ADDRESSING SYSTEMMIC FAILURES
How UTS is leading the march towards gender equity in research

ALGAE BUILDING BLOOMS
The makings of Australia’s first living algae buildings

BIG DATA, BIG THINKING
Could Australia lead the next wave of digital innovation?
The environment in which we conduct our research is complex and highly competitive, with many organisations competing for top talent and funding.

At UTS, we strive to undertake excellent research that contributes to the world’s body of knowledge, challenges current thinking, and sets new directions in fields from quantum computing through to market design. Our excellent research also contributes to and underpins our teaching, ensuring UTS students are exposed to the latest thinking across a multitude of disciplines.

Simultaneously, we seek to ensure our research has impact – economically, socially, culturally or environmentally. We are engaging with partners in industry, government and the non-profit sector who provide problems for us to work on, help fund our research and hire our graduates. And we are working to increase the participation and career opportunities for women in many fields.

Our response is encapsulated in the UTS 2016–2020 Research Strategy, which outlines our strategic objectives. The first of these is to focus our research. Building on existing areas of research strength, we have identified data science, health and sustainability as critical areas for UTS. Social futures and the future of work and industry are other areas where we see UTS can make a difference. Of course, not all our research will be aligned to these focus areas, but concentrating on specific areas will enable us to achieve scale, excellence and impact.

In addition to focusing our research, we are continually improving our research performance and culture. UTS has again achieved considerable success in research excellence as demonstrated by our ERA 2015 results. And we all know excellent research underpins our ability to translate that research into impact.

The National Innovation and Science Agenda (NISA) has outlined the Federal Government’s increased focus on research impact, and given UTS’s tradition of engaging with industry, government and the not-for-profit sector, we are very well positioned. A number of initiatives outlined in NISA highlight programs and approaches that we have been executing for some time. For example, our Industry Doctorate Program aims to develop the next generation of PhDs for working in industry, bringing both academic rigour and practical research skills to bear on challenging industry problems.

At UTS we are developing transdisciplinary approaches that integrate the natural sciences, humanities and social sciences, engineering and IT, transcending their traditional boundaries.

For example, in healthcare, we need to understand diseases, technology, the health workforce, economics, data, innovation and policy. Traditional multidisciplinary approaches that simply draw on knowledge from different disciplines aren’t sufficient to tackle these sorts of problems.

A transdisciplinary approach builds a common language around problems, provides different perspectives and helps reframe research questions – which we believe is essential to tackle some of the complex real-world problems facing society today.
FEATURES

Big data, big thinking
UTS Luminary and CEO of Data61 – the country’s largest data innovation group – Adrian Turner reveals what it will take for Australia to lead the next wave of digital innovation

Algae building blooms
A unique multidisciplinary team is set to bring living algae buildings – structures powered entirely by microalgae – to Australia

Addressing sySTEMMic failures
How UTS is leading the march towards gender equity in research thanks to policies and support programs aimed at females and by signing on to the Athena SWAN Pilot

REGULARS

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NEXT ISSUE
The next issue will be released on Monday 1 August 2016.
All U: articles are available to read online via newsroom.uts.edu.au or follow us @utsnewsroom
Send your story ideas, opinions and events to u@uts.edu.au

On 7 April 2016, the Australian Technology Network (ATN) launched their National IP Principles. On display at the launch was the Centre for Autonomous Systems’ wheelchair step-climbing attachment. Thanks to Easy Access IP, Mobility 2000 was able to develop the technology into a commercial product for leading disability service provider Northcott. For more information, visit bit.ly/21MIdLt
Imagine being awarded a prestigious Endeavour Postgraduate Scholarship that takes you abroad and enables you to collaborate with world-leading researchers. Bronwyn Cumbo doesn’t need to.

The PhD candidate at UTS’s Institute for Sustainable Futures is spending 12 months at the City University of New York’s Children’s Environments Research Group (CERG). Here, Cumbo is working with leading Environmental Psychologist, and CERG Director, Professor Roger Hart.

CERG’s research centres on improving the rights of children in cities by increasing their participation in processes that affect their lives. Cumbo is currently a co-researcher on a project digitalising the Young Citizens’ Score Cards – a collaboration with international development organisation Plan International.

Cumbo is collecting data to understand how this scorecard process may be digitalised in a way that is child-friendly, participatory and accessible.

“The scorecard evaluates the ‘friendliness’ of their local neighbourhoods, assessing a child’s experience of safety, education, play and green space,” explains Cumbo.

“This process not only captures data, it also provides a platform for young people to learn and discuss important issues about their experience of childhood.”

“It also empowers children to get organised and connect with relevant networks and individuals to create changes within their community.”

Up until now, the scorecard has been successfully used in over 27 countries using pens, paper, sticks or rocks – whatever is available in the community. CERG’s plan is to bring the scorecard into the digital age.

“This digitalisation project is looking at how tools can be used to increase the efficiency of the scorecard process, while maintaining its participatory and child-friendly approach,” explains the early-career researcher.

To do this, last March, Cumbo and her colleagues embarked on a British Council-funded trip to New Delhi, India to run workshops with children, young adolescents and adults. Their aim was to better understand the feasibility of applying these tools in a developing community.

While digitalisation would increase the efficiency of data collection in some cases, Cumbo explains, “There are a number of unique contextual and cultural factors to consider when introducing software to run these activities in developing communities, such as WiFi access, literacy levels and the child-friendliness of the software.”

A new proposal that incorporates these contextual factors in the digitalisation process is currently underway.

Meanwhile, back in New York, Cumbo is also collaborating with the New York Hall of Science to investigate how their exhibitions and programs may be designed to further children’s understanding of and appreciation for the natural world.

In one exhibition, Connected Worlds, Cumbo is researching how children’s experiences of the exhibit influence their understanding of the connectivity between people and their local natural environment. The exhibition is a collaboration between researchers from Columbia University, Yale, MIT and more.

“Connected Worlds is an immersive, animated experience, containing six ecosystems that children can influence through their movements, gestures and decisions. It’s really an incredible exhibition, but the New York Science Hall and its collaborators have little idea about how this unique experience influences a child.

“My project aims to understand how you can use play in neutral places like the New York Science Hall to support children’s learning about science and nature.

“Working on these projects,” enthuses Cumbo, “is enabling me to apply and further develop my research in a range of contexts, which is wonderful.”

It’s a goal she has had since taking part in the 2014 UTS Three Minute Thesis (3MT) competition. The 3MT is a competition where Masters by research and PhD students explain their thesis topic in only three minutes.

While Cumbo found the 3MT “nerve wracking”, sharing the big picture story of her research opened doors for new opportunities and collaborations.

“It was definitely a valuable experience,” says Cumbo. “Having the opportunity to gather feedback about your communication skills and your research project from a range of expert 3MT judges is a rare opportunity, and one that I would recommend.”

The 2016 3MT will be held on 7 September. For more information visit bit.ly/1Rc8JpC

Belinda Lee
Graduate Research School
Photographer (B Cumbo): Joanne Saad
Photographer (workshop): Bronwyn Cumbo

This research is funded by: Australian Government Endeavour Scholarship Program and the British Council’s Elevate Fellowship Program
When women receive a breast cancer diagnosis they face choices not only about their immediate treatment, but also about how to manage the risk of recurrence. For a growing number of women that involves surgery to remove a healthy breast.

A study by health economist and Research Fellow at UTS’s Centre for Health Economics Research and Evaluation (CHERE) Richard De Abreu Lourenco seeks to understand what factors influence this choice.

“My broader research looks at how we ‘value’ the experience of health care and how people engage with the health care system beyond just what it does to our health – things like convenience and control,” De Abreu Lourenco says.

“With breast cancer, sometimes a decision isn’t just about what it’s going to do to a woman’s health, but about the implications for other aspects of her life – how she feels about herself, her appearance, whether she feels constantly under threat from this cancer coming back,” he says.

It’s the latest in breast cancer-related research that has been conducted over the years by CHERE, a Centre of Excellence known for its policy-relevant research which is celebrating its 25th anniversary this year.

Throughout his project, De Abreu Lourenco was guided by two patient representatives Kim Parish and Domini Stuart. The pair was an integral part of the research team, ensuring the research remained patient relevant.

In the first stage of the project, De Abreu Lourenco met with breast cancer survivors who shared what mattered to them in making treatment choices.

“Those focus groups were a very enlightening first step because there were aspects people hadn’t really thought about,” he says.

One of the most important was the big difference in “cancer fear” between women who removed their healthy (contralateral) breast and those who didn’t after a diagnosis of cancer in their affected (ipsilateral) breast.

“Women who chose not to remove their contralateral breast really couldn’t understand why the women who did remove the breast were so afraid of the cancer coming back,” De Abreu Lourenco says. “So there was a very large difference in motivating factors.”

That set the scene for the second stage of his research, which involved a survey of nearly 500 women (only 3.5 per cent of whom were breast cancer survivors).

The women were presented with a series of choices, which varied each time, and asked to decide whether in those circumstances they would remove their healthy breast or have routine monitoring only.

“The first big result that hits you is how many women have a very strong preference one way or the other,” De Abreu Lourenco says. Regardless of how he adjusted the parameters, nigh on 60 per cent of the women stuck with their original choice.

Just over 49 per cent always chose routine monitoring, while 8.4 per cent always chose surgery, no matter how the choices were framed.

The remainder of the women were willing to ‘trade’ depending on the scenario, sometimes selecting routine monitoring and sometimes choosing surgery.

What influenced those choices, most of the time, was the perceived risk of the cancer returning.

When De Abreu Lourenco evened out that risk in the choice questionnaire – making it the same regardless of surgery or monitoring – other factors then emerged.

“The way they were monitored became important,” he says. “Women wanted a less invasive type of monitoring – they wanted ultrasound rather than a mammogram.”

Involvement in decision making also emerged as a key factor. De Abreu Lourenco says his study has implications for how we inform women of their choices, especially when data suggest only a marginal improvement in long-term life expectancy from contralateral prophylactic mastectomy (CPM).

“One of the things that will hopefully come out of this is that it will help to frame education pieces,” he says. “Does CPM represent the value that people think it does? Or could that money be better spent in other ways?”

Lesley Parker
UTS Business School
Photographer: Shane Lo

This research is funded by: UTS Business Doctoral Scholarship
Capturing the future and bringing it forward to today, that’s the essence of innovation.

And it is how new business models are created which disrupt the old order. To succeed is to identify and quickly tap into latent demand for goods, services or intellectual property (IP) which changes the game. Think Google, Apple or Microsoft.

So much of the innovation we are seeing globally is being driven by digital technology and the power of data. This will only intensify as the world rapidly embraces more data-intensive business models.

The competition is fierce because those companies that are able to develop and adopt more sophisticated platforms are able to upscale faster than those that don’t, and typically who gets to scale first wins the prize of market share.

There is no doubt that Australia has the capability to be ultra-competitive in the data race. We have some incredible talent in this country, along with the institutional capacity through our world-class universities, to play a lead role. But we must aim higher.

Traditionally, we have been viewed as an inventive country, a knowledge-based economy renowned for our research and the ability to produce some outstanding innovation. There are many celebrated examples like WiFi (which was developed by CSIRO), and Cochlear’s bionic ear, which are among our best known.

What we haven’t been so good at is commercialising our innovations. Quite simply, there are some market failures in the areas of technology and data that need addressing before we can improve. Raising the bar in this respect is a burning focus of Data61.

Rather than an institution, Data61 is developing a formidable network. It is underpinned by our own great talent, comprising 1100 people including PhD students, who are organised around all facets of data.

It is a network that includes 22 universities under a single collaboration agreement (with links to others); federal and state government; and of course industry, as well as the entrepreneurially minded (led by our partnership with leading start-up incubators in the country).

By locking arms we bring the entire ecosystem together under one umbrella with the aim of plugging those existing gaps between research, development and all-important commercialisation. Basically, the more successful our partners are, the more successful we are.

We want to show the world that Australia offers so much more than just being a sales and marketing arm of the big corporates; it is a place to do primary research and development, and product development.

And raising the bar means not just being satisfied with spinning out start-ups and IP for acquisition by global companies, but...
We shouldn’t be afraid either to replicate those characteristics of ecosystems in places like Silicon Valley or Tel Aviv that help foster success. In these places the infrastructure is stacked more in favour of the entrepreneur with more ready access to sophisticated risk capital from ‘angel’ investors through to late stage.

In this regard, we should be most encouraged by the government’s $1.1 billion national innovation and science package, which uses policy levers and incentives to target the right areas.

In thriving centres of innovation, risk and even failure are not things to be feared. They are, in fact, celebrated. In this field of endeavour the statistics show we will fail more than we succeed. We need to build higher levels of community tolerance of this, with the proviso that we learn from our past failures and carry these forward.

Data61 sees its role as something of a product management factory for Australia. Armed with the best possible resources, including human capital and domain expertise, we are committed to helping build the new technology-based businesses and industries of the future.

As a country we have a choice to make right now because the likes of Silicon Valley keep moving apace. Do we want to be a global leader of this next wave of digital innovation or are we happy to miss what is a very fast moving train?

Adrian Turner
CEO
Data61

Photograph (A Turner) supplied by: Data61
Background image: Thinkstock
A multidisciplinary team bringing together science, sustainable building design and architecture may soon develop the first living algae buildings in Australia. Their unique collaboration has seen a comprehensive feasibility study conducted on behalf of the City of Sydney, with plans to create the first flat façade algae panel this year.

It looks like a giant green lava lamp as the bright, syrupy liquid twists and turns from the bubbles rising to the surface. The panel, however, contains microalgae – tiny aquatic plants that capture carbon dioxide from the air and light from the sun to generate energy and oxygen.

While it might appear to be Sydney’s latest public art installation, if Sara Wilkinson and Peter Ralph have their way, these flat panels will soon be gracing the outside walls of buildings throughout Australia.

The researchers are working with Research Engagement Manager Dr Brenton Hamdorf and Director of the Australian arm of architectural firm Atelier Ten, Paul Stoller, to make their vision a reality.

“Our goal is to successfully integrate algae into the built environment and use it to heat buildings, fertilise rooftop gardens and filter vehicle exhaust fumes,” says Wilkinson, an Associate Professor in UTS’s School of the Built Environment.

The concept of a building powered by algae is new to Australia, and one that Wilkinson believes is the next step in sustainable building technology. “There is demonstrated success of living algae bioreactors overseas, but nothing of such scale has been explored in Australia, until now,” she says.

Wilkinson has recently undertaken a feasibility study, funded by a City of Sydney environmental research grant, to look at algae building technology. Her team have interviewed over 20 stakeholders in the building industry, including designers, engineers, developers, planners, architects, sustainability managers and certifiers, to ascertain what they see as the drivers and barriers to an algae building.

One year into the feasibility study and the response has been enthusiastic. However, as with all new technologies, Wilkinson’s research has uncovered challenges.

“One of the architects we spoke to said that they’ve spent most of their professional careers helping design facades that purposely avoid things growing on them or having water flow through them – so you can see how such a concept would raise lots of questions.

“For example, one of the recurring questions we were asked throughout the study was, ‘What would happen if a panel was accidentally or intentionally damaged? So what we’ve recommended is specifying toughened glazing in certain areas.’

Another concern that arose was around excessive heat killing the algae, and what could be done to mitigate that. As a result, the research team spoke to the Australian Window Association, who have advised on tempered and heat-resistant glass.

Such questions and concerns will help inform the next stage of this innovative research – the design of a prototype flat façade panel.

The research team is collaborating with a leading engineering firm to fabricate the Australian-first panels, and they hope to place it in a high visibility location on campus so it can begin to pique public interest.

Ralph, a Professor in the Plant Functional Biology and Climate Change Cluster (C3), is helping to build this prototype. He unabashedly describes his role as ensuring that Wilkinson puts “the right green stuff on the buildings”.

Ralph’s team from the UTS Centre for Industrialised Algae will be studying algae strain optimisation and selection to recommend the best species for the living building project.

It’s just one of the possibly endless applications of algae products, says Ralph. He believes algae can play a large part in solving climate change issues via new, sustainable bioproducts.

“Algae can be used to make almost anything that society needs – plastic, food, pharmaceuticals, paints, carpet and cosmetics, for starters. We think there could be up to 300,000 species of algae out there, and that we are only culturing about 100 of those.”

Ralph says the building project is a great medium to encourage people to engage with algae outside of science.

“I want the public to accept the use of algae in everyday life. I want people to see more of this microorganism for what it is – a natural solution to the energy, food, economic and climate challenges facing our world today.”

He also believes the project will encourage designers and architects to think about algae in their “quirky” building designs. “I see it as technically interesting and exciting for them, and for us as scientists, it’s a chance to promote this natural, sustainable alternative to fossil fuels.”

The production and uptake of algae-based materials will also provide greater diversity in our built environment, says Wilkinson. “One of the biggest advantages of this technology is that it is so visually appealing.

“I mean, how could you walk past a building with bubbling green wall panels and not stop to learn more about it? It’s eye-catching, it’s unique and it’s decarbonising the atmosphere, all at the same time.”

Elizabeth Kuo
Marketing and Communication Unit
Photographer: Shane Lo
This research is funded by: City of Sydney

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“ALGAE CAN BE USED TO MAKE ALMOST ANYTHING THAT SOCIETY NEEDS – PLASTIC, FOOD, PHARMACEUTICALS, PAINTS, CARPET AND COSMETICS, FOR STARTERS.”

Associate Professor Sara Wilkinson and Professor Peter Ralph
Today, women account for only one quarter of the science, technology, engineering, mathematics and medicine (STEMM) workforce. In Australian universities, approximately 20 per cent of senior researchers are female. UTS, though, is leading the march towards equity with policies and support programs aimed at female researchers, and by signing on to the Athena SWAN Pilot – Australia’s largest gender equity program to date.

Though women have a long history of high achievement in STEMM disciplines, they also have a long history of being sidelined. While inventors like Thomas Edison (who developed the lightbulb in 1880) are household names, others like Margaret A Wilcox (car heater, 1893), Anna Connelly (fire escape, 1887) and Letitia Geer (single-hand-operated medical syringe, 1899) rarely rate a mention.

“Recently, we’ve seen some of our female STEMM researchers received fantastic recognition for their achievements,” says Deputy Vice-Chancellor (Research) Professor Glenn Wightwick. “But overall, women in STEMM are still under-represented and under-recognised.”

Recent individual successes include Director of the ithree institute Professor Liz Harry and Director of the Innovation and Enterprise Research Laboratory Professor Mary-Anne Williams, who were recognised among SBS’s 2016 list of six Impressive Aussie Women Scientists. Likewise, Deputy Director of the Institute for Sustainable Futures Professor Cynthia Mitchell was named one of the Australian Financial Review and Westpac 100 Women of Influence last September.

Across UTS, women account for 36 per cent of all associate professors and 31 per cent of professors. “That’s well above the Australian university average of 20 per cent,” says Wightwick, “but it falls short of gender parity, which is what we’re committed to achieving.

“That’s why we established the Research Equity Initiative (REI).”

This multi-layered initiative, led by UTS’s Equity and Diversity Unit (E&DU), aims to implement university-wide support for academics, and some research students, with carer responsibilities at key stages in their careers; explore and employ tailored actions to address gender disparity in research activities, and; improve data collection, monitoring and reporting on gender equity in research at UTS.

“We’re looking at issues affecting early-career researchers and mid-career researchers as well as senior staff to see how we can better support and sustain people here,” says Equity and Diversity Project Officer Sybille Frank.

So far, under the REI, the university has developed an equity program for all higher degree research (HDR) supervisors, piloted a mentoring program for female HDR students, introduced leadership training for female academics, created a Women Researcher at UTS network and undertaken an annual forum to highlight the achievements of, and promote awareness of, issues affecting women in research.

The initiative has also led to changes in recruitment practices, new professional development workshops and new financial support programs.

These include a Childcare and Carers Support Fund and a UTS Research Equity Fellowship, valued at $60,000, for mid-career researchers with care responsibilities.

“With some academic research, especially in STEMM areas, you can’t stop when you have a baby. Even in other disciplines, many researchers are unable to put publications or research projects on hold without seriously affecting their research careers,” explains Frank.

It’s a trend also seen by Professor in the Centre for Forensic Science, and Chair of the Faculty of Science’s Academic Women in Science Committee, Shari Forbes.

“In academia, because we don’t work a nine-to-five job, having a good work/life balance is always a challenge. It’s a particular challenge for females in a carer role, but we’ve found a lot of our young, male, early-career researchers are finding the exact
same challenges looking after children and not having time to publish.”

The Academic Women in Science Committee was started by the faculty to address gender equity gaps identified by UTS’s Women in Research report. (The committee is only one of a number of initiatives developed by individual faculties based on their local results.)

“We started that committee to try to understand what the numbers look like in terms of gender equity in our faculty, and then specifically, were there differences in the way males and females perform in research?” explains Forbes.

Over the past year, the committee has put forth numerous recommendations to address the imbalance. However, both Forbes and Frank agree the next big changes are likely to come from the Athena SWAN Pilot project.

Athena SWAN began in the UK in 2005 to improve the representation of women in STEMM areas.

In 2015, Australia became the first franchise of Athena SWAN outside the UK, thanks to a pilot program introduced through the Academy of Science’s Science in Australia Gender Equity (SAGE) committee. There are currently 32 research institutions, incorporating 24 universities – including UTS – in the Australian SAGE Athena SWAN pilot.

The awards, which are assessed by an independent body, include bronze, silver and gold. Organisations must qualify for an institutional bronze award before they become eligible to receive further bronze, silver or gold awards at an organisational or departmental (faculty) level. The success rate for first-time applications is only about 50 per cent.

Professor of Public Health and Assistant Deputy Vice-Chancellor (Research) Liz Sullivan is the Chair of UTS’s Athena SWAN self-assessment team (SAT). The SAT is responsible for examining UTS’s gender equity in research data, preparing a report on the university’s performance and reporting those findings to the Athena SWAN assessors. The SAT will also develop the goals and action plan needed for UTS to improve its performance.

“UTS has a very strong history of really good initiatives for gender equity, but there is always more we can do,” says Sullivan.

“As part of Athena SWAN, we’ll be developing a plan of action to look at how we can put in place initiatives to try to address the gender inequity that is found.”

“It will be a game changer,” adds Frank. “Athena SWAN can get us all to look at the subtleties in how we distinguish between and interact with each other in a diverse workplace. And with that, deeper changes are possible.”

Frank says a 10-year review of Athena SWAN in the UK, “found the benefits for female staff were clear. But another key finding was that there were benefits for men too – workplace culture became better and that makes for a happier and more productive workplace for all.”

“UTS has a very strong history of really good initiatives for gender equity, but there is always more we can do.”

Sybille Frank
LIZ SULLIVAN

Liz Sullivan is not only the Assistant Deputy Vice-Chancellor (Research) and Chair of UTS’s Athena Swan SAT, she’s an internationally esteemed public health physician too.

Sullivan began her research career in 1987 by undertaking a Master of Public Health.

Today, she says, “My particular area of interest is reproductive populations. I’ve spent a long time doing research on mums and babies and in recent years I’ve started doing a lot more research in justice health.

“The first study I did in this area, in 2009, was looking at survivors and gestation in prison. That really raised so many issues that hadn’t been fully researched and I thought needed an evidence base to be able to impact policy and practice.”

It’s a natural fit for Sullivan, who has “always been interested in women’s empowerment and education.

“In developing countries women start childbearing at a very young age, and that makes it more difficult, historically, for them to have further education.”

Of course, childbearing does impact women in the developed world too. Sullivan, a mother of three (the youngest is now 19), worked full-time throughout her children’s youth. She was only able to access paid maternity leave following her last child’s birth.

“I always wanted a family, so that was, and is, very important to me. But it was extremely challenging and exhausting, and I was very lucky I had a highly supportive partner and parents.”

These days, says Sullivan, “I think we’re a bit smarter about what you need to progress. Initiatives around paid maternity leave and re-entry – where there’s support for researchers to maintain their research while they go on career leave and to help when they come back – are certainly much more common. And that’s enormously important.”

Sullivan’s suggestion to female researchers:

“Sit down with someone – be it your supervisor, colleague or mentor – and work out a five-year plan.

“One of the wonderful things about the STEMM disciplines,” she says, “is there are endless possibilities.

“When you look at younger children at a science museum, you see both girls and boys equally enthused. But somewhere along the lines, that gets lost.”

She says, “We need to remember universality is the end point, not the beginning. We need to ensure high-level maths and science are attractive so we retain younger females in these disciplines and so there’s an opportunity for them, when they come to university, to pursue those careers.”

SHARI FORBES

“I wish I had a really great story about something that sparked my interest in science,” confesses Professor in the Centre for Forensic Science Shari Forbes, “but in all honesty, I was just always interested in science at school.

“Strangely, the subjects I did best at in the HSC were Japanese and economics, but it was science that motivated me.”

Today, Forbes, who grew up on a property “right in the outback in north-west New South Wales”, is best known for an entirely different kind of ‘farm’ – the 48-hectare Australian Facility for Taphonomic Experimental Research (AFTER).

“What that means is I’m particularly interested in the odour produced by forensic evidence and how detector dogs use that odour to locate the item of interest,” explains Forbes.

“Because of the AFTER facility, most of my expertise is University of Computation and working with cadaver dogs. But I also do research with other types, such as drug detection, explosive detection and accelerant dogs.”

“Everything I do is driven by police questions, by their needs, what they want to see out in the field.

“I think I’m fortunate that forensic science is female dominated. Although I do recognise that when working with the police, it’s still very much a male-dominated career. But we’re starting to see that change.”

So too, says Forbes, is academia.

“I think having female role models is important for demonstrating to female students what you can accomplish.

“People think ‘chemistry’, and they think you’re sitting in a dark, dungeon lab. But most chemistry degrees have a really clear application.”

“It’s something Forbes, who completed her undergraduate and honours chemistry degrees at UTS (as well as her PhD), knows all-too-well.

“I got into my area of research through my honours year. When I looked at the list of honours projects, there was a project about decomposition in cemeteries and I just thought, ‘Oh that sounds so fascinating!’

Forbes says excitement is key to success. “We need to do anything we can to get people interested in science, because while there’s an issue with women in STEMM, there’s an issue, generally, with getting people interested in science as well.”

This research funded by: Australian Research Council Future Fellowship

WEI WANG

Growing up in Jinan, China, halfway between Shanghai and Beijing, Wei Wang’s childhood was idyllic.

“My father was a university teacher and my mother was a leader in another university, so we lived just within Shandong University,” explains the PhD candidate in the Centre for Quantum Computation and Intelligent Systems.

“I was an only child, so I often played by myself. I was very interested in biology, so I would explore the grounds of the university and look at the animals. That gave me a lot of motivation to become a scientist!”

While Wang first dreamed of becoming a doctor, as a young adult she opted to study computer science.

“When I did my bachelor’s degree, I learned about artificial intelligence. My teacher was a very, very enlightened person – he gave us a lot of case studies and those inspired me,” she reveals.

Fast forward 17 years, and Wang has just submitted her PhD thesis. Wang’s research (which saw her receive a prestigious IBM Fellowship in 2013) led to the creation of a framework that could be used to develop “social networking for robots”.

“In the future, robots will be able to learn skills through their peers in a virtual environment. They’ll be able to figure out new solutions to new tasks, even if those tasks haven’t been pre-programmed into the robot,” she explains. “They won’t need any extra intervention, they can just evolve.”

While Wang is currently weighing up her options post-PhD, she’s hopeful of joining an international collaboration project that enables her to implement her framework in a real robot environment.

“I’m very interested in discovering new things,” says Wang. “This enthusiasm, she says, has been fostered by her PhD supervisor, Director of Disruptive Innovation and Director of the Innovation and Enterprise Research Laboratory (The Magic Lab) Professor Mary-Anne Williams.

“You know what she said about doing research? ‘Just use your imagination’. They’re such magical words,” enthuses Wang.

“One of my dreams is to become a female mentor, like Mary-Anne. Research isn’t just about publishing papers; it’s also about passing on the scientific spirit and methodologies. You know, a good mentor can make a huge difference in your life. And in my field, it’s quite rare to see female researchers.”

This research funded by: UTS, IBM PhD Fellowship and the Australian Research Council

Fiona Livy
Marketing and Communication Unit
Photographer (IS Frank, L Sullivan, S Forbes, W Wang): Shane Lo
Photographer (women in STEMM): Anna Zhu
Martin Cloonan isn’t your run-of-the-mill academic. As a Professor of Popular Music Politics at the University of Glasgow he’s made a career out of researching and rocking out to great music.

Cloonan has spent 25 years looking at the broad relationship between popular music and social politics, campaigning for UK musicians and chairing Freemuse, an organisation for freedom of musical expression in Copenhagen. Most recently he spent a month with the UTS School of Communication as a Distinguished Visiting Scholar.

Sharing his expertise in popular music and music industries research, Cloonan gave guest lectures and workshops and advised on the reaccreditation of the Music and Sound Design program that will begin in 2017.

"I think UTS is an exciting place to be at the moment," says Cloonan. "Mark Evans, who is Head of the School of Communication, has a clear vision of what needs to be done to keep the school up-to-date in terms of industry and international partnerships."

These industry relationships are key to the new Music and Sound Design program, which is planning to engage more practitioners from the Australian music scene.

"I think it’s great for the students to see experts’ relationships with the industry so that they can get those professional experiences," he says.

"The physical location of UTS is great for this, too, because a lot of music companies are within walking distance. I’ve been so impressed by the people I’ve met in the music industry here – they’re very open to academic research."

Another aspect of Cloonan’s visit involved looking at external funding opportunities in the creative industries, something he believes UTS is well placed to explore.

As universities worldwide push for more measurable evidence of research impact, the School of Communication is striving to reach its research potential on the back of a solid teaching reputation.

"People want to know what impact social research is having in the real world," explains Cloonan.

"But, it can often be somewhat intangible or it can take 10 or 20 years to see a result if, for example, you’re involved in campaigns to change laws. We need to think much more inventively about what we do in our research so the results have impact."

Cloonan has written books, curated exhibitions and even put on gigs in the name of research. This included staging a gig featuring a host of acts as part of Glasgow’s annual Celtic Connections festival in January this year.

For Cloonan, academia and music politics are “all about changing power dynamics”.

"If you look at the music industry 15 years ago you would have thought about the record industry, but that’s been in decline since about 2000. Live music is more important now, so we need to think about what that means for musicians and their lives."

That’s why Cloonan also worked with the City of Sydney and other academics around Australia to discuss the issue of live music in the context of Sydney’s controversial ‘lockout laws’.

"It’s always useful to have someone coming in from the outside who has a different vision," says Cloonan. "You get a chance to step back when someone says ‘Oh, have you thought about doing this?’.

It’s something Cloonan and Evans also incorporate into their co-supervision of PhD students. “This wasn’t a one-off visit,” assures Cloonan. “We’re building exciting relationships and I think student exchange is one thing to aim for – I don’t know many Glasgow students who wouldn’t want to come here!”

Hannah Jenkins
Marketing and Communication Unit
Photographer: Hannah Jenkins
This research funded by: UTS Distinguished Visiting Scholar scheme
When children experience traumatic events at a young age, the effects can be devastating and long-lasting. However, new research is helping to develop better ways of parenting and helping at-risk children.

Traumatic events in childhood can be good indicators of mental ill-health through childhood and well into adulthood, says Senior Lecturer and Clinical Psychologist in the UTS Graduate School of Health Dr John McAloon.

“For this, and many other reasons, children who have been maltreated are particularly vulnerable,” explains McAloon.

“They may be born to parents who have not had good models of parenting, to parents with their own trauma histories, or to parents with significant mental health difficulties.

“Every parent makes mistakes, but abusive or neglectful parenting goes beyond mistakes and into the realm of trauma.”

McAloon’s research focuses on developing ways to help parents who have come to the attention of the State Government’s Family and Community Services to find better ways to parent.

“Teaching parents about self-control, ways to regulate their own emotions, helps them better manage frustrating situations that are part and parcel of parenting. Often it can be the difference between them taking their frustrations out on their children and not doing that.”

The UTS Family Child Behaviour Clinic, which McAloon established in 2015, has also developed a program of therapeutic foster care. The 10-week, group-based program offers education and therapeutic skills to foster carers and kinship carers (family members or close family friends who help to care for children when their parents cannot). It focuses on areas like child safety, trauma, attachment, relationships and skills-building within the context of foster and kinship care.

“We know there are often significant social, emotional, behavioural and neuropsychological implications for children who have been removed from their biological parents following early trauma.

“Often what happens when children are removed from their biological parents is they are placed in foster homes with fostering families, or with members of their own extended families. Sometimes, for a range of reasons, these arrangements fall apart and they are moved to another placement, and then another,” explains McAloon.
“TEACHING PARENTS ABOUT SELF-CONTROL, WAYS TO REGULATE THEIR OWN EMOTIONS, HELPS THEM BETTER MANAGE FRUSTRATING SITUATIONS THAT ARE PART AND PARCEL OF PARENTING.”

“As you can imagine, this can be damaging. Attachment relationships that are essential for children’s development are repeatedly broken. In a situation like this, a child has only limited ability to develop a stable idea of who they are, what they are worth, and how they might behave before their trust is broken. The more this happens, the more detrimental the effects can be.

“If the first foster care placement, or the second, can be supported to withstand the difficult emotions and behaviour that often follow early maltreatment, then those children can have a better chance.”

The most recent figures from the Australian Institute of Health and Welfare show that nearly 152,000 children have received child protection services. Indigenous children are also seven times more likely than non-Indigenous children to have received child protection services.

“Child protection and out-of-home care statistics – both at a state level and nationally – are unacceptably high for a country with Australia’s standard of education, living and opportunity,” says McAloon.

“On the basis of relevant research evidence, a strong argument can be made that the disadvantage evident in some Australian communities has resulted from past social policies.

“The implications of this practice and its results, in terms of the destruction of attachment relationships, have been devastating for subsequent generations. This continues to happen today.”

But it’s something we can change. McAloon sees a future where research programs like his inform better parenting for vulnerable populations.

“For many reasons, Australia needs to think about how it is both establishing and responding to disadvantage, how it is distributing opportunity, and how it is placing itself for the future.

“Australia has a duty of care. Programs of early intervention in areas where there are high levels of vulnerability can lead to massive savings in social, emotional and mental health, as well as criminal justice and personal costs.”

Michelle Price
Graduate School of Health
Photographer (J McAloon): Manal Nehme
Photograph (child): Thinkstock
Essentially our project involves cleaning up 10 years’ worth of data, getting it into the cloud space and ensuring we can present information that’s readily understood by our clients. Currently employers and government only have access to population statistics, which have no direct correlation to the health of the actual workers. So they don’t have a clear picture of where to spend money to improve the physical profile of their employees or keep people in the workforce longer. Similarly, when insurers are writing premiums for workers’ compensation they’re doing that on the back of the employer’s injury history and what types of processes and practices they have in place. This project will enable access to specific workforce statistics to better inform all of those decisions.

Collecting this digital data, we knew that one day we had another job of work we’d like to do in analysing it and being able to provide statistical reports to a range of people including employers, industry bodies and government. So we were on the lookout for a partner to collaborate on that project. We interviewed and looked at a few different universities for which one we were going to partner with and we felt that in the technology space where we were, the best fit for us was UTS. When we first met with Farookh and Dianshuang, we spoke about what the university as a whole had to offer, and got a good understanding of how the collaboration would work. We were also pretty keen to know what key relationships the university had with different technology bodies. This project is definitely in the big data space, so we needed to make sure we partnered ourselves with a university that is thinking along the same lines.

The ability to understand data in a meaningful way is changing in front of us. We did a tour of the UTS Data Arena, which is one of only two or three data arenas of that type in the world. Being able to see data presented that way shows you analysing data isn’t simply standing over a spreadsheet looking at numbers; you can pull it out and actually look at its movement and how it changes when you change something in the data set. You certainly bring two very powerful things together on a project like this. Rather than having a multitude of layers of different people who have been brought to the table you’ve got us as an organisation that lives and breathes it in the industry, and you’ve got the university that has access to all that emerging technology, equipment and breadth of expertise. It really does make all the difference.
Farookh Hussain

My expertise is around cloud-based intelligent data analytics, and this project is in the same direction. In the initial phase, this project is about data cleaning and data cleansing, but as an end goal they want to be able to get to cloud-based data analytics. WHA has a large information base at their disposal. They can use it for intelligent analytics and mining so they can feed this back to their clients to help inform business and policy decisions.

To me it is a very rewarding experience working with WHA, especially as they work in the health sector. The health sector is vital to the general well-being of any country. We have had a good collaborative partnership with them for the past 16 months on the first phase of this project. And we have been talking about embarking on other projects as well, such as an ARC linkage project. So there are possibilities for ongoing collaborations.

Given the focus on industry engagement these days, a collaborative research project is a good way to find out how industry engagement actually works and build on that collaborative approach. And what’s even more useful is when you see the outcomes of the relationship coming good at the end of the day. It’s very rewarding.

Dianshuang Wu

My research area is recommender systems, data mining and data analysis. So in this project, I used my knowledge to help WHA clean their data, analyse their data and to develop software to generate reports based on the data.

Farookh is my supervisor and we worked together to secure the contract with WHA. Farookh is an expert in information systems and cloud computing, so I learned many things about cloud computing working with him. In this project, because we have a lot of data, we need to use a cloud database. Farookh discussed the structure of the software with me. He also introduced me to his students who work with Amazon. Amazon provide a cloud platform and I learned the industry cloud platform to understand how it works. So this helped develop the software in this project.

Farookh also helped me to communicate with business people. He has many partners in industry projects, so working with him on this project I learned how to communicate with the industry people. I think that’s very important.

Collaborating with WHA on this project has given me a great sense of achievement. Because I can apply my research into the real world and help the company to solve their real problem. That motivates me to do the project. I’m very happy to work with WHA; I’ve found Jason and their other directors are very interested in the new technologies and believe the technologies can help them to become a leader in their field. Also their IT manager is very kind; when I ask him anything about their current database and current software, he takes the time to tell me everything. It feels very good to work with them.

I think doing the project benefits both the industry and the university. WHA have accumulated a lot of data and they believe the data can bring greater value. They want to transform the raw data into valuable information like reports. By doing this project, we can better understand the real-world problems and identify the research questions that benefit our research.

Rachael Quigley
Marketing and Communication Unit
Photographer (F Hussain and D Wu): Shane Lo
Photograph (J Unwin) supplied by: Jason Unwin
What do we want? It sounds like a simple question, but for Dr Heidi Norman, finding an answer has been far from easy.

Last May, after years of meticulous archival and ethnographic research, the Associate Professor in Social and Political Sciences released her first book: *What do we want? A political history of Aboriginal Land Rights in NSW.*

*What do we want?* is the first published work documenting the fight for Land Rights legislation in NSW. It chronicles the political struggle of activists and discusses the ongoing impacts of the 1983 laws, which, at the time, heralded an entirely new and unprecedented involvement in government and governing by the state’s Aboriginal people.

Norman describes her work as a study of the “possibilities, tensions and entanglements” of Land Rights legislation.

“Aboriginal people took up the political demand of self-determination and worked to address their community disadvantage, all the while grappling with the expectations of government,” she says.

For the book, Norman’s research was conducted in collaboration with the NSW Aboriginal Land Council (NSWALC), local Aboriginal Land Councils and a number of community and academic partners. Among those partners were CEO of the NSWALC Lesley Turner, and Community Elder and NSWALC Community and Cultural Advisor Sol Bellear.

“I really enjoyed writing the book, and the endless cups of tea and conversation I shared with families and communities across NSW about the highs and lows of Land Rights and, more broadly, about the long struggle to escape the clutches of colonisation.”

For much of Australia’s history, Indigenous people have been treated as objects of academic study rather than as participants or co-collaborators. Such exploitation has generated levels of mistrust and resistance towards research.

Norman’s work, however, was different.

“When Heidi approached the NSWALC requesting access to archival materials for a research project on the NSW Land Rights network, our organisation was more than willing to assist,” explains Turner.

“There has been a lack of meaningful analysis of the cultural and political environment that informed the advocacy and the institutions that were established to deliver Land Rights.

“This is what makes *What do we want?* indispensable – Heidi’s research is unique in its scope and methodical in its approach.”

In recognition of her significant scholarly achievement, Norman received the 2015 Vice-Chancellor’s Award for Research Excellence Through Collaboration.

Says Norman, “It’s great to gain that acknowledgement and to see UTS is a university that values contributions to improving understandings of Aboriginal worlds in all their complexity, messiness, madness and joy.”

For Norman, herself a Gomeroi woman, inquiry into social justice and inequality has been a life-long passion. It was something fostered by her upbringing in Western Sydney – Norman was the youngest of four children and a student at a progressive, experimental Catholic senior college.

“There were lots of great things happening at the school,” recalls Norman, “and we were all involved in this unique student democracy.”

It’s a feeling that academia still imparts in Norman.

“Research covers the highs and lows. At times it seems a painful, slow and monotonous struggle. At other times it’s the most fun you can possibly have.

“I mostly enjoy conducting in-depth interviews and working to make sense of the archive and ethnography. I love the tensions between the two sources and methods and the eventual clarity. That is the sweet spot; that feeling of swimming with the current.”

Jack Schmidt
Faculty of Arts and Social Sciences
Photographer: Hannah Jenkins

This research is funded by: Australian Research Council
She hopes her work will highlight the way copyright and culture influence each other, and the intersection between private rights and public access.

“Because it’s a historical project, the main focus is to help us understand the world we live in,” explains Alexander. “I think it will help us understand the interplay between legal regulation, the creation and circulation of information and the impact of law on commercial trade.”

Associate Professor Thalia Anthony and Professor Larissa Behrendt’s project, ‘Where are Indigenous women in the sentencing of Indigenous offenders?’ was also awarded funding. This research is aimed at ensuring fair and appropriate sentencing is given to Indigenous women – the fastest-growing prison demographic in Australia today.

For both Anthony and Behrendt, a major component of their project is encouraging the self-determination of Indigenous people.

Alexander’s project, ‘Copyright and Cartography: Understanding the past, shaping the future’ was one of the faculty’s three successful grant applications.

Her project investigates the history of mapmaking and the copyright of maps both in the United Kingdom and Australia. The Discovery Project funding will enable Alexander to travel to archives overseas and across Australia, attend conferences to present findings, speak to others in adjacent fields and pay for research assistants.

Both Vrdoljak and Alexander agree the faculty’s strong results reflect the collaborative efforts of the whole team.

Says Vrdoljak, “I am really proud of everyone, both my colleagues that were successful and those who were not. I’m also proud of the professional staff including the research development officers, Emily Hammond and Claire Wiltshire who helped put the applications together.”

And following on from the faculty’s two successful DP-funded projects in 2015, it’s another step forward in their goal to become one of the top five law schools in Australia by 2018.

Lexy Akillas
Bachelor of Arts in Communication (Journalism)
Photographer: Shane Lo

This research is funded by: Australian Research Council
ALGAE POWER

An artist’s impression of the proposed location for algae panels on UTS's Alumni Green. These flat façade panels – the first of their kind in Australia – are part of a collaborative effort between the Faculties of Science and Design, Architecture and Building to bring the concept of algae-powered building technology closer to reality.

Artist’s impression: Paul Stoller, Atelier Ten Environmental Design Consultants
Photographer (Alumni Green): Shane Lo