AS I NEAR THE END OF MY FIRST YEAR AS THE EXECUTIVE DEAN FOR THE FACULTY, IT GIVES ME GREAT PLEASURE TO WRITE THIS FOREWORD FOR INGENUITY MAGAZINE.

Our theme this year is ‘global engineering challenges’. In our rapidly changing world, we are faced with many challenges, such as energy, food, safety, security and health, and none of these will be solved without the leadership of engineers. Importantly, they will also all require multi-skilled teams and cross collaboration if we are to make significant progress.

Our Faculty is, of course, exceptionally strong and if the league tables are to be believed, we remain amongst the world’s elite. However, if we are to retain that position we will need to continue to innovate to enhance both our educational programs and our research outcomes.

Our vision for the student learning experience builds on the outstanding work already done to provide a problem-led education that encourages our students to have confidence in team based, complex engineering challenges. Looking ahead, a key ambition is to increase our students exposure to innovation and entrepreneurship and we hope to develop a co-working space in the near future to act as a home and a focus for this cross-disciplinary activity.

Thinking further about global challenges has encouraged us to cluster the Faculty research effort across six larger scale thematic areas. We hope that this will produce opportunities for better integration across the Faculty, and increased engagement of our research staff with large scale research problems. For a university like ours it is vitally important that our Faculty engages in research with wide-reaching impact. We have the capacity for such work and we certainly have the people. This year sees ingenuity include Information Technology for the first time. This is entirely consistent with the messages about the increased need for collaboration across discipline boundaries.

What is clear to me is that the realisation of our ambitions will be greatly enhanced and accelerated through active partnership with our alumni and industry. Excitingly, this last year has seen the launch of alumni-led chapters in Perth and Brisbane, an initiative we hope to roll out to other cities around the globe. We have also seen the expansion of our MEET a Mentor Program across all engineering and ICT disciplines. Engaging with our alumni and industry partners in these and other ways provides important opportunities for us to test and refine what we are doing, helping us to remain relevant into the future and our graduates to be amongst the best Australia has to offer.

I would like to offer a personal thanks to our alumni and community. Your continued support is invaluable to us.

Professor Simon Biggs
EXECUTIVE DEAN
FACULTY OF ENGINEERING, ARCHITECTURE AND INFORMATION TECHNOLOGY
Clean energy goals could be thwarted by skills and resources

Researchers believe it might not be possible to build enough low-carbon and renewable power stations to limit global warming to two degrees Celsius.

UQ researchers are leading the four-year international Rapid Switch Project to understand what could be achieved in designing and building low-carbon and renewable power sources.

"Every new low-carbon and renewable power generation plant of meaningful size requires large numbers of qualified and specialised people, not to mention raw materials and sophisticated manufactured goods," Director of the UQ Dow Centre for Sustainable Engineering Innovation, Professor Eric MacFarland said.

Professor McFarland said the Rapid Switch Project, a collaboration with industries that build power and fuel facilities, aimed to identify constraints and bottlenecks to help enable appropriate policy, research and planning.

"Even if the political decisions to reduce carbon emissions were taken today, without sufficient technical and human resources and possibly new manufacturing methods, significant reduction in carbon dioxide emissions might not be possible."

I-Ball provides inclusive sporting environment

People with vision impairments will soon be able to participate in games of soccer and other social ball games, thanks to UQ researchers.

The Interactive Ball (I-Ball) is a soccer ball that contains motion sensors, high-efficiency speakers and a small UQ-developed controller that can be programmed to suit the player.

Developed by Dr Paul Pounds, Dr Surya Singh and Dr Hanna Kurniwati, the I-Ball improves on existing technology to increase accessibility to sport.

"Traditionally, balls designed for people who are blind or have low vision have been very simple – they contain bells, or are even just a ball wrapped in a plastic bag to create some noise," Dr Singh said.

"We wanted to create a ball that was socially desirable, that would be the ‘cool ball’, and would make game play fun and inclusive."

The team is working with Vision Australia, who have provided expertise on the social, physical and developmental aspects of vision, especially in regard to sport.

Vaccine technology receives $25million funding boost

Vaccine technology company Vaxxas has moved a step closer to achieving its goal of improving world health, thanks to a capital raising of $25million.

The Nanopatch, invented at UQ’s Australian Institute of Bioengineering and Nanotechnology by Professor Mark Kendall (PhD1998; BE1993), seeks to replace traditional needle and syringe methods with a small patch that delivers vaccines painlessly.

“This investment is a key next step in advancing a series of clinical programs and develop a pipeline of new vaccine products for major diseases using Vaxxas’ patented Nanopatch technology,” Professor Kendall said.

“The technology is the size of a postage stamp, and has thousands of small projections designed to deliver the vaccine to abundant immune cells in the skin. It is designed for thermostability, making it cheaper to produce, more convenient to transport and easier to access in developing countries.”
**Class Gift**

The annual Engineering Class Gift initiative is an important avenue for graduating students to recognise the opportunities that they have benefited from at UQ and to ‘pay these forward’ to the next generation of engineering students.

The 2014 Class Gift Committee led peer to peer fundraising efforts for their “Leave it Better” project, a legacy of student driven change. The Engineering Second Year Learning Centre was chosen to benefit from the funds raised. The Committee wanted to leave this space better than they found it, fundraising to provide an improved interactive learning space for future engineering cohorts. This joint gift from students and staff created an improved interactive learning space, so that future engineering cohorts may collaborate, innovate and excel together.

Donations from graduating students, staff, alumni and members of the EAIT community saw a total of $3,727 raised for this project. And with support from the Faculty, this year’s gift from the graduating class was made possible. “To me, one of the things that makes UQ stand out from other universities is its sense of community. Creating an ethos of ‘giving back’ helps to elevate UQ from a place of learning to something much more. While I’m sure the gifts themselves are valued by the recipients, I think that the effects that initiatives such as this encourage are something that students will remember long after they’ve left,” 2014 Class Gift Committee member, Lachlan Presscott said.

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**Industry to benefit from new postgraduate program**

To help meet the changing professional training and development needs of the extractive resources sector, UQ has launched a new postgraduate coursework program.

Offered by UQ’s Sustainable Minerals Institute (SMI), the Responsible Resource Development program is for both industry professionals seeking to broaden their knowledge base, as well as graduates planning on exploring future career opportunities within the sector.

“This unique program will provide graduates with in-depth understanding of sustainability and its role in the extractives industry. We aim to facilitate the development of higher order skill sets in problem solving, effective communication, project management and teamwork, in addition to content specialisation for a more holistic approach to future career development,” SMI’s Deputy Director Professor David Brereton said.

Professor Brereton said the program would be offered at graduate certificate, diploma and masters level, and built around common core courses with the opportunity to specialise in one of three topic areas: environment, health and safety, and community relations.

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**Engineers dominate at Courting the Greats**

Courting the Greats, UQ’s annual alumni awards ceremony, celebrates exceptional alumni who have achieved distinction in their chosen field and recognition amongst their peers. The 2014 awards recognised two distinguished engineering alumni, and a recent engineering graduate who are making an impact within their respective industries.

Andrew Buckley (BE 1980), a widely respected leader in the international business landscape, was awarded the Vice Chancellor’s Alumni Excellence Award, which recognises the significant contributions made by alumni in their local communities and beyond.

Meanwhile Dr Warren Hogarth (PhD 2006, BCom 2004, BE 2002) was the recipient of a Distinguished Young Alumni Award, recognising young alumni (35 years or younger) whose early accomplishments inspire and provide leadership to students and alumni.

It’s not just our alumni who are establishing a reputation for excellence, with our students also forging early success while still studying at University. The Graduate of the Year award is given to students achieving the highest GPA in their undergraduate degree, with two out of the three students awarded being engineering graduates. Aaron Brooker and Morgan Lewis received this accolade in 2014.
Gus Wiles was recently awarded an Order of Australia for his contribution to chemical engineering education, but he was famous long before 26 January 2015.

You know someone is a celebrity when they are known by just one name. Mention “Gus” to a UQ Chemical Engineering (Chem Eng) graduate from the past 40 years, and you’ll see instant recognition, a smile, and maybe hear a story or two.

Some will tell you about Gus coming to the rescue with vacation work opportunities, only days before exams finished. Others will relate with delight their time as international exchange students, an experience encouraged and made possible by Gus. You’ll hear plenty of tales of job interviews arranged by Gus, often leading to careers that span decades. Gus helped others with references and applications for post graduate courses many years after graduation.

Many will recount stories of Gus-led field trips – particularly the third year Sydney trip where Gus ferried up to 20 undergraduates around industries from Wollongong to Newcastle, depositing them each night in budget accommodation in Kings Cross.

However, Gus’s biggest achievement was organising the 2010 inaugural UQ Chem Eng second year site visit to Gladstone, involving 120 students and 12 staff members, visiting 10 industrial sites. This far surpassed previous trips in both size and complexity. Gus organised everything – buses, accommodation, site tours, catering, and the after-match function at the Gladstone Rail Institute – using phone calls to personal contacts and yellow sticky labels. It tells you a lot about Gus that this took place more than 10 years into his retirement, and that he and Ted White caught the bus up and back with the students while the other staff flew!

One of the reasons Gus was the default field trip and vacation work organiser for the department was his phenomenal list of industry contacts. The man was a walking UQ Chemical Engineering alumni database. Gus was always interested in what Chem Eng graduates were up to, and could tell you where most people were working, along with where they went to school, information about their interests and achievements, and a few choice bits of gossip. He was the original Chem Eng Facebook and Linkedin, both in terms of the data he had about people, and the connections he made.

Gus was the essence of UQ Chem Eng, the gate-keeper of its traditions, and an enthusiastic supporter of ChESS (Chemical & Environmental Engineering Student Society). He was a fixture at the Friday afternoon smokos, and was particularly encouraging of ChESS efforts to obtain industry sponsorship.

In all that he did for the students and the department over the years, Gus didn’t ask for anything in return, and seemed to deliberately avoid opportunities for recognition. But he was genuinely chuffed by the Gus Wiles Scholarship Endowment Fund to support students on international exchange, which was announced at the 2010 UQ chemical engineering reunion. There are two reasons why the chemical engineering reunion was the biggest reunion of the UQ centenary year: because UQ ChemEng feels like a family, and because we had an extensive alumni database, both thanks in a large part to Gus.

When Gus became ill in 2013, the outpouring of concern from people all over the world was truly moving. His wide range of interests was reflected in the eclectic collection of gifts he received, including books, beer, whiskey, State of Origin paraphernalia, notes about the early Queensland sugar industry and a model of a WWII Japanese battleship. Before he passed away in December of 2014, Gus was able to accept his Order of Australia for his contribution to chemical engineering education. Perhaps more importantly, it was made very clear to him that his life’s work was valued and appreciated by many, many people.

His funeral was attended by hundreds of people, each with their own stories about Gus. His wake was the ultimate smoko: the only thing missing was Gus himself, to fill in the backstory on each chemical engineer there. It is hard to imagine the department without him, and to realise that there will be UQ Chemical Engineering graduates who won’t know Gus.

But perhaps those of us who were fortunate to have crossed Gus’s path can preserve his legacy of connecting people by going to Chemical Engineering smokos, helping a student find vac work or a job, hosting a site tour, mentoring a graduate or donating to the RJ ‘Gus’ Wiles Scholarship Endowment Fund.

Pay it forward for Gus.
Volunteering

Meet a mentor

Motivate encourage empower transform

The MEET a Mentor program is an exciting initiative for current third and fourth year students and graduates of more than ten years, in engineering, at The University of Queensland. As an alumnus, your wisdom, experience and leadership can help the University’s future engineering graduates on their path to success.

Program Overview

The MEET a Mentor Program aims to connect students with established alumni to motivate, encourage, empower and transform the next generation of professional engineers entering the industry.

Alumni participating in the MEET a Mentor Program will:

• Help students discover their potential and define and pursue their career goals;
• Discover the value of their own expertise;
• Sharpen their skills;
• Expand their networks;
• Give back and get something back.

The program will assist with students’ career development and transition from University into the workforce, and engage business professionals in a mutually beneficial partnership.

Participating students and alumni mentors are matched based on their shared interests and area of specialty.

Mentoring Sessions

Mentors and mentees should connect for at least four one-on-one mentor sessions (in-person/phone/Skype/email) over a six month period. At least two of these connections should be personal (in-person/phone/Skype). Each mentoring session should last for approximately one hour, and the mentoring relationship should be maintained for at least the minimum time frame of a six month period.

Register your interest

Online applications open on the 1st of March each year with the six month mentoring period running from April to September annually.

To register your interest in the Program for 2016, please contact Lara Pickering, Associate Director, Alumni & Community Engagement via email alumni@eait.uq.edu.au

For more information on the MEET a Mentor Program, please visit the website, www.eait.uq.edu.au/meet-mentor

Kristen Burgess
Chemical Engineering Graduate

“I found the experience of being guided and supported by someone who has achieved so many things that I hope to achieve in my career, invaluable. My mentor’s advice has helped me to prepare for when I start work as a graduate, and for moving into leadership positions in the future.”

Shelley Brown
Manager Technology and Innovation, AGL Energy Limited

“My mentee is intelligent and goal-oriented, and I have no doubt that she will have an interesting and rewarding career. It has been a pleasure to help guide her at this point in her professional life. I am confident that the relationship that is being developed will last beyond the end of her studies.”
The Big Question:
Will Divestment Ultimately Help or Harm our Progress Towards a Sustainable Future?

Professor Eric McFarland
Dow Chair in Sustainable Engineering,
UQ School of Chemical Engineering

Few rational individuals fail to understand that continued global prosperity requires finite fossil fuels to eventually be replaced by cost-effective alternatives. Where credible authorities can disagree is exactly when a transition is needed and on the specific strategies and tactics to progress towards a sustainable future.

The public provides funds to the University to help educate their society and, through research, develop new knowledge for the common benefit. Investment or divestment decisions on these public funds must be made solely for the benefit of the taxpayers and the University’s public mission. If the potential returns to the University by divestment would likely exceed those from the present portfolio, then divestment is in both the public’s and University’s best economic interest. Overwhelmingly, the Australian public and the University rely on and support, through nearly exclusive use, fossil fuels and the fossil fuel industry. Provided the return on investment is expected to be as high or higher than from other legal investments, clearly investments in fossil fuels are consistent with the public trust…

Could an investment decision that results in lower returns to the University benefit progress in sustainability? Clearly, an investment in fossil fuel related industries as a public (University) statement of support for the fossil fuel industry resulting consciously in lower monetary returns hardly seems necessary or likely to progress sustainability. The public already shows their support by consuming fossil resources in most every aspect of their life and accepting lower returns has no clear benefit.

Similarly, a divestment decision made for potential non-financial psychological and emotional benefits is difficult to defend. The public debate is largely over the rate and pathway to progress sustainability not whether or not it needs to someday be done, any emotional impact that divestment might have will not further the fundamental argument. As there are no economically sustainable alternatives, divestment will not motivate adoption of any desirable energy option at any particular time. The financial impact divestment might have on fossil fuel producers either directly or by any multiplier effect on other investors following the University’s lead, would likely appear as higher fuel prices hurting disproportionately those least able to pay.

Emotions were the driver for biofuel mandates in the U.S. which led to significant taxpayer and investor losses as large subsidized facilities were constructed with no possibility of solvency, these projects provided no progress towards sustainable fuels. Funding for sustainable energy research is now more difficult to obtain. Emotions drove Queensland to use taxpayer’s money to pay for massive numbers of uneconomical solar panels primarily for their wealthiest citizens who will capture economic benefit from the pockets of less fortunate tax and ratepayers for decades to come. No progress towards a sustainable energy future was achieved, only a demonstration of just how high electricity rates can go with bad management.

The greatest progress in sustainability has been from efficiency improvements motivated by the economics of fuel cost reductions. New ideas from creative minds pursuing stably funded research in Universities can make progress on sustainability. The history of emotionally based strategies for progressing sustainable energy is dismal.

Divestment that results in lower returns on University investments will only harm progress on finding meaningful pathways to sustainability.
An international campaign, initiated in the United States, is calling for universities to divest their investments in companies engaged in fossil fuel production because their assets will become stranded. Here are 5 reasons I think divestment would do more to harm than help our progress towards a sustainable future.

Divestment won’t make a difference because:

1. **The fossil energy reserves of corporations will not be stranded.** Fossil energy companies are valued on their known economic reserves, not total resources. Reserves are typically turned over every 10-15 years and are not at risk of being consumed because scalable cost effective technologies are unlikely to threaten those reserves during that time span.

2. **Publicly traded energy corporations own less than 20% of global fossil energy resources.** More than 80% are owned by nation states like Venezuela, Saudi Arabia, Iran, Iraq, Russia, China and Libya whose production will increase to meet any withdrawal of supply by our corporations.

Divestment might harm progress towards a sustainable future because:

3. **Large energy companies have been and will continue to be responsible for some of the biggest investments in renewable energy.** They have the technical and financial capacity to accelerate renewable energy deployment if and when scalable, cost-effective technologies are capable of replacing fossil fuels.

4. **Both the IEA and IPCC forecast that fossil fuel use will continue to be significant in 2050 and that carbon capture and storage (CCS) is crucial to meet our emissions reductions goals.** Only the oil and gas corporations have the technical and operational expertise to develop and deploy CCS at scale.

5. **Reducing emissions is our shared responsibility.** The accused companies producing and converting fossil fuels do so to provide the goods and services that society desires and, in many cases, considers a basic right. Demonsing these companies shields everyday Australians from the collective obligation to increase energy efficiency and reduce national carbon emissions. It is our responsibility to change our behaviour to consume less energy and energy intensive products if we are going to reduce energy use and carbon emissions.

Finally, fossil energy production is neither illegal nor unethical. The universities’ investment strategies should be based on maximising returns to the university and not an advocacy / activist agenda.
Engineering Challenges
Engineering and technology advances continue to transform the world we live in, improving health, societal and economic prosperity for our global population.

However, as the human race continues to evolve, populations swell and resources become ever more precious, significant challenges are emerging.

In the 21st Century our world continues to be confronted by environmental, health, climatic, and sustainability challenges. The solutions to many of these complex issues rest within the hands of engineering and technology leaders and innovators. We’re proud that some of UQ’s greatest minds are leading the charge…
With a maximum temperature of 46 degrees after a two-month dry spell, Victorian firefighters knew that Saturday, February 7 would be extremely challenging. The weather conditions of this now infamous day in 2009 were some of the worst bushfire conditions ever recorded in Australian history. As many as 400 individual fires were recorded across rural Victoria, affecting 78 townships and their occupants, meanwhile an estimated 7,563 people were displaced from their homes as the threat of bushfires loomed. The infamous Black Saturday fires resulted in Australia’s largest loss of life from bushfires, claiming the lives of 173 people, and injuring 414. Tragedies such as those of the Black Saturday fires have highlighted the need for a more remote and efficient way to monitor climatic conditions prior to, during and after the event of a bushfire. Real-time information about environmental conditions is extremely valuable for the highly-dynamic and safety-critical activities of bushfire fighting.

Rapidly shifting fire-fronts pose a danger to fire crews who may not have accurate intelligence about fire movement from observation posts, or who suffer from degraded situational awareness due to smoke and wind. Obtaining measurements about fire development at ground level is extremely risky as sudden changes in wind can cause workers to be overrun by the front.

Even after a fire has passed through, an area may not be safe for crews to enter until the ground has cooled sufficiently. Safety is difficult to ascertain without subjecting volunteers to potentially hazardous conditions, and the deployment of people to unknown conditions is not only expensive, but can often result in fatalities.

Dr Paul Pounds and Professor Surya Singh are confident that a technological development they’re working on will not only safely provide information on climatic conditions required by the fire brigade, but that, ultimately, this device can be mass produced for a low cost. “In small, hand-built quantities, the devices cost $100 each to make, but it is expected that the cost of a mass produced version could eventually be as low as $10,” Dr Paul Pounds said.

Pounds and Singh’s ‘Disposable Self-Deploying Sensor Modules’ are designed to land in close proximity to a fire front or onto recently burned ground, to take measurements such as local temperature, pressure and relative humidity, which are then transmitted back to the receiver. These can provide critical clues about how the atmospheric environment is changing around a fire, and give warning about which areas may be unsafe.

Mirroring the natural function of the maple or ‘samara’ seed, the device’s electro-aeromechanical design is a self-deploying sensor module which has a variety of benefits for environmental applications. “One of the problems we encountered with the device was the inability to safely deploy a sensor widely over rugged and diverse terrains, while keeping costs down. Trees have to solve the same problem, which led us to the samara seed. These well-known seeds consist of a fibrous fruit that is elongated into a wing. When the seed falls from the tree, the wing auto-rotates under passive aerodynamic forces that slow the descent, increasing the seed’s chances of being caught by a gust.\n
ENGINEERING CHALLENGES

Dr Paul Pounds

Fighting fires with technology
Field trials have shown that the system is extremely reliable. In tests, a fully autonomous quadcopter flew through several GPS waypoints, releasing a sensor at each one. Each deployed sensor successfully entered spiralling flight and soft-landed with 100 percent success rate. Using this system, large-scale wind maps were built by tracking the motion of each sensor as it descended, and in a series of deployments, the changing wind patterns could be identified over the course of a day. In its current form, the sensors can transmit data up to 100m, but future work will allow much further range.

Dr. Pounds has had much interest in the technology, both from local organisations including the Queensland Rural Fire Service, and international fire organisations in Canada and the United States.
ENGINEERING CHALLENGES

Engineering a Skin-Safe Future

Touted as the ‘Sunshine State’, Queenslanders have developed a love affair with the sun which is having detrimental effects upon their health. Too much exposure to ultraviolet light has resulted in Queensland reporting the highest rate of skin cancer in the world.

Early detection is key to decreasing the health risks and potential deaths associated with skin cancer. Led from the engineering side by Associate Professor Aleksander Rakic (PhD 2000) and Professor Stephen Wilson (PhD 2000, MBBS 1999), a collaborative team of engineering and clinical researchers are changing the face of skin cancer diagnosis. Developing a ground-breaking laser imaging system that safely provides a different view of skin structure to that achievable with visible light, their revolutionary technology has the potential to vastly improve the detection and diagnosis of the disease.

“At present, doctors assess skin cancer simply by looking,” says Professor Stephen Wilson. “They may use a hand-held magnifier – the dermatoscope – to help, but essentially their visual inspection is what determines whether or not further treatment is required. “We know that other parts of the electromagnetic spectrum can tell us much more about the nature of the tissues and structures underlying the top-layer of skin (epidermis), particularly through the use of Terahertz (THz) radiation. However, applying THz imaging to clinical medicine has been held back to date mainly because of the lack of compact and robust imaging systems. “Our research has overcome these difficulties and demonstrates the potential of using self-mixing (or laser-feedback) interferometry (analysis of electromagnetic waves) in a new THz microscope design.”

What this means is that previously “invisible” skin tissue structure and contract can now be seen. “We hope our new system will be the precursor to a device capable of discriminating malignant from healthy skin tissue for use in clinics without having to rely on laboratory-based instruments,” says Associate Professor Aleksander Rakic.

Still in its infancy, the team of researchers have built a prototype system, which they’re hopeful will help combat skin cancer by facilitating early detection of the disease, leading to much better outcomes for patients. “Although the prototype is currently laboratory based, it could well follow the trend that sees complex technology become common place.”

“Our approach encompasses not only the School of Information Technology and Electrical Engineering, but is a collaborative effort with the School of Medicine’s Professor Peter Soyer whose dermatological research focuses on translational skin cancer research,” Associate Professor Rakic said. Under Professor Soyer’s leadership, UQ’s Dermatology Research Centre has successfully developed systems to accelerate early detection of skin cancer – work that will ultimately save lives.

As Australia’s lifestyle continues to focus on the great outdoors, skin cancer diagnosis is reaching epidemic proportions. The research conducted by both the School of ITEE and the School of Medicine in line with the Dermatology Research Centre has never been more important.
Adaptation, the key to change

Engineers have a critical role to play in considering how best to respond to climate change and its potential impact, with mitigation of risk – through alteration or adaptation – a vital component of any response.

While many climate change issues and solutions have not yet been agreed upon, for some low-lying communities in the Asia-Pacific, the time for debate is over; the time for action has come.

Located less than two metres above sea level, Taro – a Solomon Islands provincial capital – is one such community at risk. “The community’s close proximity to the sea presents a significant risk, which will be compounded in the future with climate change and the resulting rise in sea levels,” Professor Tom Baldock (GCELed 2012) said.

Working with British Maritime Technologies WBM (BMT WBM) and Buckley Town Planners, UQ researchers, Professor Tom Baldock and Dr Simon Albert (PhD 2008, BAppSci 2001) have developed a comprehensive climate change adaptation plan to move the town of Taro, and its population of 800, to the adjacent mainland. The relocation plan marked the first time a Pacific Islands capital, with all of its services and facilities, would be relocated due to coastal hazards and climate change.

Unfortunately, relocation is the only option available that will keep the community safe. The capital’s relocation – including schools, hospitals and businesses – will take many decades to complete, and will also increase the community’s resilience to coastal hazards such as tsunamis and ocean storms.

“Planning for this relocation relied not only on climate change and engineering understanding, but also needed to be based on detailed social, cultural and political factors,” Dr Albert said. The multi-disciplinary team of engineers, scientists and town planners consulted extensively with the Choiseul Bay communities to develop a vision and future town layout that reflected the needs, traditional values and expertise of the local Lauru people. “The project followed the ways of our traditions – talking with people, listening to people, and reflecting on the desires of the people,” Choiseul Province Premier Mr Jackson Kioe said.

The project is now being hailed by the Solomon Islands National Government as a best-practice model for natural hazard resilience planning for other provinces across the Solomon Islands and more broadly across the Pacific region. It was recently referred to in a speech by UN Secretary General Ban Ki Moon at the Small Islands Developing States conference.

Recognising the ground-breaking work conducted on the Choiseul Bay Climate Change Adaptation Plan, the collaborative team has won the category of ‘Best Planning Idea – Small Project’ at the Planning Institute of Australia’s National Awards.

The award is a testament to the great collaborative effort between the community, the stakeholders, the governments and the study team in coming up with a plan that we believe is achievable and responsive to the existing and future risks faced by the Taro Island community.
Living in the world’s driest populated continent, the value of water to the Australian people has never been greater. Water is one of our world’s most valuable resources and, in a century filled with warnings about the impacts of climate change, continues to bring together the great thinkers across our nation to ensure its safe stewardship for future generations.

As the population of Australia continues to increase, so does the growth of urban centres and inner-city dwellings, placing ever larger demands upon the existing water supply, waste-water and drainage systems – and the associated high-value infrastructure.

Challenging scientists, engineers, economists, environmentalists, architects, and sociologists, the question of how to future-proof Australia and create liveable, productive, sustainable and resilient cities has become a national priority.

Recognising the need to provide answers and innovative solutions to these challenges, a network of 85 universities, government entities and private-sector organisations are working together in the Cooperative Research Centre for Water Sensitive Cities (CRCWSC), established in 2012. Supporting this vision for cities of the future, the Australian Government has provided $30M funding to the CRCWSC until 2021, with additional contributions from partner organisations.

Deputy Director of UQ’s Advanced Water Management Centre (AWMC) and interim Chief Research Officer of the CRCWSC, Professor Jurg Keller says that collaboration between academics in diverse fields, decision-makers in government and those within the water industry is vital to find solutions for current and future water management problems.

“Queensland provides interesting challenges and great opportunities for innovative and efficient water system integration with the combination of rapidly increasing, dense inner-city residential areas as well as large, new suburban housing developments,” Professor Keller said.

On this theme, the CRCWSC is assessing the complexities of integrating centralised and decentralised water service options. It takes into account the local structural and environmental factors, and also the public and political willingness to introduce and utilise alternative schemes in the long-term.

“At AWMC we focus particularly on innovative future technologies to improve the performance of water distribution and wastewater collection systems, which make up about 70% of the total water infrastructure value in urban areas” says Professor Keller.

“Through numerous collaborative research projects, we’re helping urban water utilities and local councils save millions of dollars every year by improving wastewater system processes and minimising infrastructure replacement impacts.

However, to establish more effective water sensitive cities, many other disciplines including social sciences, humanities, economics as well as planning and architecture all need to be integrated and with an equally wide range of stakeholders including local and state government entities, utilities, developers, consultants and other private-sector organisations.

To help bring all these important stakeholders together with the researchers, the CRCWSC has created highly integrative ‘synthesis projects’. A recent synthesis project focused on the Ripley Valley near Ipswich, where a 50,000 house green field development is planned that could become one of the first in Queensland to demonstrate some leading-edge achievements from ongoing water management and urban design work across Australia.

It is this broad and integrated approach to managing the urban water cycle that encompasses a diversity of stakeholders and disciplines, and that is what makes the CRCWSC unique in its vision to develop increasingly effective water sensitive cities of the future.
From bushfires to skin cancer, climate change to conserving our natural resources, the research being conducted across our Faculty is safeguarding our communities and ensuring that our present and future world will be sustainable for future growth.

At UQ, it is important to us that our world class research and the knowledge acquired translates to societal benefits. Philanthropic support of these endeavours matter. It helps to ensure a global community can learn and benefit from engineering and technological advances. Combining many smaller gifts with larger transformative philanthropy at UQ has the power to revolutionise how we combat – and eventually overcome – these challenges we are facing.

If you are interested in making a gift, large or small, to translatable research at The University of Queensland, please contact:

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International collaboration in research and innovation, particularly across the Asia Pacific region is a strategic priority for Australia. As a global top 100 university, UQ has been leading partnerships with top Asian institutions and industry for many years, establishing particularly strong relationships with Chinese partners.

As one of the champions in strengthening these close ties with China, I am delighted to offer some personal perspective here. I am currently Provost and Senior Vice-President at UQ. I grew up in Shandong Province in Eastern China and commenced my studies in engineering at Northeastern University at age 16. I came to Brisbane in 1987 to study for my PhD in Chemical Engineering at UQ (graduated in 1991). After a brief spell of three years spent teaching in Singapore, I have been proudly associated with UQ ever since my return as senior lecturer in 1994.

In some ways, to many Australians, China seems to be very foreign and incomprehensible. However, we are all dealing with similar challenges – and they are some of the big ones – energy, environment and climate change, agriculture and food security – amongst many others.

China is currently the second highest Research and Development (R&D) spending country in the world (having recently reached 2.0% GDP on R&D) and aims to become an innovation-based economy by 2020. China’s intensity in R&D is driven by economic dynamism and its long-term commitment to science and technology driven economic transformation.

China’s strategy for innovation has seen the establishment of multiple national engineering centres and clusters, acting as catalysts for entrepreneurship and innovation capacity building. Through both national and international collaborations and partnerships, Chinese industries are now
moving towards longer term investments in high quality and strategic research.

This long-term strategy to advance the economy presents a fantastic opportunity for Australia to work with China to synergise our complementary areas of strengths.

UQ’s close links with multinational companies such as Dow Chemical, who also have hubs in China, provide an opportunity for the University to engage in collaborative research. Dow Chemical’s commitment towards a more sustainable future has led to the establishment of the Dow Centre for Sustainable Engineering Innovation at UQ, supported through a $10 million gift from the company.

Officially opened in December 2014, Dow Chemical Company’s President, Chairman and CEO, and proud UQ alumnus, Dr Andrew N. Liveris (DSc 2005; BE 1975) said China’s growing commitment to sustainability coincides with Dow’s own philosophy.

“We have implemented rigorous sustainability goals, which benefit our bottom line and the environment,” Dr Liveris said. “R&D is key to Dow’s innovative efforts. The R&D centre in Shanghai plays a critical role in leveraging the talent and innovative spirit of our Chinese scientists and engineers to develop new approaches to address our planet’s most significant challenges. The centre is just one way we can harness the interests of the young Chinese who are pursuing science and engineering futures.”

In 2011, as Deputy Vice-Chancellor (Research) I coordinated the establishment of a joint R&D Centre between UQ and Shanghai-based company, Baosteel, one of the world’s top three steel producers. Baosteel has committed $25 million to a research partnership between UQ, the University of New South Wales, Monash University and the University of Wollongong.

The Centre is creating fundamental knowledge and innovative technologies which hold commercial relevance to the steel industry, focussing on metallurgy and new materials, energy utilisation, and environmental sustainability. The centre has proven to be very successful and fruitful with its own intellectual property generated from various projects.

Chinese venture capital is starting to come to Australia to invest as well. I am confident that over the coming years, there will be growing opportunities to attract Chinese venture capital investment to support start-up companies or to facilitate prototype manufacturing in China.

“The cross-cultural transfer of knowledge and expertise is key to developing solutions for the challenges humanity faces in the future. UQ has more than 100 active links with Chinese Universities and Academies of Science, and more than 450 joint papers per year focussing on clean energy, climate change, neuroscience and genomics, marine and environmental sciences, immunology, bioengineering and nanotechnology.

Currently, more than 3000 Chinese students study at UQ across a range of disciplines. As part of a collaborative program between the Faculty of Engineering, Architecture and Information Technology and its Chinese partner institutions, Chinese students are taking advantage of the opportunity to undertake the final year of their engineering program at UQ.

For Zhu Yutong from Tianjin University, for example, the UQ Engineering China Partner Program is a valuable opportunity for students to study in both Chinese and Australian universities. “Most Chinese university students who want to pursue education overseas have to wait until they graduate, but this program allowed me to study overseas within my bachelor degree, and provided me with the opportunity to experience both a Chinese and Australian education,” Zhu said.

The University recently signed a Memorandum of Understanding (MOU) for a joint partnership with Jilin University and the Shenzhen Government in China. Feasibility work is under way towards the establishment of a UQ campus in China, which would have the infrastructure capacity for 5000 students, some major research laboratories and a commercialisation hub in the broad fields of new energy, biosciences and environment.

We are citizens of a global community that face grand challenges in the future. As the next generation of professionals in engineering, science and technology take advantage of the opportunities to collaborate with partners in China and other countries in Asia, the University is in a stronger position to capitalise on the ‘Asian Century’.
What is the Colombo Plan for Cooperative Economic and Social Development in Asia and the Pacific?

First implemented in 1951, the Colombo Plan was launched as a cooperative venture for the economic and social advancement of the peoples of South and South East Asia. Based on the partnership concept of self-help and mutual help, the Colombo Plan was originally intended to assist in the transfer of both technology and skills development from developed countries into developing countries.

The Colombo Plan was initially hosted by Australia, Britain, Canada, Ceylon, India, New Zealand and Pakistan.

For Dr Lim Huat Seng, all it took was one opportunity to change the course of his life.

Travelling from Malaysia to Brisbane in 1964, the world which Dr Lim (BE 1967) knew quickly changed from that of a developing city, to one full of technological advancements and fast food restaurants. Leaving behind the humble Malaysian town where he grew up, Dr Lim took a chance on a scholarship to study Electrical Engineering at The University of Queensland - a scholarship which offered him the chance to better the prospects of his home country through that of his own education.

Having just completed his 6th Form in Malaysia, Dr Lim arrived in Brisbane one week before classes were due to start.

“When we first landed in Brisbane and stepped foot on the University campus, it all seemed so grand, and was such a pleasant first impression,” Dr Lim said.

With no accommodation booked Dr Lim, along with two other Colombo Scholars, was offered a boarding place at Kings College under fortuitous circumstances. “It was just by chance. We took the bus and the first college on the bus route was Kings College. So we walked in and met the Master. He told us ‘you are very, very lucky that some of our students didn’t show up and we have some vacancies. We would love to have Colombo Plan students.’”

Having recently travelled back to UQ to celebrate 51 years since he first arrived, Dr Lim was delighted to share memories and thoughts of his time at university. “It was when I started working that I realised UQ Engineering was very unique and showed leadership in areas such as close links with industry. At that time, I can remember Dr Parnell, Dr Darveniza and Dr Prentice talking about working with the Queensland Electricity Industry in 1964! Today everyone talks about partnership with industry, but in 1964, UQ was already doing that.”

It wasn’t all about the study though. For the Colombo Plan Scholars their time at UQ, and indeed in Brisbane, provided them with a chance to socialise with their fellow students and engage in the college lifestyle. “The other thing which also affected my life a lot was the campus life – of course staying in Kings College helped. There was always lots of fun and games between the Colleges and students. The thing that I love, and always joke about with my school mates is that in
this University, every weekend – every Friday and Saturday night there is a function – if not engineering, it will be medicine, if not medicine it will be the Hong Kong student association, the Malaysian student association, or a smoko! It was a good balance between academic study, lab work, sports and extra-curricular activities – that’s what a university should be.”

Graduating with a Bachelor of Electrical Engineering in 1967, Dr Lim headed to the University of London, U.K., as a Commonwealth Scholar, where he obtained a Ph. D. in Computer Science. Having discovered the potential of computers for complex problem solving in engineering during his student days at UQ, he returned to Malaysia to advocate and develop a wide range of computer applications across multiple disciplines at the University of Science of Malaysia.

His exploits resulted in a call up from the Malaysian Prime Minister’s Office, state governments and statutory boards to provide computer consultancy and advisory services to the public sector in the late seventies. His incredibly successful and varied career accelerated with Dr Lim going on to a number of senior executive positions in several Asian and U.S. multinational companies, including Packard Bell NEC, Compaq Computers, and the technology arms of Keppel Corporation and Sime Darby Berhad. Dr Lim has been affectionately termed the “technology gatekeeper” in developing countries of Southeast and other parts of Asia; he attributes much of this success to his time at UQ and participation in the Colombo Scholars Plan.

Throughout the decades that the Colombo plan was implemented in Australia, it is calculated that by 1980 as many as 20,000 students had benefited from the Colombo Scholarship plan. As Dr Lim says of those who took part in the program, “I cannot think of a single one of us who was not successful. They became a success for themselves, but they also contributed a lot to the rest of their country.”

As we near the 64th anniversary of the original Colombo Plan for Cooperative Economic and Social Development, the transfer of knowledge from developed to developing countries can certainly be considered a success. In reviews of Colombo graduates from engineering disciplines at The University of Queensland, this success is clear – each engineering graduate has indeed gone on to lead a successful career – with Professors, Chairmen, Directors of National and International corporations, and a Chief Mineral Economist amongst the graduates. Back in a period where their home countries were still developing economically and socially, it’s hard to say what sort of career paths these talented students would have had without assistance from Australia and the other Commonwealth nations.

For these Colombo Scholars, their UQ education was indeed life-changing.

Today

Re-launched in 2015, the new ‘Colombo Plan Scholarship Program’ has opened up a new world of possibilities to Australian undergraduate university students. The $100million program provides Australian students with the opportunity to study at any one of the 35 host countries across the Indo-Pacific zone, strengthening relationships between individuals and institutions across the region.

Dual Engineering/Economics student, Kristie Higginson is one such student who, having received a New Colombo Plan Scholarship, is broadening her international knowledge and experience while studying at the Waseda University in Tokyo, Japan.

If you have a story you would like to share about the Colombo Scholars Plan, please get in touch with us via email: alumni@eait.uq.edu.au
We’d love to hear from you!
100 years on
The year is 1914 and Australia, as a 13 year old nation, is about to experience the most devastating loss of life in its short history. Throughout the four years which World War I raged, approximately 420,000 Australians enlisted in the young nation’s armed forces, representing 38.7% of the male population aged between 18 and 44.

For those left behind at home, the wait for news was agonising. On May 12, 1915 The University of Queensland celebrated the graduation of its first cohort of Mechanical Engineers, with one notable absentee; newly minted Mechanical Engineer Norman Austin Lloyd (1915) had already enlisted in the Australian Armed Forces and left behind UQ and his engineering degree to embark upon active service.

Departing from Hobart on the HMAT Geelong, Norman was one of 996 army personnel aboard the same ship. Promoted to Sergeant on August 26, 1915 Norman served as an Engineer within the 3rd Field Company Engineers, Australian Imperial Forces, Royal Engineers – putting his engineering knowledge to very good use. The 3rd Field Company served throughout Egypt, Gallipoli and the Western Front, and was responsible for constructing bridges and roads, as well as the demolition of existing infrastructure. One of the lucky ones, Norman was discharged from the Australian Armed Forces while in England on March 12, 1916.

Meanwhile after graduation, life for Stanley Miller (1915) followed a similar path. After graduating from UQ, Stanley travelled to England where he enlisted in the British Armed Forces special reserve B1 Loyal Engineers, Group 2. Employed as a munition worker, Stanley was responsible for the development of ammunition and weapons used by the Armed Forces. In a letter home to his parents, Stanley told of his work in furthering the war efforts for Britain. “At present we are in the midst of a crisis from which to emerge successfully we must buck up. The people have at last realised the seriousness of it all, I wonder if you all do out in Australia,” Stanley wrote. Having seen out the war in England, Stanley returned to Australia where he became Chief Engineer of the Vacuum Oil Co.

For such a young university, UQ contributed greatly to the nation’s war efforts. 118 members of the UQ Community participated in the war, and assisted in the allied forces war efforts. April 25, 2015 marked the first anniversary of the landing at Anzac Cove. To this day, the deepest of respect is paid to all servicemen and women past and present. Lest We Forget.
Tech A Look At Me Now

Three boys from Brisbane are leading a global disruption in digital services, eyewear and designer women’s shoes. We speak with these UQ alumni whose entrepreneurial activities suggest that perhaps we need to be looking closer to Fortitude Valley, rather than Silicon Valley, for the people and ideas who will drive Australia’s tech-focused innovation agenda...

Visionaries

Founded by two young entrepreneurs, UQ alumnus, Peter Winkle (LLB/BSc 2007) and friend Nick Perry, Bailey Nelson’s success was built on the basic concept that great glasses shouldn’t cost more than an iPad...

Peter came to The University of Queensland to study Computer Science and Law. Most of his first few years were spent rowing, until he realised he “actually had to spend some time on study to get his degree!”

He greatly enjoyed his time at UQ and recalls being more focused at the time on being a lawyer, as opposed to following a career in computer science. Following his graduation, Peter opted to pursue a career in management consulting rather than law, joining McKinsey & Co. After four years at McKinsey, Peter took a break and moved to South Africa to consult for a not-for-profit organisation in the agricultural sector.

It wasn’t until he returned to Australia, having taken a role with a venture capital firm in Sydney, that his eyes were opened to the possibilities of becoming an entrepreneur himself. “Naively, I thought that it didn’t seem that difficult,” Peter recalled.

So, with this positive and gutsy attitude, Peter set out to make it happen. In 2012, Bailey Nelson was founded when Peter teamed up with Nick Perry, who had been a member of the founding team of successful online retail store, The Iconic. These two ambitious young men saw a gap in the market for high quality optical glasses to be delivered to your door. The vision was simple – to deliver fantastic eyewear frames at a reasonable price, backed up by great service. In Nick’s words, “Buying my first pair of glasses at university meant I couldn’t afford to go out socialising for a month. We thought we could do something to improve that for future generations of students.”

Passionate about design, materials and quality, the duo realised that a quickly changing world was opening up new opportunities to simplify the supply chain and streamline manufacturing and order processing. “We looked around the world at the best models and saw that people in Europe and the US had great options for high quality glasses at fair prices, but in Australia the options were somewhat limited,” said Peter. “We knew there was a mismatch that we could address.”

The first couple of years at Bailey Nelson were mostly focused on disruptive play – selling high quality frames at reasonable prices, online, direct to the consumer. The pair focused relentlessly on service and word of mouth to grow the business through positive customer experiences. Over the last year, the business model has evolved to a more complete service provider, with their online success complemented by the establishment of optometry practices in Sydney, Melbourne and Brisbane.

Peter’s leadership of the start-up Aussie eyewear design company has seen 13 ‘bricks and mortar’ stores established across Australia with 100 plus staff. Adding to that, a further four have sprung up in London and most recently two in Canada. It’s been quite a ride in just a couple of years.

On reflecting on his career successes to date, the advice that Peter has for young people who are looking to start their own business is threefold: “Plan carefully but not at the expense of action, always double your estimates for how long things take, and work with people you want to spend your time with.” And most importantly, “Go for it!”
David Harrison’s desire to play multi-player video games as a teenager has evolved today into his creation and leadership of Mammoth Media, a highly successful full service digital agency.

David always had a fondness for computing and a passion for computer games so naturally, when it came time to consider university, David enrolled in a Bachelor of Science, majoring in Computer Science at UQ.

“I actually started out doing mostly biology and chemistry, with only a small focus on computer science. I didn’t really enjoy that and ended up taking a break after my first year, but returned pretty quickly with much more focus on the computer science side,” David recalls.

“To be honest, despite having a long history with computers, I struggled with the curriculum at first – it took me a while to realise that ‘computer science’ is quite a literal term and doesn’t just involve messing around playing games! A lot of the core principles are decades old and I naively thought that they would be outdated and useless. It wasn’t until I got into some of the more advanced courses that I realised how fascinating a lot of it was and how critical it is to understanding what makes things work.”

The catalyst for the contemporary business that is Mammoth Media stemmed from a simple desire to play video games with friends. “We certainly never set out to build a software company that specialised in custom web development and cloud services. We were riding the wave that was the explosive growth of multiplayer video games - it grew from humble beginnings, running small LAN-based video gaming events in school halls with just a few friends, to filling the indoor arena at ANZ Stadium in Brisbane with over 500 people,” David said.

In 1998, Ausgamers, the online business that would transform into Mammoth Media was born. As broadband internet access grew, David and his friends started providing online gaming services, and in 2001 Telstra, looking to revamp their online gaming, music and movie services, started to take notice. David and his team, with their newly renamed business, Mammoth Media, launched their product GameArena – technology that Telstra was quick to adopt – saving the telecommunications giant about $1 million per year. The user experience and interface of Telstra’s Bigpond Games was transformed through this new platform.

In 2003, Mammoth Media employed their first developer who is still with them today. Today, there are 30 employees with the company boasting a long list of clients including Sky News, Telstra and Stadium Fantasy Sport.

So, what advice does David have for the next generation of tech entrepreneurs looking to get involved in the tech start-up arena? “Get involved in your local start-up ecosystem – it is exploding in Brisbane at the moment, and in many other places in Australia, with awesome regular events being held. Meet people in this space and ask them about their story - ranging from people who have been running a brand-new start-up for a couple of months all the way up to successful veterans who have years of experience in a variety of fields.”

Brisbane is also seeing the growth of larger events like ‘Start-up Weekend’, which allow budding entrepreneurs to actively participate in the compressed process of coming up with an idea and executing it. “They’re a great way to get some exposure to the start-up world and to learn an important first lesson – it’s about doing, not talking,” David said.

And what does this avid gamer’s next business chapter look like? “We’re continuing to expand our cloud and hosting business, which has grown over the last few years to become a significant business in its own right. We’re just about to launch a new expansion for our Binary Lane service, adding a Sydney data centre presence to our existing Brisbane one, which we’re really excited about. Busy times ahead and we’re looking forward to continuing to expand our platform both in Australia and overseas!”

Media with Digital Grunt
TECH A LOOK AT ME NOW

Three words: your perfect shoes.

FROM LEFT, MICHAEL FOX, JODIE FOX & MIKE KNAPP
In 2009, Mike Knapp, a UQ Computer Science and Law graduate, with friends Michael and Jodie Fox, launched what is now the global multi-channel retail brand, Shoes of Prey.

Mike had tinkered with computers from a young age, and in high school, was inspired by “an incredible IT teacher”, Peter Whitehouse. “He really opened my eyes to the beauty of computer programming, and inspired me to study computer science despite, at the time, thinking I would certainly become a lawyer. Mike has fond recollections of his time at UQ. “I absolutely loved studying computer science at The University of Queensland. To this day, I wish I could go back and do more!” Mike said.

During his time at UQ, Mike met fellow Co-founder, Michael Fox whilst studying Law and quickly formed a friendship. “Michael was a lot of fun and, in our final year, was the president of the Law Student Society. He was great at managing people and organizing things, and we both enjoyed talking about start-ups,” Mike recalls.

“So what next for Mike Knapp and Shoes of Prey? Mike says that “in many ways we are at the very beginning of our journey. There are so many things left to accomplish with Shoes of Prey, and I’m sure my schedule will be full for the next 10 years!”

As the company’s Co-founder and Co-CEO, Mike’s passion for developing the world’s slickest shoe design interface is only matched by his interest in cutting-edge technology and online learning. “We want to expand our retail stores, continue to create beautiful products and cool technology, and also create a world class organization that treats its workers with dignity and respect. I feel very energized about the future.”
For Lisa Siganto (BE 1982) and Greg Coghlan (BE 1982), their fathers provided engineering inspiration that transcended two generations...

Greg’s father, Paul Coghlan (BE 1955), was one of six children growing up in Brisbane, living in Nundah on the Northside. His parents struggled on a modest clerk’s wage with all six children attending the local catholic primary school, and then high school at St Joseph’s Gregory Terrace and St Rita’s College. Due to Paul’s high academic achievements at high school, the Christian Brothers awarded him a scholarship to complete year 12. “Without this, he would have left school after completing year 10 like his two older brothers,” Greg said.

Finishing school, Paul pursued further study in engineering, primarily due to his love of maths but having started University, discovered his real passion for civil engineering. “My father was the Port Engineer and ultimately Engineering Manager for the Mackay Harbour Board from 1965 until his retirement in 2003 – the only job I ever experienced him doing,” Greg recalled. This was an instrumental role in the expansion of Mackay Harbour as a major port in Queensland. “I spent many holidays working as a labourer and draftsman at the Port during school holidays and saw firsthand the Port expansion and structures that he was responsible for. I was inspired to be involved in the design and construction of similar structures to provide further civil infrastructure. How he was regarded and respected by the workers and how he genuinely looked for ways to develop them for their own benefit and that of the Port was an inspiration to me in choosing my career path. That respect was for him as a person, but also because he was ‘The Engineer’,” Greg said.

Greg, thus inspired and enthusiastic about his future as an engineer, enrolled in a Civil Engineering degree at The University of Queensland, where we would meet his future wife. Lisa Siganto and Greg Coghlan enrolled to study engineering at The University of Queensland inspired by their two fathers, a legacy that would transcend two generations within their family. While for Alan Grummitt, his brave leap into the unknown world of tertiary education inspired many more ‘firsts’ down the line for his children...

A Family Legacy – the Sigantos and Coghlans

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He had done well at school and wanted to give higher education a go and build a professional career of some kind. Arts, Law, Science and Medicine didn’t interest him in the least. Dad was always clever and resourceful but I think engineering must have helped him develop further his wise and brilliant mind. He was independent, resilient and a problem solver.”

Bill Siganto AM was the only child of older parents and spent much time on his own. His childhood was spent either at home in Brisbane tinkering with meccano or toy trains, or spending holidays fencing and chasing cattle at farms in Tambourine and Coomera. He was always trying to make things work or ‘not work’.

As a Mechanical Engineer, Bill set up Siganto and Stacey Air Conditioning Pty. Ltd. in 1968, which he successfully led throughout his working life and proudly handed over to Lisa’s engineering graduate brother, William (BE 1987). Bill and his wife, Marie Siganto AM, had six children, with Lisa recalling a lot of “engineering osmosis” going on in the Siganto household growing up. “Although Mum had her own career path with a PhD in English literature she was part of a dynamic team of household engineering-like project management and implementation. The dinner table could be a fun but tough place. We were encouraged to use our minds but with strong, fair values at the heart. We would be interrogated on
our subjects of interest and learned to enquire, investigate, develop and prove our hypotheses. We were encouraged to give all problems a go, analyse as much as possible – we could do anything and failure was okay, but only after trying hard. There were many rowdy debates and one couldn’t get away with an unsupported logical analysis, no matter how old you were!"

A special memory, and one that sparked Lisa’s interest in engineering, was when her father took her into the business after dinner and very deliberately taught her to use the BASIC mainframe computer he had installed in the early 70s. Lisa remembers vividly how the computer filled the whole room!

When it came time for university, Lisa’s teachers were somewhat surprised at her choice. “The nuns at school didn’t know what I was talking about when I said I was putting engineering as a first choice, but it seemed perfectly sensible to me,” Lisa said.

And so, in 1979, Lisa too enrolled in the Bachelor of Engineering at UQ. Both she and Greg hold very fond memories of their time on campus. Greg recalls “the establishment of lifelong friends and being connected with such a beautiful campus with history…including my father’s education,” amongst his favourite memories.

Lisa “loved every minute of it and thrived in the learning, specifically, the variety of subjects and the opening of wide-ranging career possibilities across engineering. Maths was my thing and engineering was a way of practically using maths, with all the engineers seemingly speaking my language. It was learning to use my mind on complex problems, including how to map and model a situation or issue to be resolved, that has put me in good stead for life.”

Of course the social life on campus was also a drawcard for Lisa and Greg. They enjoyed sitting in the Civil Engineering building, studying, eating Freer’s Red Seal chips, and “doing afternoon pracs” at the Regatta Hotel.

The best thing about their time at UQ however, was that they met one another. “My sister said that since I was the only girl in my year’s Civil Engineering class, Greg had to eventually notice me, which luckily he did,” Lisa joked. Greg recalls their paths crossing during the Great North Tour. “In my 4th year I was Secretary of Civil Engineering Students Association (CESA) when the executive was to organise the 4th Year Great North Tour – a trip by train up the Queensland coast and visiting civil infrastructure construction sites and established facilities. In 1981 there were only about 25 final year students and not all 4th years chose to come on the tour. With its financial viability in jeopardy, we invited some of the 3rd year students to join us,” Greg said. Third year student Lisa, who he described as the “diligent, conscientious student,” took this opportunity to further her insights into civil engineering ahead of her peers. And as they say, the rest is history!

Greg and Lisa married in 1989 and have four children, two of whom also have a thirst for engineering running through their veins. Their son Jack graduated in 2011, while their daughter Florence is currently enrolled in a UQ Chemical Engineering degree.

When asked what Greg and Lisa are most proud of in their personal and professional lives, it is that they have been a successful team balancing two careers alongside their strong family values. They have “raised four well educated and socially responsible children, and are a strong, happy, supportive and loving family that stick together through thick and thin.” There’s a lot the two have learnt throughout their working lives, which have shaped their careers and those they’d like to see for their children. “I’d like to see my children embrace the idea of establishing a broad portfolio of careers during their working life, as well as a broad portfolio of qualifications and further education in both related and unrelated fields. I hope they study more than one discipline to expand their horizons, knowledge and experience,” Greg said.

As the next generation of engineering professionals, including son Jack and daughter Florence, shape their futures at universities across the world, Greg and Lisa have some hopes for what they take away from their tertiary experience: "Learn to use your mind well. Learn to learn. Be curious, inquiring, analytical and disciplined. Be able to make a good argument and provide proof. Build an ability, courage and fortitude to take on challenges and do your best to solve the problems that will be presented to you. And take on responsibility for educating others as you go.”

“THE SIGANTO & COGHLAN FAMILY

BILL & MARIE (AM) SIGANTO

INGENUITY / ISSUE 5 2015

INGENUITY / ISSUE 5 2015

29
Growing up, Alan was always thankful for the value his parents placed on education. “My parents were quite modest people and my mother thankfully recognised the importance of a good education. They sacrificed a lot for us, they worked hard to get me to university but it wouldn’t have happened without a scholarship,” Alan said. In 1958, University fees were to be paid upfront. Alan was fortunate enough to receive a scholarship from the Department of Harbours and Marine to study engineering at The University of Queensland, and ventured into the unchartered territory of tertiary education. As the first in his family to attend university, Alan wasn’t sure what to expect. “It was pretty traumatic and dramatic. University in those days was very different from school. School was a disciplined environment and university was relatively undisciplined, in the sense that nobody made you work. A mental switch was necessary – the disciple and self-discipline had to change places, and that was different,” Alan said.

Alan credits the many memories and valuable lessons he learnt at UQ as the transformational pivots in his career trajectory. “It’s made a huge difference to my career of course. If I didn’t come to university to get an engineering degree I probably would have become a motor mechanic like my father,” Alan says. Alan credits his time at UQ to obtaining the one critical skill that has underpinned his career success to date – UQ teaching its engineers how to think.

His move into a consulting group in 1962, which had one full-time employee and two part-time staff was the beginning of today’s “Cullen Grummitt & Roe” (CGR). His scholarship with the Department of Harbours and Marine certainly shaped the company’s focus on port and harbour engineering, cold storage and mining infrastructure projects.

“In the early days, our big clients in Australia became international so ‘we hitched our wagon to theirs’ with our first overseas move being a project in Malaysia. So, we went there and opened an office,” Alan recalls. This strategy has served the company well with it now boasting work on major projects on every continent, except Antarctica.

Having met Wendy at a church football match, the pair were married after Alan graduated in 1962. Soon after, their family of two became a family of five. They’re both extremely proud of their children. “The kids all being successful is something I am most proud of in my life,” says Alan. “Our eldest daughter studied commerce and economics at UQ, while our two younger children both followed in my footsteps and studied engineering. Susan (PhD 1996, BE 1990), Chris (PhD 1996, BE 1989) and I all studied engineering at UQ. Susan, in the last year of her undergraduate degree, completed 17 subjects, and received 17 straight High Distinctions. I didn’t get that many in my whole course!” Alan laughed. Susan Grummitt became the first female to win the University Medal in engineering – a very proud day for her parents.

Their drive and ambition saw Susan and Chris going on to undertake PhDs in Civil Engineering at UQ. Chris, who was a year-and-a-half ahead of Susan during his undergraduate studies,
took a break in between, heading to Canberra to study at the Australian Institute of Sport. He then returned to UQ to undertake his doctorate and in taking this time in between, Susan caught up.

In a first at UQ, this brother and sister duo graduated their PhDs together. “Professor Colin Apelt, Head of the School of Civil Engineering, said to me at the time, ‘I’ve done some research on this and these are the first siblings ever, to graduate together with a doctorate from this University.’ This was really quite an achievement for a family with our background,” Alan proudly said.

Chris and Susan have both had very successful careers to date after both joining CGR following graduation. Ultimately, Chris left the company to start his own small consulting company – he is currently in Kiribati on a project for the World Bank. And CGR are doing exceptionally well in the UK under Susan’s leadership.

Having personally experienced the transformative power of education, Alan and Wendy are passionate about supporting education for the next generation of university students, with Alan having served on a number of secondary school boards. “We rate education very highly, especially the education of girls, and we try to extend every student’s potential as far as it can be extended.”

Alan hopes for the next generation of engineers, his grandchildren and their children, that Australian universities continue to offer a world class, broad engineering education.

“In 1975 I was asked to go to South Africa on a project so we packed up the family and went. While I was there I came to realise that Australian educated engineers are amongst the best in the world. We have a broad depth of knowledge, so my hope is that our universities will continue to develop broad engineering minds. Australian engineers see and are well versed in the big picture,” Alan says.

Last year, Alan was invited to be an Honorary Fellow of the Institution of Engineers – the highest engineering award that can be received in this country. Alan is ‘winding-down’ the Australian CGR business, and he jokes that his most unsuccessful project so far has been retiring. He is also still looking out for that project in Antarctica...

“If you have an interesting UQ family story to tell, we would love you to share it with us: alumni@eait.uq.edu.au
In today’s business environment, many UQ engineering and technology students are finding it harder than ever to find work experience and internships to complement their studies.

As a UQ alumnus, can you help to solve this problem by providing work placements for talented UQ students?