campus, with other students who were much more academically prepared and confident, she had to deal with feelings of self-doubt. Could she do this? Was it too much? It was during these times that Nura Gili and the Faculty of Engineering came to her aid. Making Rachel part of their family, Nura Gili provided emotional support and cultural connection.

David Clements, Deputy Dean (Education) of UNSW Engineering, prophetically said to Rachel “It’s going to be extremely difficult, it’s going to take a lot of hard work and dedication but I believe you can do it”. Here was the helping hand we all need at times when we doubt ourselves.

As a proud Aboriginal woman, Rachel, at first, found it hard to accept assistance. But as she continued to work closely with Nura Gili and School staff she came to realise that their support services, including the Indigenous Tutorial Assistance Scheme, were designed to provide opportunities previously denied. As she reflects, “supporting disadvantaged students doesn’t mean you are giving them an advantage over other students. We all still have to work extremely hard at achieving our goals, but the support makes the impossible possible.”

“Rachel has clear ethical standards and she knows what kind of work she intends to do and who she will work for. Wealth is not her goal. She wants to improve the lives of Indigenous people...”

Her hopes for the future are enormous and they are not just about personal ambition and achievement. Her goals include working with Indigenous communities to provide vital infrastructure. Rachel has clear ethical standards and she knows what kind of work she intends to do and who she will work for. Wealth is not her goal. She wants to improve the lives of Indigenous people. She wants to act as a bridge between remote communities and institutions. She hopes to educate us about the Indigenous communities who are already practicing the sustainability that is so often discussed in civic and commercial endeavours.

Education does not move in one direction and through hopeful, intelligent young people like Rachel McVittie, knowledge can reticulate, and maybe we can all learn to listen.

There are often questions raised about reconciliation, about constitutional recognition and treaty, about the future of colonial and Indigenous relations. But when one meets someone like Rachel McVittie, the solution stands embodied before us.
William (Bill) Cox
Managing Director – Australia and New Zealand, Aurecon
BE Civil Hons 1988

Why did you choose to become a civil engineer?
I always enjoyed creating and building. Civil Engineering seemed to be the logical profession for me and I never really considered other career choices. There is an enormous degree of satisfaction in being part of a team that is challenged to design, build and successfully deliver a product that works and works well.

What and who do you most clearly remember about your days at the School?
Apart from the formal, structured learning aspect of my time at UNSW, I clearly remember that the School fostered a deep sense of community, “mateship” and comradeship amongst its students through sports and a multitude of social offerings. I was a member of CivSoc and Vice President in my final year which was great to get involved with the students from different years as well as the teaching staff. Some of the names that spring to mind include Ray Lawther, Ian Gilbert, Vic Sommersby, Neil Mickleborough, Francis Tin Loi, John Black, and Max Irvine.

The 609 Common Room was a great place to meet and collaborate on assignments (and play cards). This balance of formal and informal teachings encouraged all students to discover their particular strengths and recognise their weaknesses, and it celebrated and promoted the intrinsic right of each student as a unique individual to realise his or her full potential to succeed, without fear or favour.

[Some of] the most rewarding and most challenging aspects of your career to date
- The project experiences have been great, working with exceptional people in our business and with our clients
- Seeing our staff develop and deliver some really clever engineering solutions with our clients and seeing our next generation of engineers develop as leaders
- The projects are getting bigger and more complex
- Community expectation rightly is going up and we need to respond and step up to meet that expectation
- Gender diversity is still a big challenge that our industry needs to get on top of. We are making progress but it is still too slow in my view
- The digital age is upon us and our industry needs to harness this new technology and go with it, even though for some it will mean some real change in where and how we do business
- Continue to provide mental health awareness education to all staff and ensure the stigma attached to this insidious health issue is removed.

Your advice to young engineers today
The biggest lesson learned that I took from University to my workplace was to adapt and regroup quickly (understand where the work is and make sure you are there, ready, willing and able), and survive the troughs (keep your head down and try that little harder), knowing that the troughs will pass. Enjoy the peaks and all that can be achieved at these times and don’t be afraid to step up and speak out. Pursue your passion for excellence and lead by example.

Now, more than ever, you should approach your career in the realisation that you will more than likely have several potentially quite different careers over your working life so enjoy them all.

You and your peers are the future of the industry; look for the opportunities to collaborate and build the partnerships that will lead a key group in our society in the decades ahead.

“The biggest lesson learned that I took from University to my workplace was to adapt and regroup quickly (understand where the work is and make sure you are there, ready, willing and able), and survive the troughs (keep your head down and try that little harder), knowing that the troughs will pass...Be true to yourself and ensure you always retain your integrity in all your dealings.”
ALUMNI GOLDEN REUNION

Back L-R: Alan Knoke, Jeff Lind, Ian Stainton
Front L-R: Ron Wilcoxon, Mike Pyne, Geoff West, Rowan Morrison

On a breezy Saturday in July, seven alumni who graduated in the early 70s paid a welcome visit to the School. For many of them, the campus had not been re-visited since that time. ’In the 1970’s the campus had a spread out almost country town feel,’ reflected visit organiser Jeff Lind BSc(Eng) ’71, MEngSc ’74. ’Today the feeling was more that of a small city.’

The purpose of the visit was primarily to celebrate 50 years of friendship. With a few minor variations, the friends had met first at UNSW in 1965, as they began their part-time degrees. ’The marathon men’, as the School history recalled the part timers of the past – who in the late 60’s made up a third of the undergraduate student population - ‘the masters of the slog.’

Rowan Morrison BSc (Eng) ’74 commented, ’When we came as students, there was a feeling of newness – almost a rawness - with the university. Now my feeling from walking on this campus is that UNSW has built up its own sense of tradition and history –a lot has happened in the intervening years.’

SCHOOL STATISTICS 2015

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CONGRATULATIONS TO ALUMNI ACHIEVERS THIS YEAR

EA Top 100: UNSW Engineering was well represented with 22 researchers and alumni appearing on this year’s list, including six of the School’s high achieving alumni: William Cox, Managing Director, Aurecon. Dr Mehreen Faruqi, Member of NSW Legislative Council – NSW Greens, A/Prof Stuart Khan (CVEN Academic), Grant King, CEO, Origin Energy, David Stewart, Director-General, Queensland Dept of the Premier and Cabinet, and Em Prof Elizabeth Taylor, Chair, RedR Australia and RedR International.

Alumnus Ms Erin Cini, Director of Water Licensing and Compliance at the Independent Pricing and Regulatory Tribunal of NSW, was awarded the 2015 UNSW Engineering’s Maria Skyllas-Kazacos Young Professional Award for Outstanding Achievement.

Surveying alumnus and former federal MP Gary Nairn (BSurv’73 UNSW) was awarded an Order of Australia in the Queen’s Birthday honours.

Alumnus Dr Jacqueline Thomas received the 2015 UNSW Alumni Award for Science and Technology for her contribution to research in Tanzania in Water, Sanitation and Hygiene (WaSH).