Meet our new Deans

Creative and innovative thinking will be their driving force

OUT OF THE SHADOWS
Shining a light on refugee life on Nauru and Manus

BIRDS OF A FEATHER
Tracking waterbirds one plume at a time
Welcome to the Winter issue of UNSW magazine.

Our cover story profiles our three newest faculty leaders in the Built Environment, Arts & Social Sciences and Law. You will enjoy reading what they have to say about how creativity and innovation will be the driving force behind their implementation of the University’s 2025 Strategy.

New ways of thinking will become increasingly important as we seek to fulfill our aim to be among the world’s best research and teaching intensive universities. One researcher who illustrates this mindset is Mike Manefield, from the School of Biotechnology and Biomolecular Sciences. Together with his colleague Sabrina Beckmann, Mike has uncovered a remarkable way of extracting more gas from existing coal seams and even from food waste. This innovation will help increase the more carbon-friendly methane gas as an energy source and bring down global emissions to help us transition to a cleaner future.

Having influence where it counts is crucial if we are to help solve some of the world’s most pressing challenges. When it comes to the vexed issue of international migration, the Andrew and Renata Kaldor Centre for International Refugee Law is compiling the evidence we need to properly inform public policy. Madeline Gleeson’s powerful new book Offshore: Behind the wire on Manus and Nauru offers perhaps the most comprehensive account of what is happening inside Australia’s offshore detention centres and is a must-read for anyone with an interest in forging a new, and more humane, way of treating asylum seekers.

Our students are also having an impact. I am excited to read about the work of entrepreneur and aeronautical engineering student Solange Cunin, who has teamed up with hundreds of NSW high school students to make history by sending Australia’s first scientific payload to the International Space Station. We will all be watching keenly as the rocket lifts off from Cape Canaveral as expected in November.

Elsewhere in the magazine, we talk to disaster risk expert David Sanderson, UNSW’s inaugural Judith Neilson Chair in Architecture, and discover why he believes architects have a crucial role to play in enabling communities to recover from disaster and in making our cities more resilient.

It is exciting to read about the important work being conducted by members of our UNSW community across so many areas. I hope you enjoy the issue.

Professor Ian Jacobs
UNSW, China partner on $100m innovation precinct

The UNSW Torch Innovation Precinct, the first outside China, has the potential to put UNSW at the centre of a global innovation drive and help reset Australia’s relationship with its largest trading partner.

UNSW is joining forces with China’s innovation system to develop a science and technology precinct in the heart of Sydney in one of the biggest innovation initiatives by Chinese companies outside China.

Prime Minister Malcolm Turnbull and Chinese Premier Li Keqiang unveiled the partnership at a signing ceremony at the Great Hall of the People in Beijing in April.

Backed by leading Chinese companies and the Ministry of Science & Technology’s flagship “Torch” high technology industry development program, the partnership will deliver a major boost in research and development funding for Australian research through a new science and technology precinct at UNSW. An initial $30 million investment has been secured by eight Chinese companies to support Australian research in advanced materials, biotechnology, energy, and environmental engineering.

The precinct will give researchers access to new R&D funding to work in Australia to translate local breakthroughs into commercially viable technologies. Deloitte Access Economics has estimated it could boost GDP by $1.1 billion in its first decade alone.

“This partnership is a global first and has the potential to reset the Australia-China bilateral relationship and boost the nation’s innovation system,” Professor Jacobs said from Beijing shortly after the signing ceremony.

“This is about future proofing our national competitiveness by strategically positioning Australia as China becomes the world’s largest investor in R&D and the 21st century’s science and technology superpower.”

China’s Torch program has been successfully co-locating Chinese businesses, universities and research organisations in science and technology precincts to drive innovation since 1988. The 150 Torch precincts in China now generate some 7% of GDP, 10% of industrial output and 16% of export value.

“The Torch partnership is an important milestone in the further development of Sydney as Australia’s global innovation city. It’s an example of UNSW proactively taking the initiative to put some real momentum behind Australia’s National Innovation and Science Agenda,” Professor Jacobs said.

Initially, the first group of UNSW Torch industry partners will set up incubator spaces on the Kensington campus in close proximity to researchers and a growing community of student entrepreneurs. Investment is expected to build to $100 million, enabling the construction of a new purpose-built, globally connected UNSW innovation precinct by 2025.

“The statistics are staggering,” said Laurie Pearcey, UNSW’s International Executive Director and former Chief Executive of the Australia China Business Council. “In China, Torch zones are home to over 50,000 tenant companies and invest RMB 347 billion ($A70 billion) in R&D. The OECD forecasts China will overtake the US as the world’s largest investor in R&D by 2019. This is a major shift in the global knowledge economy and Australia must be strategically positioned.”

With two-way trade worth $160 billion annually, China is already our largest trading partner, Pearcey said. “Although China will continue to value us as a quarry and a food bowl, our once overwhelmingly dominant iron ore exports have fallen in value from 62% of our earnings from exports to China in 2010-11, to 23% last year.

“As mining investment contracts and commodity prices cool, Australia has an opportunity to leverage its world-class universities, the tens of thousands of Chinese students studying here and our strong links to Asia to meet the challenges of the ideas boom,” Pearcey said.

“The UNSW Torch Innovation Precinct is one approach to building partnerships. We need as many initiatives and ideas like this on the table as possible if we are to redraw the Australia-China paradigm.”

– Louise Williams

This is an example of UNSW taking the initiative to put some real momentum behind Australia’s National Innovation and Science Agenda.

Malcolm Turnbull and Li Keqiang look on as Ian Jacobs and his Chinese counterpart sign the Torch agreement. PHOTO supplied.
New leadership line-up

UNSW has announced a major expansion of its senior management board, introducing three new members to ensure the best team is in place to spearhead the implementation of the 2025 Strategy.

A new post of Deputy Vice-Chancellor (DVC) Enterprise will be responsible for integrating activity across the innovation and enterprise portfolio, working closely with the DVC Research and DVC Education. The position is currently being recruited.

Professor Eileen Baldry, Academic Lead for Equity, Diversity and Inclusion, will join the Management Board to help drive this critical aspect of the UNSW 2025 Strategy.

Also appointed is Pro-Vice-Chancellor (International) Fiona Docherty, who will join the Board as Vice-President International to lead the University’s global impact priorities, including international education, partnerships and global development.

“These arrangements mean that the Management Board will have representation in three areas of great importance to UNSW – Enterprise, Diversity and International – and Eileen’s input will strengthen the voice of the Humanities,” President and Vice-Chancellor Professor Ian Jacobs said, announcing the changes in a message to staff.

The appointments follow the naming of new leadership in the Research portfolio.

Deputy Vice-Chancellor (Research) Professor Nicholas Fisk will take up his role in early August and Pro-Vice-Chancellor (Research) Professor Emma Johnston began her new position in May.

Fisk will join UNSW from the University of Queensland, where he is Executive Dean of the Faculty of Medicine and Biomedical Sciences. Prior to his appointment as Executive Dean in 2010, he was the inaugural Director of the University of Queensland’s $70 million Centre for Clinical Research.

Johnston comes to the position of Pro-Vice-Chancellor from the Faculty of Science, where she heads the Applied Marine and Estuarine Ecology Lab and was the inaugural director of the Sydney Harbour Research Program at the Sydney Institute of Marine Sciences.

Our Diversity Champions

Five Equity, Diversity and Inclusion Champions will help the University achieve its 2025 Strategy aim to better reflect the demographics of the communities it serves.

The Champions are Professor Laura Poole-Warren, who is leading the University’s Athena SWAN pilot program and is the Gender Champion; Professor Vanessa Lemm (Culture); Professor Andrew Lynch (Disability); Professor Mark Willcox (LGBTQI); and Mr Warwick Dawson (Flexible Work and Leave Options). The five will advocate for their respective areas and work with staff and students to explain the changes that will take place at UNSW over the coming decade.

All will be part of the UNSW Equity, Diversity and Inclusion Board that meets quarterly and will play a key role in raising awareness across the university.

A UNSW Indigenous Strategy led by an Indigenous Advisory Council is also being developed.

The benefits of equity and diversity are clear, says Professor Eileen Baldry, who will work with the Champions in her capacity as the Board’s Academic Chair.

“Diverse workplaces produce better results than mono workplaces. Flexible workplaces produce better results than inflexible workplaces. Workplaces that are inclusive produce a better culture of work,” she says.

Baldry says she was overwhelmed by the number and calibre of the expressions of interest for the diversity roles. “We had dozens and dozens of applications from people who are clearly very passionate about diversity and equity,” she says.

Baldry is also encouraged by the enormous interest shown by students. “The students are as keen as mustard to get involved. They say ‘of course this is the way we should be going’. For them, this is a no-brainer.”

Innovators and entrepreneurs to gather in San Francisco

Some of the Asia-Pacific’s leading innovators and entrepreneurs will gather in San Francisco 23-24 June for UNSW’s inaugural Alumni Entrepreneurs and Innovation Summit. The summit builds on the launch of the UNSW Innovation Statement, the opening of the Michael Crouch Innovation Centre and UNSW Innovations’ continuing cultivation of an innovation ecosystem at UNSW.

The meeting will feature talks from prominent UNSW alumni and researchers who are leaders in their respective fields of finance, IT, health, technology and social innovations.

Confirmed speakers include Robyn Denholm, Vice-President Juniper Networks, ‘In Conversation’ with Scott Farquhar, co-Founder and co-CEO of Atlassian on ‘Taking Australian start-ups and innovations to the world’. Also delivering a keynote address is UNSW Scientia Professor and Laureate Fellow Michelle Simmons, Director of the Australian Research Council Centre of Excellence for Quantum Computation and Communication Technology (CQC2T), whose speech ‘From Silicon Valley to Quantum Harbour’ will cover the future of computing. For more details go to alumni.unsw.edu.au
Quantum research ‘the best in the world’

For her world-leading research in the fabrication of atomic-scale devices for quantum computing, Scientia Professor Michelle Simmons (pictured) has been awarded a prestigious Foresight Institute Feynman Prize in Nanotechnology.

Two international Feynman prizes, named in honour of the late Nobel Prize-winning American physicist Richard Feynman, are awarded each year in the categories of theory and experiment to researchers whose work has most advanced Feynman’s nanotechnology goal of molecular manufacturing.

Professor Simmons, director of the UNSW-based ARC Centre of Excellence for Quantum Computation and Communication Technology (CQC2T), won the experimental prize from the Foresight Institute for her work in “the new field of atomic-electronics, which she created”.

Her group is the only one in the world that can make atomically precise devices in silicon. They have produced the world’s first single-atom transistor as well as the narrowest conducting wires ever made in silicon, just four atoms wide and one atom high.

President of the Foresight Institute Julia Bossmann said the US$5000 prizes reward visionary research. “Our laureates realise that big innovation is possible on the nanoscale. The prizes acknowledge these pioneering scientists and inspire others to follow their lead.”

Professor Simmons said: “I am delighted to win this award. Feynman once said: ‘What I cannot create, I do not understand’.

“By creating electronic devices atom by atom, we are gaining a very fundamental understanding of how the world behaves at the atomic scale, and it’s phenomenally exciting,” she said.

In April, Prime Minister Malcolm Turnbull visited UNSW to open new laboratories at the CQC2T headquarters. He said: “There is no bolder idea than quantum computing” and UNSW’s research in the transformative technology was the “best work in the world”.

The laboratories will double the productive capacity of the CQC2T, and will be central to commercialising the quantum computing research and establishing Australia as an international leader in the industries of the future.

Double win in book industry awards

A UNSW creative writing lecturer and the University’s publishing company have won major prizes at the annual Australian Book Industry Awards in Sydney.

The Other Side of the World, by UNSW lecturer Stephanie Bishop, was named the Literary Fiction Book of the Year, and UNSW Press’s publishing and sales division NewSouth Books was named Best Small Publisher at the awards ceremony held at the Art Gallery of New South Wales in May.

Described as a story of love, marriage and geographical dislocation, The Other Side of the World tells the story of a young English woman and her husband as they emigrate to Perth in Western Australia in the 1960s.

“It’s such an honour to win the Australian Book Industry Award for Literary Fiction Book of the Year – I really didn’t see this coming and am so thrilled and grateful. It was an incredible shortlist, and a real privilege to be in such fine company,” Bishop said of her win.

NewSouth was named the Best Small Publisher for 2016. This division of UNSW Press creates general and illustrated non-fiction books and scholarly titles, manages the sales and marketing of these books and also represents other independent publishers from Australia and around the world.

UNSW Press chief executive Kathy Bail said the industry recognition alongside Bishop’s award was an “excellent double” for the University and “demonstrated that our authors and publishers continue to stimulate public debate and policy making. Books published by NewSouth have a real impact – nationally and globally”.

ALUMNI HIGH ACHIEVERS

A philanthropist novelist, a business leader, a mental health educator and an Australian cricketer were among a group of high achievers to be recognised at UNSW’s 2016 Alumni Awards and dinner. The awardees join a select group of fewer than 200 winners, drawn from a UNSW alumni community of over 277,000 graduates across 146 countries. Among the winners were acclaimed contemporary artist Shaun Gladwell; company director, social entrepreneur and novelist John M. Green and his wife Jenny Green; business leader Robert (Bob) Cameron; mental health educator Betty Kitchener; University of Melbourne Provost Professor Margaret Sheil; and international cricketer Usman Khawaja.

LUMINIS SCHOLARSHIPS

Corporate advisory firm Luminis Partners has committed $1 million to launch a prestigious MBA scholarship program at UNSW. The program will provide full tuition fees and a stipend for a fulltime MBA student each year for 11 years. It will include international exchange at The Wharton School of the University of Pennsylvania, one of the world’s leading business schools, as well as access to an exclusive business network.

Guest of Honour Lucy Hughes-Turnbull, the Chief Commissioner for the Greater Sydney Commission, unveiled a classroom named in honour of the Luminis Foundation.

TOP SCIENCE HONOURS

Three UNSW academics are among 21 leading scientists to be elected to the Australian Academy of Science, Australian science’s highest honour. Professors Justin Gooding, Fedor Sukochev and Toby Walsh were recognised for their outstanding contributions to chemistry, mathematics and artificial intelligence respectively. Meanwhile, UNSW Professor Richard P Harvey has joined scientific luminaries Einstein, Newton, Florey and Hawking as a Fellow of the Royal Society, the oldest continuously operating academy of science in the world. Since its inception in 1660, the Royal Society has played a part in some of the most significant and life-changing discoveries in scientific history.
UnSW is hosting the Leadership Forum on Energy Transition, an initiative that brings together leaders from business, academia and the community to develop a clean energy blueprint for the nation.

An influential grouping of diverse partners will create a roadmap to create a clean energy future, as part of a new Leadership Forum on Energy Transition for Australia.

The Forum, an initiative of the Australian Conservation Foundation, is being hosted and chaired by UnSW as part of the University’s Climate Change Grand Challenge.

The Forum brings together 17 partners who recognise the significant dangers and disruptions to Australia that are already occurring due to climate change and that will worsen as the globe continues to warm.

“The forum members accept the science of climate change and the evidence that the way energy is produced and consumed is a fundamental driver of global warming and that a fair and just transition to clean energy is essential for Australia’s future,” a statement announcing the grouping said.

“If Australia is to honour the international commitments made at the climate negotiations in Paris last year, all of those in leadership roles must contribute to tackling the problem of pollution from energy production in Australia,” the statement said.

“Without a national plan to transition from emissions intensive energy to clean energy, the growth of clean energy in Australia will stagnate and forum members fear the nation’s contribution to international greenhouse pollution will continue to rise.

“The forum will develop a blueprint for energy transition in Australia that is in the best interests of the Australian community, economy and environment; it will offer this evidence-based plan for transition to political decision makers.”

To assist the next Australian government in leading the energy transition, the forum will produce the blueprint within 100 days of the upcoming federal election.

The Forum consists of 17 members including Professor Ian Jacobs (Chair), President and Vice-Chancellor, UnSW; Mr Geoffrey Cousins AM President, Australian Conservation Foundation; Dame Quentin Bryce AD CVO, former Governor-General of Australia; Ms Jillian Broadbent AO, Chair, Clean Energy Finance Corporation and Swiss RE Life and Health Australia; Mr Andrew Vesey, CEO, AGL Energy; Mr David Thodey, Chair, CSIRO and former CEO, Telstra; and Ms Maria Atkinson AM, co-founder of Green Building Council of Australia and board member, Australian Renewable Energy Agency.

UnSW has launched a new campaign to prevent sexual assault and harassment, partnering with all Australian universities on a major national initiative. Developed by peak body Universities Australia, the campaign – Respect. Now. Always. – highlights the determination of Australia’s universities to ensure that students and staff are safe from sexual assault and sexual harassment.

UnSW Vice-Chancellor Professor Ian Jacobs, who is also lead Vice-Chancellor for equity and diversity for Universities Australia, said the campaign built on longstanding work at UnSW and across the Australian university sector.

“It is essential that universities are places of safety and respect,” Professor Jacobs said.

“Respect. Now. Always. will raise awareness among university students and staff that sexual assault and harassment are unacceptable, and provide clear pathways of support for those who need it.

“I hope the campaign is giving people confidence to report inappropriate behaviour and where necessary change ethos and culture,” he said.

Respect. Now. Always. was launched at UnSW with a special screening of US film The Hunting Ground, which focuses on sexual violence in American universities and highlights the importance of developing effective prevention strategies and reporting mechanisms to address sexual harassment.
Trapping the light fantastic

UNSW solar cell researchers have broken yet another world record, squeezing even more electricity from a beam of sunlight. Wilson da Silva reports.

Using a clever combination of cells embedded in a prism, UNSW engineers have dramatically lifted the efficiency of photovoltaics, setting a world record for sunlight-to-electricity conversion.

The record was set by Dr Mark Keevers and Professor Martin Green at the Australian Centre for Advanced Photovoltaics (ACAP), using a prism configuration that extracts the maximum possible energy from sunlight.

It does this by splitting the incoming rays into four bands, using a hybrid four-junction receiver to squeeze more electricity than ever before from each beam of sunlight.

The UNSW module converts 34.5% of received solar energy into electricity. The result, confirmed by the US National Renewable Energy Laboratory, is almost 44% better than the previous record, set by Atla Devices of the US. This reached 24% efficiency, but over a larger surface area of 800 square centimetres. The UNSW module is 28 square centimetres.

“This encouraging result shows there are still advances to come in photovoltaics research to make solar cells even more efficient,” says Keevers, a Senior Research Fellow. “Extracting more energy from every beam of sunlight is critical to reducing the cost of electricity generated by solar cells as it lowers the investment needed, delivering payback faster.”

The result was obtained by the same team that set a world record in 2014, achieving an electricity conversion rate of more than 40%, but using mirrors to concentrate the light. The new result, however, was achieved using normal sunlight with no concentrators.

“What’s remarkable is this level of efficiency had not been expected for many years,” says Green, director of the ACAP and a pioneer in solar research for 40 years.

“Things are moving faster in solar cell efficiency than many experts expected, and that’s good news for solar energy.”

Australia’s research in photovoltaics has already generated flow-on benefits of more than $8 billion to the country, Green says. Gains in efficiency alone, made possible by UNSW’s PERC cells, are forecast to save $750 million in domestic electricity generation in the next decade. PERC cells were invented at UNSW and are now becoming the commercial standard globally.

The record-setting UNSW mini-module combines a single-junction silicon cell on one face of a glass prism, with a triple-junction solar cell on the other.

The triple-junction cell targets discrete bands of the incoming sunlight, using a combination of three layers: indium-gallium-phosphide; indium-gallium-arsenide; and germanium. As sunlight passes through each layer, energy is extracted by each junction at its most efficient wavelength, while the unused part of the light passes through to the next layer, and so on.

Some of the infrared band of incoming sunlight, unused by the triple-junction cell, is filtered out and bounced onto the silicon cell, thereby extracting just about all of the energy from each beam of sunlight hitting the mini-module.

The spectrum-splitting, multi-junction approach is perfect for solar towers, like those being developed by Australia’s RayGen Resources. However, solar cells of this type are unlikely to find their way onto rooftops soon due to high manufacturing cost and complexity – a problem the UNSW team is working on.

The research is supported by $1.4 million grant funding from the Australian Renewable Energy Agency. Other research partners include RayGen, Trina Solar, a PV module manufacturer, and the US National Renewable Energy Laboratory.

The conversion milestone came as UNSW registered another world record, this time in thin-film solar cells used in façades, roofs and windows.

In April, UNSW’s Dr Xiaojing Hao achieved the world’s highest efficiency rating, recording 7.6% efficiency in a one square centimetre area. The rating was achieved using a new type of thin-film cell called CZTS, made from abundant materials such as copper, zinc, tin and sulphur, which have none of the toxicity problems of rival technologies.

“This is the first step on CZTS’s road to beyond 20% efficiency, and marks a milestone in its journey from the lab to commercial product,” says Hao, who was named last year as one of UNSW’s 20 rising stars. “There is still a lot of work needed to catch up with [rival technologies], in both efficiency and cell size, but we are well on the way,” she says.

Things are moving faster in solar cell efficiency than many experts expected, and that’s good news for solar energy.
Building resilience

In a world increasingly impacted by poverty and natural disasters, David Sanderson is teaching architects to build resilience, not skylines. The inaugural Judith Neilson Chair in Architecture talks to Fran Strachan.

We need to take the time to listen.” It’s a simple statement, but one Professor David Sanderson believes can alter the way post-disaster situations are managed.

As an international disaster risk-reduction expert who has spent 25 years working with aid agencies helping piece together communities torn apart by natural disasters, he is well-placed to comment.

“Aid organisations tend to focus on what’s missing, instead of the resources and capacities local communities already have. People aren’t helpless victims. They have dignity and they want to get on with their lives, and the best thing we can do is listen to them,” he says.

As UNSW’s inaugural Judith Neilson Chair of Architecture, UK-born Sanderson is committed to building resilient communities that have the capacity to “bounce back” from disaster by collectively rebuilding their homes and communities.

It might seem a simple approach, but after years of observing inadequate aid and needless suffering he’s convinced it works.

“Bad international aid efforts tend to promote our ‘saviour mentality’ by flying in quick-fix temporary housing, but after the TV cameras have packed up and gone that’s all people are left with,” he says.
Cities are growing by one million people per week and 30% of poorer countries’ populations are living in slums; by 2050 that could reach 50%.

“Cash transfers are cheap to administer, help mobilise people and boost local markets and economies.”

Having been trained as an architect, Sanderson’s main focus is shelter – how to keep people warm, dry and safe after disaster has struck.

But he says he had to spend some years realising that what mattered was the process as much as the product.

“I love architecture and it’s the most wonderful profession to be trained in. From my education it was the transferrable skills I took into the aid sector that counted: problem-solving, lateral thinking, a sense of space and form and creativity – not just designing buildings, but involving people in owning the decisions that were made.”

Sanderson says architects need to move beyond their traditional role of designing buildings in places of relative certainty to becoming facilitators of building processes that involve people in places of uncertainty and rapid change.

“Urban migration is a huge issue,” he says. “Cities are growing by one million people per week and 30% of poorer countries’ populations are living in slums; by 2050 that could reach 60%. We need to learn how to house people in affordable, dignified ways.”

He describes a photo he once took of a young girl from a slum in India standing on a rubbish heap “beautifully dressed and smiling”.

“I had it on my desk for years – it reminded me of the incredible dignity and resourcefulness people have, even in the most horrific situations.”

He hopes the introduction of UNSW Built Environment’s Master of Architecture – Social Agency program, which he leads, will help students think through how to serve greater social needs.

“The question we’re asking is, ‘what does it take to be relevant as an architect in the next 20 or 30 years?’.”

When asked if he calls himself a humanitarian architect, Sanderson shakes his head.

“It’s a funny phrase, I don’t like it. Most architects are humanitarians in terms of wanting to serve society. But good development and humanitarian work is about engaging people in the process and listening.”

He says not-for-profit agencies including Care International and the Norwegian Refugee Council make a far more significant difference to post-disaster communities than celebrated architects, referring to this year’s Pritzker Prize winner, Chilean humanitarian architect Alejandro Aravena, whose architectural practice Elemental builds low-cost housing for the poor.

“The building of houses is the easy bit,” he says, dismissing what he calls the “pretty, media-friendly”, temporary housing that is often built after disasters.

“The knotty, difficult part is dealing with each country’s politics, economics, governance and corruption.”

He insists, however, that the situation isn’t all doom and gloom. He hopes this year’s inaugural World Humanitarian Summit and the Venice Architecture Biennale, Reporting from the Front, will be game-changers in the sector.

“I look forward to the day when we all know how to listen, and we judge good architecture on what it does for marginalised people.”


Madeline Gleeson has read more pages of Hansard than any person should reasonably be expected to.

But not for pleasure. The lawyer and research associate at the Andrew and Renata Kaldor Centre for International Refugee Law pored over the thousand or so pages for her book *Offshore: Behind the wire on Manus and Nauru*.

Gleeson had already trawled myriad government and Department of Immigration interviews and media releases, media reports and official inquiries, and interviewed sources to build a picture of what had been happening inside the detention centres on Manus Island and Nauru.

The Hansard search was a bid to understand the logic behind the policy. She found none. “I kept going back further and further to find this policy’s purpose,” Gleeson says. “There is yet to be one government that has thought through this policy to the end. There’s never been an answer to where these people are supposed to go when they are found to be refugees.”

The book is a comprehensive – and at times confronting – account of what life has been like inside the centres on Manus Island and Nauru since offshore processing was resurrected by the Gillard government in 2012.

Gleeson wanted to move beyond the rhetoric to present a factual account of what has happened on Manus and Nauru. “I want this book to help Australians recognise how spin is being used, to recognise that you can’t assume a policy has been properly thought through,” she says.

The seeds of the book were sown as Gleeson worked on her Masters in International Law at the Graduate Institute of International and Development Studies in Geneva from 2012 to 2014.
“My Masters thesis was on Australia’s state responsibility for offshore processing, so from the day that policy was announced, my research began,” she says. Even then, Gleeson was struck by the secrecy that shrouded offshore processing.

“I wanted to have conversations about the legal question of state responsibility but you can’t even start that if you don’t know what’s happening there,” she says.

When Gleeson was growing up, her family were always conscious of issues of social justice and fairness and she had a strong interest in immigration issues and refugees, spending her Year 10 work experience placement at an asylum seeker centre in Surry Hills, in inner city Sydney.

After completing a Bachelor in International Studies and Bachelor of Laws with First Class Honours at UNSW and working for a few years in Sydney, Gleeson spent a year in Cambodia.

“I just wanted to get out there, be on the ground doing something practical, get some experience, not just sit in Sydney and analyse things academically,” she says.

A global callout yielded an offer from Sister Denise Coghlan, an Australian nun and Director of the Jesuit Refugee Service in Cambodia, and Gleeson spent a year there producing a guide to help international and grassroots organisations understand the relationships between various causes of displacement within Cambodia. The experience set her on a different path.

There is yet to be one government that has thought through this policy to the end.

“In Cambodia, we were looking at a much more diverse range of displacement, and I absolutely got the feeling that there were greater issues than Australia’s concern with people coming by boat, especially in this region,” she says.

In 2014, Gleeson returned to Australia and the job at the Kaldor Centre, where she anticipated a relatively quiet settling in period. “But within a week, Australia announced its refugee resettlement deal with Cambodia,” she recalls.

“I had never thought my work in Cambodia would be directly relevant to Australian refugee policy and I couldn’t believe we were proposing to send refugees there who should have been our responsibility.”

Gleeson admits there are no easy solutions but says the only choice is to commit to an effective system of processing asylum seekers.

“We need to have this discussion, and a core focus of the Kaldor Centre’s work is figuring out the nuts and bolts required to achieve that effective system,” she says. “But what we really need is an Australian government committed to investigating the options, building relationships in the region to make it happen, and investing in the research.”

*Offshore: Behind the wire on Manus and Nauru* is published by NewSouth.
Australia’s first payload of scientific experiments is heading to the International Space Station thanks to a group of high schoolers and UNSW space entrepreneur Solange Cunin. Myles Gough reports.

For Kelly-Anne Bauer’s Year 9 students, making history is as simple as rocket science. Gathering after school, the group of 10 from Parramatta Marist High is tinkering with satellite hardware, learning to collect data using electronic sensors, brushing up on new programming languages, and designing creative, software-based science experiments.

The kicker: these experiments won’t be confined to their western Sydney classroom.

Instead, they’ll be part of Australia’s first cargo package delivered to the International Space Station (ISS). If all goes to plan, the payload, smaller than a shoebox, will launch in November aboard a SpaceX Falcon 9 rocket from Cape Canaveral, Florida. The experiments will be tested by NASA astronauts and then run on the ISS over several weeks.

“Our students are ridiculously excited,” says Bauer, the school’s innovation and STEM coordinator. “It’s the ultimate opportunity. There’s nothing that can actually mirror this project.”

The “project” Bauer is referring to is the Quberider Space Program.

Quberider is a STEM-education start-up co-founded by fifth year UNSW aerospace engineering and maths student Solange Cunin. Its aim is to get students excited about science, maths and technology by giving them a space mission.

So far, 40 schools and close to 1,000 students, mostly in New South Wales, are participating in the inaugural program.

“This is actually the first Australian-owned payload to go to the International Space Station,” says Cunin. “It’s a monumental achievement for Australia and it’s being driven by a bunch of 14- and 15-year-olds.”

Cunin, who grew up staring at the night sky on her parent’s eucalyptus plantation in northern NSW, has long been fascinated by space, and was thrilled when she received her first telescope as a Christmas present, more than a decade ago.

In early 2013, while at UNSW, she teamed up with a friend named Sebastian Chaoui to form Quberider. The self-professed “space geeks” envisioned a future where access to space was commonplace and not dominated by space agencies or big corporations.

Quberider was initially formed as a ride-sharing service – a way to lower the cost of launching small-scale payloads and software-based experiments into space.

But along their start-up journey, they discovered a more fundamental problem: a massive gap in technical skills, and a lack of motivation for engaging with space in Australia – the only OECD country that still lacks a space agency.

Changing course slightly, the entrepreneurs decided to address the problem at its root. They began developing an innovative education program to teach high school kids to code, collect and analyse data, and develop creative solutions.

“These are 21st century skills major industries are demanding, but they haven’t really been incorporated into the school curriculum yet,” says Cunin.

In early 2016, Quberider was accepted into a Telstra-backed accelerator program, muru-D, which invests in technology start-ups. The Sydney-based accelerator allowed the business to continue expanding its educational space.
program, which launched just as Australia’s performance in maths was under fire.

In March, the Australian Academy of Sciences warned that the country’s school system had “an acute shortage of properly qualified mathematics teachers” compared to other OECD countries and had experienced a decline in student performance on internationally standardised maths tests over the last decade. Engagement had also dipped: the percentage of students taking advanced and intermediate maths subjects in year 12 had fallen from 41% in 1995 to just 29% in 2012.

In response to the report, Geoff Prince, director of the Australian Mathematical Sciences Institute, told The Australian Financial Review that the country’s performance in the subject was “internationally embarrassing”.

Cunin believes part of the problem is that high school students don’t have a clear understanding of what STEM-based careers entail, and what opportunities are available in those fields.

“A big part of our program is facilitating webinars with industry leaders and professionals in high tech fields … and exposing students to the opportunities that are out there,” she says.

But what is most exciting about the program is the space missions, made possible after Quberider partnered with DreamUp, an American space education company with an ongoing flight schedule to the ISS.

“Space is something that naturally fascinates and excites kids and adults alike,” says Cunin. “Giving students a space mission is a really effective way of catching their attention.”

Bauer confirms her students have been “very engaged” with the program since its inception, and have devoted a lot of energy “outside of school hours” to completing assigned tasks.

“I think I will be nervous. I hope it doesn’t explode,” says Garvey, of the rocket launch. “And, of course, I hope the scientific experiments work and yield some interesting results.”

“In our school,” says Garvey, “I hope the scientific experiments work and yield some interesting results.”

“I would love to see every school give their Year 9 and 10 students a space mission every year. That would be amazing.

“There are videos, and there’s a teacher’s section and a student’s section. The kids are basically running it themselves, and I’m just the facilitator, making sure they’re meeting on time and progressing through the program quickly enough,” she says.

But the teachers deserve credit too.

“This program is brand new and it’s pretty intimidating. All the teachers we’ve been working with have made a tremendous effort,” Cunin says.

Parramatta Marist High is offering the program for gifted students who have already undertaken STEM electives, says Bauer, though she suspects there will be more interest in future, once other students learn about the launch and see what their classmates have accomplished.

As for the experiments, they are being conceived and designed organically. “At the moment I’m leaving it totally up to the kids,” says Bauer. “They’re researching different options.”

Quberider gives students suggestions to get them rolling, such as measuring the amount of radiation that astronauts are exposed to (see breakout box below), or the changes in altitude or speed when the ISS makes a sudden manoeuvre.

Cunin expects students to use their imaginations. One group is using data points to create a piece of music. “Who knows what kinds of ideas some of these gifted and talented students can come up with?” she says.

One thing is certain: excitement around the mission is mounting, and will reach a fever pitch come November.

Bauer says her students are “planning a big party to watch the launch”, which she insists will go ahead, even if it means coming into school at night.

Cunin is determined that it won’t be the last Quberider payload bound for the ISS.

She’s been working with the Australian government to reduce the regulatory hurdles that have discouraged small companies from engaging in space-related activities, and says launches will become more affordable as more schools sign up.

“This is the first run of many,” she says. “I would love to see every school give their year 9 and 10 students a space mission every year. That would be amazing. That’s our dream.”

How to launch a scientific career

When the SpaceX Falcon 9 blasts off from Cape Canaveral, headed for the International Space Station, Marcus Garvey will be watching with a mixture of excitement and self-conscious dread.

The 15-year-old from Tempe High School in Sydney’s inner west is one of more than 1000 students whose science experiments will be onboard the rocket, thanks to space entrepreneur Solange Cunin.

“I think I will be nervous. I hope it doesn’t explode,” says Garvey, of the rocket launch. “And, of course, I hope the scientific experiments work and yield some interesting results.”

The experiment Garvey has devised with his Year 10 classmate Eden Neilson aims to measure the Earth’s electromagnetic field. They will compare the data they collect against long- and short-term meteorological data to see if there is any correlation between fluctuations in solar radiation, weather events and climate change. “The data might even be of interest to the wider scientific community,” Garvey says.

The students are using Python computer code to write the experiments. They will then load them into a mug-sized module called an Asimov which, once activated on the ISS, will relay the data back to the Earth.

Tempe High student Marcus Garvey talks solar radiation with Quberider founder Solange Cunin. PHOTO Grant Turner/Mediakoo
Their optimism is palpable. And Professors Susan Dodds, George Williams and Helen Lochhead – UNSW’s new deans of Arts & Social Sciences, Law, and Built Environment respectively – share a common goal: to give their students the skills, confidence and opportunity to propel themselves and the University onto the world stage.

“No challenge is insurmountable if we keep people’s needs and aspirations at the heart of what we do,” says Lochhead, the former Deputy NSW Government Architect who combined teaching and professional practice for most of her career.

She wants students to learn creative, “out of the box” design thinking, and marry that with robust research and professional skills “I want our students to learn not only to solve problems, but to actually reframe the questions and ask: ‘Is this what we need to be solving?’

“Sydney is fast becoming a city where only the rich can afford to live. We need to accommodate people of all socio-economic groups, ages and abilities – that’s our challenge: to ensure we have a fair and just city.”

The architect and urban designer has an intimate knowledge of Sydney, but her passion lies in its sustainable regeneration and the design of better urban housing, public spaces and parks especially along Sydney’s waterways, which she describes as “the lungs of the city”.

During her time at the Government Architect’s office, Lochhead directed many projects around the harbour, including the Circular Quay Master Plan, The Bays Precinct Strategic Framework, the Walsh Bay Arts Precinct Master Plan and the post-2000 Master Plan for Sydney Olympic Park.

She has been focused on lifting the quality of the built environment. Lochhead advocates that high quality design should be within everyone’s reach.

One of her most significant roles was as part of the Sydney Harbour Design Review Panel, and she played an integral part in ensuring the beauty and accessibility of Sydney’s greatest asset was maintained.

“Our aim was to prioritise design principles that responded to the character of the harbour landscape, and to make sure new developments were scaled down to the harbour so views were shared and the waterfront was public and shared by all,” she says.

“There is a clear nexus between health and wellbeing and a well-designed built environment. When we design these sustainably the social, economic and environmental benefits can have profound impact on peoples lives.”

At the law school, Williams has big plans for it to take its place on the global stage.

“A key focus for me is building up systems, empowering our academics and students to take what they do in this building and elsewhere into the world to make a difference,” he says.

“We’re a leader in legal education in Australia but in some ways I think we undersell what we can do internationally.”

And he wants to give teaching its moment in the sun.

“It’s not that teaching has been neglected,” he says. “It’s more an imbalance.

“Even though we have undeniable strengths when it comes to research, for many of our academics their calling is to be great teachers, and I think sometimes there is a sense of justifiable frustration that the great work that has been done in that area hasn’t been given the same recognition as the research space.”

Williams, one of Australia’s leading constitutional lawyers, joined UNSW from the ANU in 2000 when he was appointed Anthony Mason Professor of Law and Foundation Director of the Gilbert + Tobin Centre of Public Law.

He has continued to practise as a barrister, has written and edited 34 books, has had a regular presence in parliamentary inquiries and is a highly sought after media commentator in Australia and overseas. And not just on the law. Williams is an avid science-fiction and fantasy watcher and reader and reviews sci-fi and fantasy books for The Weekend Australian and Books and Arts Daily on ABC Radio National.

Despite being in the UNSW law faculty for 15 years he makes no presumptions, so since his appointment has talked to about 350 people, individually and in groups, to explore the make-up of the UNSW law community.

“I wanted to get a sense of … the breadth of what they think we should be doing, a clear sense of their own priorities and what I can do to provide the best opportunities for them to thrive,” he says.
“That includes engagement with the profession, with the community, with politicians, all sorts, to make sure our work is relevant and communicated so that ultimately it makes a difference.

“That’s one of the most important characteristics of this law school: we don’t only do great teaching and research; we have an impact on the world.”

Dodds agrees. “Here is a large public university that on the one hand is excellent in research and in teaching but also not encrusted with tradition or the sense of entitlement that you might find in some of the older universities,” she says.

“It has a very positive feel and offers the capacity to make a difference, the capacity to take ideas and move them into something that has direct impact on peoples’ lives.”

As one of two new female deans, Dodds – who spent 19 years at the University of Wollongong and then seven years as Dean of the Faculty of Arts at the University of Tasmania – is more than happy to be the public face of the University’s bid for gender equity as part of its 2025 strategy.

“I’ve done a lot of work on the question of participation of women in philosophy in Australia and it has been a big challenge,” she says.

“People outside the discipline often don’t recognise that only 23% of those who are actively employed within philosophy programs in Australia are women, even though more than 60% of undergraduates studying philosophy are women.”

She says embracing diversity is vital.

“The more perspectives you bring to the table, the more opportunities you have to understand how the institution is working from the perspective of people who engage with it, and from the students,” she says.

Dodds is Chief Investigator and Ethics, Policy and Public Engagement Theme Leader on the Australian Research Council (ARC) Centre of Excellence for Electromaterials Science. She is President and Chair of the Australasian Council of Deans of Arts, Social Science and Humanities, Chair of the Board of the Australasian Association of Philosophy and has been a member of the Australian Health Ethics Committee, a principal committee of the National Health and Medical Research Council.

Her research explores the intersections of ethics, political philosophy, moral psychology, feminist theory and bioethics, with her main philosophical interest “to be able to think about the intended and unintended effects of public policy on substantive ethical and political issues”.

She is keen to get on the front foot with the 2025 Strategy.

“I want it to be the case that the faculty is positioned to support the disciplines, support the academics and the professional staff across the faculty to achieve what motivates them to be at UNSW,” she says.

“I like the fact that the university’s motto is ‘Never stand still’. That fits my life experience very well.”

– Helen Lochhead

I want our students to learn to solve problems, reframe the questions and ask: ‘Is this what we need to be solving?’

– Clare Morgan and Fran Strachan
A common fabric dye could hold the key to increased gas yields and reduced greenhouse emissions, writes Louise Williams.

NSW researcher Dr Sabrina Beckmann was doing a routine check of samples in the lab, when she realised she was looking at something extraordinary.

Peering through a microscope at the School of Biotechnology and Biomolecular Sciences (BABS), Beckmann saw a previously unknown red crystal lattice forming on the slides. Exactly how, or even if, the needle-like crystals would impact on her research into gas extraction was far from apparent. But the Research Fellow knew she needed to make an urgent call to the leader of her research team, Associate Professor Mike Manefield.

Three years later, those odd, strangely beautiful red crystals have proved to be the key to dramatically increasing gas yields from coal seam gas deposits and from biogas plants, via a relatively simple and cheap new process.

Its application in coal seam gas wells has demonstrated up to 10-fold increases in gas yields. For biogas generation, using various food, agricultural and other organic waste streams, the gains are even higher, up to 18-fold greater.

“It was an accident,” says microbiologist Manefield, of the initial discovery of the crystal lattice. Its breakthrough application, however, is the result of an elaborate cross-disciplinary UNSW study into the nature and interactions of methane-producing microbes, or “methanogenic archaea”. These single-cell organisms survive in some of the most extreme environments on earth, including deep under the earth within coal seams and on decaying organic matter, producing some one billion tonnes of methane a year.

After successful trials west of Sydney in the coal fields near Lithgow, the process has been patented. Full-scale industrial testing and validation, ahead of potential commercialisation, will begin this year in India, in partnership with India’s dominant oil and gas explorer and producer, the state-owned Oil and Natural Gas company, and the Energy and Resources Institute (TERI). In its recent funding round, the Australia-India Strategic Research Fund (AISRF) announced a new grant of almost $1 million to support the project.

“This is very exciting and likely to be a game changer,” says Manefield. “There is a lot riding on natural gas, or methane, to help bring global emissions down as the world transitions to cleaner fuels.

“As gases burn far more efficiently than solids, you emit half as much carbon dioxide for the same amount of electricity when you burn gas, compared with coal.”
The team’s research approach was initially fairly standard. Solutions of “neutral red”, a common synthetic dye routinely used for fabrics or to stain samples for viewing under the microscope, were applied to samples made up of coal and microbe-rich groundwater from coal seams. At low concentrations, the neutral red solution precipitated no notable changes. But at high concentrations of the dye solution, the red crystal lattice structures began to form.

Most significantly, the needle-like crystals appeared to “mop up” electrons. “The crystals act as electron sponges, harvesting electrons from minerals and bacteria in the mixture and then transferring them with a lot of power to the methane-producing microbes, boosting their growth,” says Manefield.

“It’s simple. If the microbes grow faster, they fart more methane.”

That finding was extraordinary enough. But field tests were essential if the process was to have industrial applications. At their Lithgow site, the researchers injected small quantities of neutral red 80 metres underground into a water-saturated coal seam, at three different locations. A five- to 10-fold increase in methane production was recorded over a 12-month period.

The Indian trials take the research a step further, enabling a battery of industrial-scale tests that factor in critical variables such as coal seam pressure and temperature, as well as the development of new technologies to precisely introduce the dye.

The partnership with India is a natural fit, bringing together the two countries’ considerable and complementary expertise in the science of coal and gas deposits.

In India, the national electricity grid is under intense pressure and some parts of the country have no access to power. Accelerated methane production is a potential means of extracting much more energy from each coal seam gas well, but it also may open up new sources of gas. Much of India’s untapped coal deposits consist of younger, softer coal that is much easier for methane-producing microbes to digest – and, therefore, potentially a much larger source of methane than higher-value hard, black coal. UNSW’s synthetic dye process could make these currently unviable soft coal deposits more commercially attractive for coal seam gas development.

“We could greatly reduce the number of coal seam gas wells needed to deliver the same amount of gas – and also add value to coal deposits that would otherwise be uneconomical to exploit,” Manefield explains.

The India-based project is also expected to deliver new fundamental knowledge about how the methane-producing microbes, known as “archaea”, work he says. It was only half a century ago that scientists realised archaesa are so distinct they cannot be lumped in with bacteria or other simple organisms, but are a separate life form.

“We still don’t really understand how they tick. This is a chance to learn more and inform our wider understanding of methane gas production,” Manefield says.

While potentially lucrative, Manefield considers coal seam gas a “transition” energy source as the world moves towards renewable energy. Methane is both naturally occurring and generated through human activities such as farming livestock, and when released directly into the atmosphere it is a potent greenhouse gas. But if captured and burnt for energy, with a by-product of only carbon dioxide, its direct environmental impact is greatly reduced. Total emissions, too, can be reduced if gas-fired electricity generation replaces coal-fired power.

“This is a big step forward at this transition stage,” says Manefield. “The difference between burning coal for electricity and burning gas is like guzzling a big cask of cheap red wine or slowly savouring a glass of fine red. There is no comparison.”

Next step, biogas

When the results of the UNSW study first appeared in the prestigious Royal Society of Chemistry journal Energy and Environmental Science, Associate Professor Mike Manefield and his team – including UNSW’s Chris Marjo, Xiaomin Li, Jan Seidel, Yee Mon Oo and Cornelia Welte – were inundated with inquiries from around the world, many from biogas generating firms. While funding had been secured to apply the new processes within coal seam wells, biogas was outside the remit of that major research grant.

Unlike coal seam applications, biogas generation is an ongoing process. However, it is currently too expensive to continuously add neutral red to biogas reactors. To more efficiently extract energy from food and agricultural waste, additional research is required to immobilise or recover the neutral red crystals after application.

Given the importance of biogas to the future energy mix, there must be a way of developing the technology for this application. But that would require investment. The answer is a crowd-funding model in which companies wanting to see the results of further research could opt in through financial contributions. It’s not a first of its kind, but is, says Manefield, an innovative way to maintain research momentum at a time of ever-increasing competition for government research funds.
It's impossible to forget," Chum says. "They took my brother and they took my father. Pol Pot took them both."

The tension in the room is palpable as he tells me what the Khmer Rouge said to him. "They said, 'to kill you is no loss (to the regime) and to spare you is no gain'. I have never been so scared or angry in my life."

Chum Siphorn is an X-ray operator who has worked at the Koh Kong Referral Hospital in rural Cambodia for 27 years. I am volunteering at his hospital as a biomedical equipment technician. Along with a team of 16 other UNSW Biomedical Engineering students, we are here to mend broken equipment in rural hospitals across the country.

Chum is visibly shaken by the remembered atrocities committed in his beautiful country. I wait as he composes himself. "Aug kun (Thank you) brother, I am okay now," he sighs and then smiles at me.

Kampuchea (the name of the country in Khmer) was caught in a proxy war between the US and the USSR during the Cold War. "In the 1950s, Kampuchea had a very strong economy," says Chum, "but during the Vietnam War, America bombed us over and over. They destroyed rural Kampuchea, and everyone either ran away or died. We turned to the Khmer Rouge because we thought they would save us. We were so wrong."

What followed was genocide. Between 1975 and 1979, the Khmer Rouge regime, led by Pol Pot, attempted to create an agrarian utopia free of family ties, religion, education, property and foreign influence in Cambodia. In this attempt to reboot society, more than 2 million people – a quarter of the population at the time – died. They focused on wiping out the educated classes – doctors, lawyers, engineers and teachers – who were perceived as "threats" to the regime.

“They destroyed hospitals, banks, educational institutions and a lot of infrastructure,” a tour guide at the Cheung Ek killing fields near Phnom Penh tells me. “Because of the Khmer Rouge, 75% of the population is under the age of 30. How is Kampuchea meant to recover?”

Healthcare was hit hard. After the country was liberated by the Vietnamese army, there were only 25 doctors, 28 dentists and 26 pharmacists left. Ever since, healthcare has suffered from insufficient funding, inadequate medical equipment and a lack of trained staff.

A recent surge of foreign aid has provided some relief, however, and on my first day in the hospital the director, Dr Laison, takes us on a tour. As we walk along the dusty corridors, we see an abundance of trained medical personnel. “In one year we are now able to treat between 4000 and 5000 patients in this hospital,” says one of the nurses.

It is also good to see so much equipment – most donated by the US and France. But secondhand equipment is prone to malfunction. Dr Laison tells us that every department has broken equipment. He is thrilled we have come to help.

Later, as I'm exploring the hospital, I hear someone calling: "Bong bong! Khnom maasen ban haa!" (Brother brother! My machine has a problem). It is a nurse from...
the surgery department. “I am trying to change the oxygen settings so that it gives me 500ml/h, but it is only giving me 400ml/h,” she says.

I pull on my latex gloves and unscrew the machine’s back panel. I suspect a leak in the oxygen pipe. I ask the nurse to release oxygen from the tank and, as predicted, I hear a hissing sound – definitely a leak. I clean the connection and reseat the pipe, and as I screw the back panel on, the nurse tests the settings. She grins – problem solved.

Right then I realise how apt it is I’m working in a hospital. I feel like a doctor – a doctor for machines.

For the next few weeks, Jeevan Shikaram, Vincent Fang and I (the student team assigned to Koh Kong Referral Hospital) repair broken and malfunctioning equipment. We fix surgical lamps and dentists’ chairs; negatoscopes, curing lights and centrifuges; suction pumps, anaesthetic machines, oxygen concentrators and more.

We also develop operation manuals for the nurses and involve a local trainee technician in the troubleshooting and repair process. We are making a difference. We see it in the smiles of the hospital staff.

The cultural immersion goes way beyond the walls of the hospital. As part of the homestay agreements between Engineering World Health, one of the organisers of this trip, and the hospitals, we live with hospital staff and their families.

I am staying with Chum and his family. Apart from his wife, mother-in-law and three children, he also supports three cheerful 15-year-old girls (Kim Seang, Dina and Lis) whose families live in remote mountain villages. They live here so they can go to school and, they hope, then university.

Living in rural Cambodia is amazing but there are challenges. There is no electricity, the toilet is just a hole in the ground and the only other bathroom feature is a bucket of water. The neighbour’s noisy chickens also take some getting used to.

To reciprocate the family’s kindness, I start a small English and mathematics class for Chum’s kids and the girls. We practise English words in the afternoons, and in the evenings we read from storybooks.

“Thank you bong (brother) OJ for teaching us Anglais (English),” they say, but I just want to thank them. Facilitating their learning of English and maths has been gratifying. I know I’m making a real difference to the Cambodian community in multiple dimensions.

UNSW Engineering would like to thank the New Colombo Mobility Plan for its sponsorship and support of Engineering World Health Summer Institute students. Thanks also to the Graduate School of Biomedical Engineering, which supplied equipment that was later donated to the hospitals.

The bottom line

Improving budget transparency is key to ensuring citizens engage with government, and Africa is leading the way, writes Usman Chohan.

Some of the least-developed African nations are leading the way with budget transparency using what are known as “citizen budgets”. These documents help to translate government fiscal policy into a simple format that ordinary citizens can engage with.

Citizen budgets are often created through collaboration between civil society groups and government departments. An example is in Ghana, where the fiscal process is made more understandable to the general public by producing abridged and user-friendly versions of the budget.

According to the Open Budget Index, the most comprehensive international budget transparency survey, some of the best improvements in budget transparency reform are happening in the weakest-ranking countries such as Benin, Burkina Faso, Cameroon, and the Democratic Republic of Congo.

A small improvement in budget transparency can create large positive impacts and is important for several reasons, including fostering higher levels of trust in government, reducing corruption and misuse of public funds, providing greater clarity on policy priorities and creating opportunities for citizens to influence decision-making.

The Open Budget Index shows governments worldwide are increasing the amount of budget information available to the public. But despite the index’s extensive coverage and rigour, it has some glaring limitations. For one, it doesn’t rank Australia, Canada or Japan.

In Australia, however, there has been a longstanding commitment to budget transparency. It’s enshrined in documents such as the Charter of Budget Honesty (1998), which at its creation was at the forefront of pro-transparency budgetary thinking.

In 2012 Australia created an important political budget institution in the Parliamentary Budget Office (PBO). In contrast to other countries, like Canada where the PBO had been brutalised by the former Conservative government, Australia’s budget office has strong institutional arrangements (such as memorandums of understanding) that allow it to undertake costings work without coming into the political line of fire.

My previous work shows PBOs can play an important role in making the budget process more efficient and participatory, and that the PBOs of advanced democracies can play a mentor role to similar offices in developing countries.

As of yet, the vast majority of the world’s people live in countries that have inadequate systems for ensuring accountable budgets. As a result, much of the fiscal decision-making in the world happens outside the knowledge of citizens, to the detriment of society.

Usman W. Chohan is a Doctoral Candidate, Policy Reform and Economics, UNSW.
A funny thing happened on the way to the checkout

UNSW research shows you could be laughing all the way to the bank if you embrace humour in your business.

The answer to the eternal question of how to keep customers engaged and satisfied is simple: Make ‘em laugh, or at least try to.

This may seem brave, but a new study, by Australian and German researchers, reports making customers laugh or amusing them with light-hearted banter presents an all-round win-win.

Researchers Michael Kleinaltenkamp of Berlin’s Freie Universität, and Christine Mathies, Paul Patterson and Tung Moi Chiew of UNSW Business School, explored the impact of humour in two different service environments: tertiary education in Germany, specifically when used by lecturers; and a suburban newsagency in Sydney where one staffer had become something of a local legend for his clowning antics with customers.

Until this study, research on the effect of humour on frontline service encounters has been scant with previous research suggesting an unwelcome joke may equate to a major service failure, comparable to billing a customer the wrong amount.

However, the new study, which recorded 537 responses straight after the service encounter, finds humour can actually have the opposite effect, regardless of a customer’s sense of humour.

One of the main difficulties for the researchers was in overcoming the many variables associated with humour. “Whether it’s perceived as being humorous very much depends on the person who’s receiving it,” notes Mathies.

For the study the researchers followed up service encounters with a survey that measured the customers’ humour recognition – their ability to tune in to humour – and their propensity to be humorous themselves.

They then looked at their perception of what kind of humour the service employee had used. Were they able to detect humour, and did they find it funny?

“Someone with a strong sense of humour can easily recognise when someone else is trying to be humorous, and is also much more likely to find it funny,” says Mathies.

“Not-so-humorous people may think the person is being friendly and friendliness is a big thing in making the service interaction positive for the customer, so all is not lost.”

Laughing is good for mental wellbeing so it’s often the better option in difficult situations.

So what happened when these “happy campers” and “grouches”, as the researchers branded them, met funny or not-so-funny employees?

Happy campers perceived more humour and found the interaction more enjoyable. Positive humour, making uplifting comments about either the customer or the employee themselves, contributed to a friendly atmosphere generally.

Happy campers also didn’t mind laughing about faults and weaknesses. They found negative humour funny and this flowed on to their satisfaction and enjoyment, but negative humour bypassed the grouches.

Important for organisations that want to have more fun with customers is the insight that even happy campers’ strong sense of humour needs to be activated by a service employee initiating humour.

Ironically the study found, when a grouch meets a serious employee – like meets like – they enjoy it, but their satisfaction with the service organisation overall goes down. Conversely, when they meet someone who injects humour, even though they don’t enjoy it, grouches perceive it as friendly and their satisfaction level rises.

This finding fascinated the researchers who expected that attempts to make a grouch giggle would go down like a metaphorical lead balloon.

Since customer satisfaction drives big-ticket monetary outcomes such as repeat purchase behaviour, long-term loyalty and positive word of mouth, the researchers conclude that serving up humour to both happy campers and grouches is universally good for the bottom line.

There are various ways for companies to embrace these findings, says Mathies. They can target applicants with humour in their recruitment programs or create a work environment where people are encouraged to use humour.

Most recently Mathies has seen this latter approach used at an aged care facility to lighten awkward moments and as an emotional coping strategy, both for the elderly residents and for staff.

“The management encouraged it by modelling the use of humour. At the end of the day, teams give a cheeky debrief in a humorous way,” she says.

“Laughing is good for mental wellbeing so it’s often the better option in difficult situations.”

A version of this article first appeared in UNSW Business Think
businessthink.unsw.edu.au

Image Shutterstock.com
wanted the installation to be carnivalesque – like a kitsch love-o-meter,” says Edison Chen of I LOVE YOU, the installation that captured the hearts of festivalgoers at this year’s Sydney Vivid festival.

Positioned at one of Vivid’s prime locations at Circular Quay, the giant illuminated love heart rewarded couples with a light display according to how loudly they yelled “I love you” into a microphone.

“We were aiming for a sideshow-alley-meets-Las Vegas-wedding-chapel aesthetic,” says Chen, a BA Design Honours student.

Encouraging couples to take part in an extreme display of public affection was part of the installation’s appeal – the louder, more intense declarations of love displayed a brighter and more colourful pattern on the 3m x 3m heart.

Fellow Art & Design Honours student Nila Rezaei, UNSW Engineering graduates Nathan Adler and Sam Cassisis, and Media Arts/Computer Science Engineering students Tom Bremner and Jordan East helped Chen bring his idea to reality, guided by UNSW Engineering Scientia Experience Manager Selena Griffith.

The giant love heart provided the backdrop for Vivid’s opening ceremony and received accolades from the Festival’s artistic director Ignatius Jones.

“IF LOVE YOU is going to go off. It’s such a clever idea – and a simple one. Every year we get countless requests for proposals and these guys have nailed it,” he told The Australian Financial Review.
Feathers are a bit like a memory chip,” says environmental researcher Kate Brandis. “They are made of keratin, like human hair and fingernails. As the feathers grow, the bird’s diet is recorded along their length in chemical elements, such as carbon, nitrogen, hydrogen and oxygen, and each stage can be linked to a specific location.

“For example, a feather found in a wetland in NSW, once analysed, can reveal the bird has been living in the Northern Territory.”

Brandis is leading the Feather Map of Australia project, an initiative of UNSW’s Centre for Ecosystem Science and the Australian Nuclear Science and Technology Organisation (ANSTO) to plot the movements of the country’s wetland birds.

Knowing the movements of waterbirds helps identify the wetlands that are the most important habitats requiring protection, Brandis says. Over the past 30 years, waterbird populations have declined as opportunities for breeding have disappeared, mainly due to water resource development.

But traditional methods of tracking the birds – leg banding and satellite trackers – have had limited success and can be expensive. So the researchers have developed a more effective way. They are asking “citizen scientists” across the continent to send in the feathers they find in wetlands to be analysed using ANSTO’s nuclear techniques.

Surveying the dozens of feathers on her desk, Brandis struggles to pick a favourite: it’s like asking a parent to choose a preferred child.

“Unfortunately, waterbirds aren’t the most colourful,” she smiles, skirting the question. “But some of the feathers are stunning; often the highly patterned ones are from the ducks.”

She points to three feathers from a Plumed Whistling Duck. The downy feathers float along the base of the hollow spines, looking more like fine ice crystals than the underclothes of one of Australia’s common long-necked tree ducks.

“To see it in the wild the duck appears just brown; it’s only when it flicks up its wings that you see the bolder patterns, the yellow and black display feathers,” Brandis says.

The project will continue into 2018 and the feathers will be collected for “as long as people keep sending them in”.

“We’ve had a huge reaction so far, people seem to connect with it,” Brandis says. “Kids are attracted to feathers from a very young age, so when we are given a reason to collect them as adults, it taps into a basic curiosity.”

To take part in the study go to newsroom.unsw.edu.au
Data captured from microwave signals firing at an electron every 5 milliseconds form the basis of this vibrant, spinning image created by UNSW Art & Design’s Associate Professor Paul Thomas.

The artistic interpretation of quantum computing graced the cover of the prestigious journal *Nature Nanotechnology*.

“Rather than creating an exact illustration of the science, my aim was to parallel the idea of neurons firing and ideas evolving,” says the artist, who manipulated the data using interactive software to incorporate fragments of random photos.

Thomas worked with Professor Andrea Morello, Program Manager in the Centre for Quantum Computation & Communication Technology (CQC2T), whose scientific research informed the artwork and was also featured in the journal.

In another unusual melding of science and art, local scientist-turned-artist Steve Durbach has been working with researchers at the UNSW headquarters of the CQC2T to “express the beauty at the heart of quantum physics and quantum computing”.

His exhibition, *Schrödinger’s Bird*, explores some of the counterintuitive concepts of the quantum world, including the dual wave-particle nature of matter at the atomic scale.

See more at newsroom.unsw.edu.au

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Quantum’s artistic spin

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Quantum Consciousness by Paul Thomas – an analogy of human and ‘Quantum Computer Thinking’
Charlotte Brontë once wrote in her journal about “this world's desolate and boundless deluge”.

“All Charlotte's writings express her search for truth and personal integrity,” says Emeritus Professor Christine Alexander. “Her novels are a timeless plea for the intellectual worth of women, for their financial independence and equality in marriage, for the right to express their passionate selves, and for a religious commitment to truth in life and art.”

Two hundred years after her death Charlotte Brontë is one of English literature's most-celebrated writers while her novel, *Jane Eyre*, still speaks to readers more than 150 years after it was first published.

The first to be born of the surviving four Brontë children and the last to die, Charlotte succumbed to illness just weeks from her 39th birthday.

Her birthday earlier this year marked the beginning of a five-year program to celebrate the bicentenaries of the births of each of the Brontë siblings: Charlotte this year, Branwell in 2017, Emily in 2018 and Anne in 2020.

Alexander, from the UNSW School of the Arts and Media, says it is no surprise Charlotte’s writings have endured because she portrayed the struggle of ambitious young women who seek a meaningful life, despite the restrictions of their social and political situation.

“Her writing is essentially romantic, yet also realistic. Jane Eyre’s passionate individualism still captures the imagination of audiences today. It speaks to people across nations and cultures.”

Alexander will play a key role in Brontë celebrations here and in the UK and has a new book, *Celebrating Charlotte Brontë: Transforming Life into Literature in Jane Eyre*.

Commissioned by the Brontë Society in the UK and co-written by colleague Sara L. Pearson, from Trinity Western University, the book combines detailed commentaries with lavish illustrations to explore the historical and biographical context of Brontë’s lived experience and how she transformed that into the world of Jane Eyre.

Brontë’s childhood writings gave an early hint of how her later fictional worlds would take shape, says Alexander, who is also the director and general editor of The Juvenilia Press, a research, teaching and publishing house based in the Faculty of Arts & Social Sciences that issues early works by writers such as Brontë, Jane Austen, Lewis Carroll, Charles Dickens, Philip Larkin, Dorothy Hewitt, and Margaret Atwood.

“Charlotte Brontë’s many early stories and magazines about the fantasy world of Glass Town and Angria and her drawings and paintings demonstrate the rich, imaginative life that led to her four novels,” Alexander says.

As a PhD student in the early 1980s, Alexander travelled across the US by bus in search of Brontë juvenilia. She discovered more than 100 early manuscripts – in libraries as well as private and public collections – that had been written by the Brontë siblings when they were children. She found an equal number of the Brontës’ drawings and paintings.

Some of the manuscripts remain in the US, but most are held in the Brontë Parsonage Museum in Haworth, West Yorkshire, once the home of the Brontë family.

In August, Alexander will speak at the Brontë Society’s conference in Manchester, joining as a keynote speaker with Germaine Greer, Professor Sally Shuttleworth from Oxford University and Brontë biographer Claire Harman as they address the position of women in the mid-19th century.

*Celebrating Charlotte Brontë: Transforming Life into Literature in Jane Eyre* is published by the Brontë Society, available in June from brontë.org.uk

Download the Uniken app to see the slideshow

Bioart Kitchen: Art, Feminism and Technoscience
Lindsay Kelley, UNSW Art & Design

What do new technologies taste like? A growing number of contemporary artists are working with food, live materials and scientific processes in order to explore and challenge the ways in which manipulation of biological materials informs our cooking and eating.

“Bioart”, or biological art, uses biotech methods to manipulate living systems, from tissues to ecologies. While most critiques of bioart emphasise the influences of new media, digital media, and genetics, this book takes a bold, alternative approach. Bioart Kitchen explores a wide spectrum of seemingly unconnected subjects which, when brought together, offer a more inclusive, expansive history of bioart, namely: home economics; the feminist art of the 1970s; tissue culture methodologies; domestic computing; and contemporary artistic engagements with biotechnology.

“Bioart Kitchen plays with the industrial food system – taking familiar products off the shelf and making them strange,” says Eben Kirksey, ARC Fellow and lecturer in UNSW’s School of Humanities and Languages, and author of Emergent Ecologies. “Chicken soup, Coke, peanut butter, canned food, and corn syrup will never taste the same. Kelly’s collection of recipes brings feminist sensibilities to home economics – showing how the kitchen has long been a space of subversion, performance, and innovation.”

I. B. Tauris

Armenia, Australia & the Great War
Vicken Babkenian and Peter Stanley, UNSW Canberra

Australian civilians worked for decades supporting the survivors and orphans of the Armenian Genocide massacres. April 24, 1915, marked the beginning of two great epics of the First World War. It was the day the Allied invasion forces set out for Gallipoli and the day that marked the start of the genocide of the Ottoman Empire’s Armenians. For the first time, this book tells the powerful, and until now neglected, story of how Australian humanitarians helped people they had barely heard of and never met, amid one of the 20th century’s most terrible human calamities. With 50,000 Armenian-Australians sharing direct family links with the genocide, this has become truly an Australian story.

NewSouth

Surgery, the Ultimate Placebo: A Surgeon Cuts Through the Evidence
Ian Harris, UNSW Medicine

For many complaints and conditions, the benefits from surgery are lower, and the risks higher, than you or your surgeon think. In this book you will see how commonly performed operations can be found to be useless or even harmful when properly evaluated. That these claims come from an experienced, practising orthopaedic surgeon who performs many of these operations himself makes the unsettling argument particularly compelling. Of course no surgeon is recommending invasive surgery in bad faith, but Harris argues many common operations, including knee arthroscopies, back fusion or cardiac stenting, became current accepted practice without full examination of the evidence. The placebo effect may be real, but is it worth the recovery time, expense and discomfort?

NewSouth

It’s Our Country: Indigenous Arguments for Meaningful Constitutional Recognition and Reform
Megan Davis, UNSW

Why should Indigenous people have a direct say in the decisions that affect their lives? Australia is one of the only liberal democracies still grappling with such a fundamental question. The idea of constitutional recognition of Indigenous Australians has become a highly political and contentious issue. It is entangled in institutional processes that rarely allow the diversity of Indigenous opinion to be expressed. With a referendum on the agenda, it is now urgent that Indigenous people have a direct say in the form of recognition that constitutional change might achieve. It’s Our Country is a collection of essays by Aboriginal and Torres Strait Islander thinkers and leaders including Patrick Dodson, Noel Pearson, Dawn Casey, Nyunggai Warren Mundine and Mick Mansell. Each essay explores what recognition and constitutional reform might achieve – or not achieve – for Indigenous people.

Melbourne University Press

Energy, Cities and Sustainability: An Historical Approach
Harry Margalit, UNSW

According to some estimates, humanity has now passed the point at which city dwellers outnumber country dwellers. This simple fact encapsulates a multitude of historical trends and contentions, not the least being “is this sustainable”? Energy, Cities and Sustainability aims to illuminate this question by tracing the evolution of the modern city, the energy sources that power it and the motivations behind increasing urbanisation. The book examines changing energy use across history, analysing the origins and significance of the Industrial Revolution to reveal how the modern city came into being. Transport, population size, housing, electricity use and growing consumption are each discussed, showing how the cultural aspects of energy use have influenced urban form in the developed world and developing countries. Finally, in contemplating the future, it is considered whether this model of modern urban life is sustainable.

Routledge
The man in charge of attracting the best and brightest students to UNSW explains why sometimes you need to take a leap into the unknown.

I grew up in a town called Racine, Wisconsin, about an hour south of Milwaukee, a city some people might know as the home of the 70s TV sitcom Laverne and Shirley. It’s right on Lake Michigan and in winter it’s so bitterly cold the inside of your nose freezes. I went to university close to home and did a Bachelor of Arts majoring in music performance and political science, two very different things. I was also very involved in non-profit work in youth empowerment, youth engagement and environmental sustainability.

I applied to study at UNSW on a whim. I realised I needed to push myself to do something different, otherwise it was going to be very safe and comfortable to stay in Racine. The combination of international law and international relations was something I was particularly interested in, and UNSW was one of two universities in the world that offered it. Within a few months I was on a plane. It was totally not my personality. I had never set foot on campus. I did all the things I would never advise any student to do, which was just blindly apply and see what happens. I never thought I would stay in Australia. I was doing a year-long masters’ program and thinking about doing a PhD back in the US. With a month left I took a group of students on a study tour to Iceland, and I was writing my final paper all through the night while the sun never set. Sydney was warm and it’s where I met my husband. At that point I had two months left on my student visa and I realised I wanted to try to figure out a way to stay.

Future Students was kind of a strange but logical connection with what I had done all through high school, and through university – going out, talking to young people and engaging them in the opportunities available to them. I really do love that there is so much variety in what we do – hosting an event for 500 people or going out and speaking to a group of year 12 students, or talking to careers advisers, or creating publications, web and digital campaigns. That’s what makes my job exciting.

With prospective students it’s about talking about what matters to them. One of the things we emphasise is to come to campus, whether as part of a school group or tour, or on Open Day. Setting foot on campus can provide that lightbulb moment – “Oh, this is what university is like, and it feels like the right place for me.”

– Leilah Schubert
THE WALLACE WURTH LECTURE

STAN GRANT

From Resistance to Rights: How Indigenous Australia is reshaping the nation

Friday 29 July
Sir John Clancy Auditorium
RSVP essential
unsw.edu.au/wallacewurth