

UNSW

UNIKEN SUMMER 2015/16

magazine

Climate for change

Scientists Stefan Rahmstorf
and Matt England explain
why time is running out to
act on global warming



ACROSS THE GENERATIONS

Glenn Murcutt on
why more architects
should teach

FISHING FOR PEACE

The unlikely peacemaker
averting conflict and
changing lives in PNG



UNSW
AUSTRALIA

Summer 2015/16

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From the President and Vice-Chancellor

Welcome to the Summer Issue of *UNSW magazine* – *Uniken*.

Our cover story and extended feature on the Paris climate conference is led by two of the world's leading climate scientists – Professor Stefan Rahmstorf from the Potsdam Institute for Climate Impact Research and our own Scientia Professor Matthew England, from the UNSW Climate Change Research Centre and the ARC Centre of Excellence in Climate System Science.

Professor Rahmstorf is visiting UNSW, working with Professor England at the CCRC and the pair sat down with the *UNSW magazine* for a Q&A. Covering a range of topics from the chances of a legally binding agreement, climate change denial and need for policy action, it is a compelling read.

At the Paris conference we hope that participants will negotiate a new international agreement on carbon emissions that aims to keep global warming below 2 degrees Celsius.

Stefan was one of the panellists at our Climate for Change event on 10 November. The packed audience at our first Forum@UNSW event, which was held in partnership with the *Sydney Morning Herald*, also heard from Peter Hartcher (SMH), Geoff Cousins (Australian Conservation Foundation), Anika Molesworth (2015 Young Farmer of the Year) and Sarah Perkins-Kirkpatrick (UNSW CCRC) with Robyn Williams (ABC Science Show) moderating the panel discussion.

UNSW is a leader in climate science research, as well as being at the forefront of developing solutions and new policy and legal frameworks. This includes our world record-holding photovoltaic



research, groundbreaking work in green manufacturing, the development of low carbon solutions for the design and building of our cities, and legal frameworks to manage the forced displacement of people from climate-related events.

We have launched our UNSW climate change “Grand Challenge” as the first of a series of challenges that will be the subject of discussion, debate and policy formulation as part of UNSW’s 2025 Strategy. Our intention is to ensure that UNSW plays a role as an international forum for thought leadership. Future grand challenges could include energy, water, equality, migration, urbanisation, ageing, poverty and security.

Our grand challenges initiative sits within our priority of social engagement, alongside academic excellence and global impact as priorities in our new strategic plan. We will deliver the ambitious objectives of the 2025 strategy through a steady, carefully planned and determined process over the next decade. My thanks to you all for making the development of our strategy such a stimulating and exciting process.

Professor Ian Jacobs



The magazine of The University of New South Wales

UNSW magazine is the University's flagship publication. Published quarterly, it reports on issues affecting the tertiary education sector and the latest developments in UNSW's research and teaching. The magazine is distributed primarily to staff, students and visitors to the University.

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Video



Audio



Slideshow



< Built Environment's Dean Utian is one of four UNSW staff to receive citations for excellence in the 2015 Australian Awards for University Teaching. Utian was recognised for his use of innovative video and games to empower his students to develop digital communication, design and creative expression. Other UNSW recipients are: Dr Martin Bliemel and Dr Natalie Buckmaster from the UNSW Business School, and Professor Alex Steel from UNSW Law. PHOTO Leilah Schubert

Teaching the way to the top

As it looks to the next decade, UNSW will pursue excellence in research while rewarding inspiring teachers. **Louise Williams** reports.

Is it possible to be a top-quality research-intensive university in the top 50 in the world and also teach a very large number of diverse and outstanding students?

Professor Ian Jacobs, UNSW's President and Vice-Chancellor, is convinced it is. Releasing the University's 2025 Strategy, he unveiled an education model that rejects the conventional wisdom that says if you are to excel at research, you must relegate teaching to second place.

"UNSW is possibly the first university in the world to declare itself both research and teaching intensive," Professor Jacobs says. "We are among a limited group of universities worldwide capable of delivering research excellence alongside the highest-quality education on a large scale."

A flagship of the UNSW 2025 vision is the design, development and implementation of the new Scientia Educational Experience that will offer academics and students more flexible and personalised pathways aligned with their skills, circumstances and aspirations.

For students it means many more choices within a three-semester structure, the seamless integration of on-campus and digital learning, the benefits of a global perspective and a keen awareness of the role universities can play in promoting social justice and giving back to communities.

For academics it means the opportunity to pursue a "teaching only" career pathway for the first time and to be properly recognised and rewarded for doing so.

Professor Jacobs says UNSW will "recognise, reward and promote teachers in a way that has never happened before".

"I don't think that many universities in the world have really valued teachers," he says. "In the past it hasn't often been possible to become a top level professor by doing day in, day out inspiring teaching that changes the lives of people and influences their careers. I think that's wrong."

A recent UNSW-commissioned report by Deloitte Access Economics found the skills and additional productivity universities contribute to the Australian economy, largely through teaching and producing talented graduates, was worth \$140 billion in 2014. "This is a very large sum of money ... and the benefits are not just economic, they are social as well," Professor Jacobs says.

The transformation in the way UNSW students learn, and teachers teach, is already well underway and the results are being constantly and rigorously assessed so that lessons learned today are fed back into learning models to drive future innovation.

"As both an early adopter of the educational technology, and an inventor of e-learning systems ourselves, UNSW is well placed to

understand the unprecedented opportunities quality educational technologies offer," Professor Jacobs says.

Professor Bob Fox, Deputy Director of UNSW's Learning and Teaching Unit, says one of the greatest benefits of educational technology is to enable great teachers to make the most productive use of face-to-face time with students.

A recent Learning and Teaching forum at UNSW – *Blended Learning: Past, Present and Future* – was told, for example, that all first-year chemistry students now use online, interactive "Lecture Prep" units that take them through the assumed knowledge they need ahead of each class.

This "flipped classroom" approach has so effectively engaged students – 95% participate every week without prompting – and improved student outcomes that it will be emulated across the School of Chemistry.

Likewise, in accounting subjects, an online flipped classroom delivers key content ahead of classes so valuable face-to-face time can be dedicated to enriching discussions and activities, rather than the mere delivery of course content.

Another outstanding UNSW innovation is a cloud-based virtual PV solar cell factory that allows students to learn how to manufacture batches of silicon solar cells by progressing through levels of attainment, much like a computer game.

Since its inception in mid-2014, and its public launch in early 2015, thousands of people from 85 countries have made more than 600,000 virtual solar cells. UNSW students also improved their performances on an assessment by an average of 6% after working with the virtual factory.

Meanwhile, a free UNSW Massive Open Online Course in systems engineering, which would previously have been restricted to 25 students a class, recently attracted more than 20,000 students worldwide.

"What we are seeing at UNSW is an increasing number of recognised quality innovations ... into the future we will have even more variety in the way people learn and where they learn," Professor Fox says. "At the heart of education is a high-quality curriculum but technology is enabling us to deliver it in many more ways." ■

Briefs

MENTAL HEALTH, HIV GET FUNDING BOOST

New drug trials for treating HIV infection and investigations into major depression and dementia were among the UNSW projects to receive major backing in the latest round of Australian Government funding. UNSW received \$27.1 million in grants from the National Health and Medical Research Council for projects to commence in 2015–16. This followed \$31.2 million in grants announced earlier, taking total NHMRC funding for UNSW in 2015 to \$58.3 million. Scientia Professor of Neuropsychiatry Perminder Sachdev received \$2.6 million for two studies as part of an international collaboration to identify the genes involved in dementia. The Kirby Institute's Scientia Professor David Cooper was awarded \$2.5 million to continue his research into HIV, while Professor Raina MacIntyre won \$2.5 million to establish a Centre for Research Excellence in Integrated Systems for Epidemic Response.

AUSTRALIA UNPREPARED FOR BIOTERROR

UNSW has launched Australia's first university-based bioterrorism course, tapping into expertise from the army, police and international authorities including the FBI. Despite the real possibility of a bioterrorist attack, the world remains ill equipped to deal with the threat, because approaches have remained largely unchanged since the Cold War, says course convenor Professor Raina MacIntyre. The program will critically evaluate the threats, and highlight the new systems and approaches needed.

PICK OF THE TALL POPPY BUNCH

Physicist Dane McCamey has been named NSW Young Tall Poppy of the Year, one of four UNSW researchers recognised at the annual awards. McCamey won the overall NSW title for his work to identify, characterise and control the many ways that electrons move and interact in electronic materials and devices, such as mobile phones, allowing improvements in performance. UNSW's other winners were behavioural psychologist Dr Amy Reichelt, computer scientist Dr Mirela Tulbure and biological mathematician Dr Deborah Cromer.

Top thinkers come together for forum on Paris climate talks

Experts from climate science, political journalism, agriculture and business debated the promises and pitfalls of the Paris climate summit in November, as part of UNSW's Grand Challenges initiative. The inaugural Forum@UNSW discussion – held before a capacity audience in Leighton Hall – was presented in partnership with the *Sydney Morning Herald*.

Panelists were: Professor Stefan Rahmstorf, from Potsdam University; Peter Hartcher, the *Herald's* political editor; Sarah Perkins-Kirkpatrick, from UNSW's Climate Change Research Centre; Geoffrey Cousins, President of the Australian Conservation Foundation; and Anika Molesworth, the 2015 Young Farmer of the Year. The debate was moderated by ABC Science Show's Robyn Williams.

It was "almost certain" 2015 would be the hottest year on record, surpassing 2014, Rahmstorf told the audience. "Forget about it if somebody tells you there is a pause, or global warming has slowed down."



The *SMH's* Peter Hartcher and UNSW's Sarah Perkins-Kirkpatrick PHOTO Arunas Klupsas

Hartcher revealed the latest news from Paris, based on an exclusive interview that day with the Environment Minister Greg Hunt. He said Mr Hunt had told him the Paris agreement would only restrain global temperature rise to 2.7 degrees above the pre-industrial average. In a special video message, French Ambassador His Excellency Mr Christophe Lecourtier urged the audience to pressure political leaders to achieve a workable solution. "It is time to act to limit global warming to below 2 degrees," he said.



Download the *Uniken* app to watch the video

Premier lauds quantum breakthroughs

NSW Premier Mike Baird has used part of his address in the annual Bradfield Oration to praise Scientia Professor Michelle Simmons and her team's pioneering work in the race to build the world's first quantum computer in silicon.

Mr Baird told leading figures from business, politics and finance how Australia is now two to three years ahead of the rest of the world in the race to build the computer, which will unlock complex problems facing modern society.

The recognition came a week before the team from the ARC Centre for Quantum Computation and Communication Technology (CQC2T), headquartered at UNSW, announced its latest breakthrough – the design of a 3D silicon chip architecture based on single atom quantum bits, providing a blueprint to build a large-scale quantum computer.

The architecture is one of the final hurdles to scaling up to an operational quantum computer and was published in *Science Advances*.

A month earlier, a separate team within the CQC2T, led by Scientia Professor Andrew Dzurak, reported in *Nature* that it had

successfully built a quantum logic gate in silicon for the first time, making calculations between two qubits of information possible – and thereby clearing the final hurdle to making silicon quantum computers a reality.



Federal Minister for Education and Training Simon Birmingham (pictured), visited UNSW in October to open a new \$3.3 million laboratory for the creation of advanced materials. The Epitaxial Growth Laboratory, within the Australian National Fabrication Facility, is infrastructure crucial to the quantum project.

PHOTO Grant Turner/MediaKoo



PM'S SCIENCE PRIZE

Polymer chemist Cyrille Boyer has been awarded one of the Prime Minister's Prizes for Science – the nation's most prestigious awards for excellence in scientific research and teaching. Associate Professor Boyer uses light and chlorophyll to catalyse the creation of new and complex polymers that are being applied in areas as widespread as non-stick coatings, anti-fouling technology, precision drug delivery, medical diagnosis and imaging. Boyer won the 2015 Malcolm McIntosh Prize for Physical Scientist of the Year – a \$50,000 prize that honours early or mid-career researchers who have made outstanding achievements that can improve human welfare or benefit society. "By using light we can significantly reduce energy consumption and carry out the polymerisation process at room temperature," he says.



Download the *Uniken* app
to watch the video

PHOTO *Quentin Jones*



WOMEN OF INFLUENCE

For work shaping international policies around displaced persons and research into transforming waste materials into valuable commercial products, Scientia Professors Jane McAdam and Veena Sahajwalla (pictured) have been named winners in the 2015 Women of Influence Awards. The professors won their respective categories in the prestigious annual awards, sponsored by the *Australian Financial Review* and Westpac. They were selected from 100 finalists and more than 500 entrants at a gala event at Sydney's Town Hall on 15 October. Sahajwalla, Director of the Centre for Sustainable Materials Research and Technology, won the innovation category, while McAdam, a renowned international refugee law expert, won the global category. Both women are featured in the latest edition of *Research@UNSW: 15 women changing our world*.

PHOTO *Dan White*

UNSW tops state in ARC Discovery funds

UNSW researchers won the highest amount of Australian Research Council funding in the state, securing more than \$36 million in the federal government's latest funding round.

The University was awarded 67 ARC Discovery Project grants worth \$25.1 million, and 19 Discovery Early Career Researcher Awards worth more than \$6.5 million. In each category, the University ranked first in the state and third nationally. UNSW also secured nine ARC Linkage Infrastructure, Equipment and Facilities grants totalling more than \$4.2 million, the second highest total in Australia.

Four researchers were awarded prestigious Discovery Project grants each totalling more than \$600,000: Professor Lynne Bilston, Dr Angela Kelly and Professor Boris Martinac from Medicine, and Professor Oleg Sushkov from Science.

Kelly, who was awarded the highest total of all UNSW investigators – \$666,361 over four years – is studying the way new biotechnologies are viewed and used in Papua New Guinea, in light of their cultural and religious landscape. Specifically, she's interested in how HIV treatments and prevention technologies are helping couples with mixed HIV status.

Bilston, who received \$620,000, is solving a longstanding problem in biomedical engineering – how to image the mechanical behaviour of soft biological tissues, such as muscles and organs, in vivo.

Among researchers in Arts and Social Sciences, Professor Deborah Brennan secured the largest grant for her work investigating labour shortages and new policy designs in the critical sectors of aged care and childcare.



Fourth Rhodes scholarship in three years for Law

Harj Narulla is the fourth UNSW student from the commencing class of 2008 to win a coveted Rhodes scholarship to Oxford University.

Harj, 25, will join UNSW Arts/Law graduates Sean Lau, Emily Burke and Kunal Sharma at Oxford next year, where he plans to study comparative constitutional law models for the recognition of Indigenous peoples, with hopes of working for the Aboriginal Legal Service upon his return.

"I'm really excited and grateful for the opportunity," says Harj. "It will be great to see all my classmates again and meet the other Rhodes scholars. There's a really close network that develops between people who have that in common."

UNSW Law Dean Professor David Dixon said: "Our best students are, obviously, brilliant. But they are more than that – they are socially engaged and globally focused."

PHOTO *Grant Turner/Mediakoo*

Architecture across the generations

Australia's greatest living architect **Glenn Murcutt** and UNSW graduate **Matt Chan** discuss their appreciation of timeless design, experimentation, and why more architects should teach.

In 1978 architect Glenn Murcutt built Ockens House, an open-plan home on Sydney's northern beaches. Thirty-seven years later the Pritzker Prize-winning Seidler Chair in the Practice of Architecture is guiding UNSW graduate and principal of Scale Architecture, Matt Chan, through its restoration. The friends, who graduated from UNSW 34 years apart, recently visited Ockens House, where Chan asked the renowned architect about his high-profile career and influences.

Matt: You've never followed the status quo with your work. As an architect, why is experimentation important to you?

Glenn: In my father's last weeks of life, he said, "Son, where do you think you'll go in this profession?" And I said, "Well, Dad, I want to be able to experiment." He asked me where the money would come from and I said, "Well, I think one can do calculated experiments, incrementally." And that's what I did. In my first 10 years in practice, I built three new houses, but I did a hell of a lot of alterations and additions as well until I built up a vocabulary of what I knew I could do.

My father raised me on Henry David Thoreau who said: "Since most of us are going to be doing ordinary things in our lives, the most important thing is to do those ordinary things extraordinarily well." The greatest attribute an architect can have is to stand back and criticise his or her work.

However, I wouldn't necessarily call what I do "experimentation" – I've just always done what I think is logical. When I first graduated everyone was thinking about air conditioning, but I was more interested in how to orientate a building to achieve cooling and ventilation. For me, buildings aren't just objects in the landscape. If you think



Glenn Murcutt (seated) with Matt Chan in Sydney's Ockens House. PHOTO Peter Rael/Fairfax

Teaching makes a good architect a better architect, because you need to articulate ideas with clarity.

of a composer creating a music score, there's the conductor, musicians and the audience. Well, for me the building is the instrument, it provides the openings and the sound, nature is the composition and I am the audience.

Matt: It seems to me there aren't enough architects who teach. How important has teaching been in the development of your career?

Glenn: Teaching is an incredibly important part of my career. For the 46 years I've been in practice, I've taught for at least 38 of those. Teaching makes a good architect a better architect, because you need to articulate ideas with clarity. When you make a suggestion to a student, you must clarify why it's so. Without that, it's only a judgement. Uncle Max Harrison, an Aboriginal Elder and colleague, said: "You must give it away to keep it." It sounds like an oxymoron – but you must give away ideas to keep them. And the giving is about the wish to give.

Matt: As a profession, architects have become very proficient at the delivery of buildings, perhaps to the detriment of the built environment. Are we giving enough time to design?

Glenn: Well, first of all, the profession decided our main role was that of designers and specifiers, and gave away the contract administration to a project manager. That was a total disaster. That's taken the true role of architecture away because it's during

site inspections that you control what you've designed. I always say: "I'm not prepared to work with a project manager. I'm the project manager." If you want to be in practice at the age of 79, it's important that people still find you relevant.

Matt: What have been the biggest influences on your work?

Glenn: Music and nature were very big parts of family life when I was growing up in northern Sydney. There were seven pianos in our house. We had animals around us and lived in the bush. I developed a great love of native flora and fauna. We'd go out into the Colong Caves and the Kowmung River [in the Blue Mountains region] – it's good to get a bit of eucalyptus in your blood. And then I discovered the Australian painter Fred Williams and he showed me how light separates elements in the Australian landscape. That was an absolute and personal revelation for me.

Matt: What is the most important advice you offer your students?

Glenn: It's important to start off the way you would like to finish; it's not necessarily the way you will finish, but the way you would like to finish – gosh, that's an important issue. As Thoreau said, "do ordinary things extraordinarily well". □

The restoration of Ockens House featured in *Architecture by Hand and Mind* an exhibition celebrating 60 years of graduate excellence at UNSW. This is an edited excerpt of a longer interview, which can be found at newsroom.unsw.edu.au



Download the *Uniken* app to watch the slideshow

No time to waste

The new Dean of Medicine is on a mission to transform the faculty into one of the world's best, and there's no free time for lunches.

By Dan Wheelahan.

The fictional “wolf of Wall Street” Gordon Gecko seems an unlikely role model for eminent Australian medical researcher and academic Professor Rodney Phillips. But in his new role as Dean of Medicine at UNSW, Phillips finds himself channelling the oft-quoted Gecko, the central character in the Hollywood hit, *Wall Street*.

“Lunch is for wimps,” he says, only partly tongue-in-cheek. Phillips’ commitment to leading UNSW Medicine up the world rankings is such that it leaves time for little else, especially long lunches.

Five months into the role, the former Vice-Dean at the University of Oxford’s Medical School recognises the strong foundations the faculty has built. But he believes much more can be done to improve UNSW Medicine’s current standing. And he brings a wealth of experience to the task.

After qualifying in medicine at the University of Melbourne, the medical researcher gained international recognition for his work on HIV at the University of Oxford before taking up a key leadership role within its medical faculty.

Oxford’s medical school is consistently ranked in the top two in the world and is the largest in Europe, in terms of research income and infrastructure.

“I got to a point at Oxford where I thought there’s not much more I can achieve here,” says Phillips, of the 34 years he spent there.

“When UNSW approached me, I thought what a great opportunity to make a difference back home.”

After wide-ranging consultation during his first few months in the new job, Phillips says it’s clear the faculty produces fine doctors.

“The very high standard of teaching that students receive is reflected in the excellent clinical care we see in our hospitals. So we do our core business very well,” he says.

“However, once you’ve got that core business solved, you’re confronted with the reality that a lot of what we do and understand in medicine is provisional. We don’t have defined treatments or even diagnoses for a lot of diseases.

“When thinking about research, there is a great imperative to ask, ‘What don’t we know in medicine and what can we do about it?’”

Taking this next step, he says, is something all great medical schools do.

Phillips says the tyranny of distance shouldn’t be underestimated as a barrier to UNSW and Australia attracting the very best medical researchers from around the world.

The solution is to provide an environment that allows researchers to perform at their best. If the opportunity is attractive enough, the best will come. His own career offers useful signposts.

The medical researcher spent six months treating tropical diseases in Papua New Guinea before spending four years conducting bedside research in Thailand, Burma and Sri Lanka on patients with severe malaria, rabies and snakebite.

His research since has focused on HIV/AIDS. He is perhaps best known for describing for the first time how HIV evades the body’s immune defences, a globally significant breakthrough.

“Our hypothesis was that the virus persists because it replicates so many copies of itself, and some of those become invisible to the immune system,” he says.

“The finding was initially completely disbelieved and it was quite difficult to get the results published, which eventually occurred in 1991.”

Then, a decade-long collaboration with researchers from the Kirby Institute drew his attention back to Australia and UNSW’s growing research capacity with the potential for far-reaching, international collaborations.

This particular collaboration aimed to better understand why HIV persists in some patients and remains dormant and undetectable in others. Phillips played an instrumental role in discovering three biomarkers that can help predict how quickly the virus will return after individuals stop antiretroviral therapy.

His well-established connections with the Kirby Institute not only helped facilitate the transition to UNSW, but offered a “proof of concept” of his vision for the future. By collaborating strategically across the globe to connect the very best in particular fields, much greater impact can be achieved.

“We’ve produced some much bigger outcomes [in HIV research] as a result of these collaborations and this is a research model that UNSW Medicine must continue to pursue,” he says. ■



^ Rodney Phillips PHOTO Miles Standish

The very high standard of teaching that students receive is reflected in the excellent clinical care we see in our hospitals. We do our core business very well.

The moral wounds of war

Even the most stable moral compass can be damaged by war. **Chris Sheedy** talks to one researcher about the inner injury that arises when good people witness terrible things.

A soldier in the Australian Army is posted to Somalia, a country ranked among the world's most troubled states and where the capital, Mogadishu, is known as the "city of death". Life is cheap and warlords rule over clan-based militia who cause widespread lawlessness.

Another soldier is sent to Afghanistan, where atrocities like suicide bombings are commonplace, and where 32 Australians have been killed and 218 wounded since 2001.

Having come from a society in which order, reason and respect for human life are givens, the scenes these soldiers witness throw everything they believe into disarray. The psychological, emotional and spiritual repercussions are profound.

Moral injury is not new, but it is becoming more acute as more soldiers return from deployments in anarchic places like Afghanistan, Bougainville, Somalia, East Timor, Rwanda and Cambodia, says UNSW professor of military history Tom Frame. Few Australians have an understanding of these conflicts or personal empathy with the men and women who've been deployed to them. Only 0.1% of the population even knows somebody who has served in the defence force, says Frame, who is director of UNSW Canberra's Australian Centre for the Study of Armed Conflict and Society.

"During the World Wars, and to some degree during the conflicts in Vietnam and Korea, large numbers of Australians returned from overseas and were absorbed into a society that



was aware of their experience and conscious of their needs," he says. But these days the general public is largely uneducated about conflict and its complex legacies.

"Soldiers are returning to the community having seen and heard things that are morally devastating. The world is not as they thought it was or ought to be and their responses are uneven at best."

Frame has written extensively on the ethical impacts of war, largely from personal experience. He joined the Royal Australian Navy (RAN) as a 16-year-old cadet midshipman in the late 1970s, and served for 14 years at sea and on land, including three years at UNSW completing an Arts (Honours) degree and a PhD. He resigned from the RAN in 1993 to train for the Anglican ministry and was appointed as Bishop to the Australian Defence Force in 2001. His latest book *Moral Injury: Unseen Wounds in an Age of Barbarism*, is published by UNSW Press, one of more than 25 he has written or edited.

"People think moral injury is a sub-set of PTSD [post-traumatic stress disorder] or a close variant," says Frame. But it's not that clear-cut. "A traumatic event may cause moral injury but a person can be morally injured without the causal event being traumatic," he explains.

"Moral injury flows from internal reflection. It has to do with what a person makes of what they see, hear, smell, touch and taste. Two people can experience the same thing: one will be unaffected while the other will be injured.

^ Moral injury is not new, but it is becoming more acute ... Professor Tom Frame. PHOTO Sean Davey

"The difference is how they interpreted their experience in terms of the value structures ordering and regulating their inner being."

Australians are slowly coming to realise there are two distinct experiences affecting returning soldiers, Frame says. "One is their inability to tell their stories in a way that helps them integrate morally injurious experiences into a coherent personal narrative. The second is the inability of society to incorporate these experiences into national commemoration."

Frame believes addressing moral injury – and having an ethical dialogue around operational experiences – needs to be a more prominent consideration. Real help begins, he says, with a realisation that some unseen wounds of war have their roots in morality – PTSD can't account for it all.

That recognition can head off problems later. "A morally injured individual can conclude that personal morality and public ethics are unnecessary or even non-existent. They can abandon notions of right and wrong, become hostile towards authority, feel paralysed by guilt and shame or profess ambivalence towards the whole notion of wrongdoing," Frame says.

"As a nation we prefer to believe that war brings out the best in people, and so we don't make room for discordant stories. But armed conflict damages human beings on many levels. In war, even the best resilience training can't protect us." ■



Dogged democracy

In a city brought to its knees by austerity, filmmaker Mary Zournazi tells **Amy Coopes** about an unlikely wellspring of dignity and hope.

Two things are certain in Athens: austerity and dogs. The former is inevitable; the latter a strange yet potent motif of dignity and humanity, according to acclaimed UNSW filmmaker Mary Zournazi.

Well-fed and watered, the strays occupy every corner of Syntagma Square, the epicentre of civic and political life in Greece, a nation hobbled by debt and successive eurozone bail-outs that have triggered waves of unrest.

When she visited in October 2014 on a holiday to explore her Greek heritage, Zournazi remembers the tension was palpable, with “people who had lost their jobs overnight begging on the streets”.

A paradox then, she thought, to see so many stray animals in such good health. Who cared for them in such lean times, and why?

“In a way, the dogs represent the vulnerability of Greece and what the [people] are going through, the dogs are the most vulnerable in the community and people can identify with them,” says Zournazi.

The strays have been a constant in the austerity struggle, marching alongside tens of thousands of protesting Greeks in 2011.

The most famous, Loukanikos, first started attending political rallies as a puppy back in 2006 and became an emblem of the popular revolt after squaring off with riot police in front of the world’s press. Loukanikos was even nominated as *Time* magazine’s 2011 Person of the Year.

That 2014 visit inspired Zournazi’s documentary, *Dogs of Democracy*, about the dogs and the people who take care of them.

Loukanikos is one of the “characters” in the film. A preview can be seen on YouTube and a radio version, together with an essay, was broadcast by ABC Radio National in October.

Narrated by actor Lex Marinos, the documentary builds on earlier work that includes the acclaimed *Inventing Peace* project with Oscar-nominated German film director Wim Wenders.

“[The documentary] became a search for how a stray dog can become so powerful in people’s psyche and the meaning of that,” she says.

“As a mirror of Greece’s place in Europe as the most vulnerable, the dogs can tell us something about what needs to be done in this situation, and the power of peaceful resistance amid the rise of neo-Nazism and the temptation for violence.”

Above all, Zournazi says the unique bond between the people of Athens and its street dogs is a demonstration of hope and community, with lessons about love, loyalty, commitment and care – it can tell us something about our “common humanity” in difficult times.

“There is something so incredible about these dogs and the people who care for them,” says Zournazi. “It is a story that was begging to be told.” □



The dogs represent the vulnerability of Greece and what the people are going through.

^ TOP Loukanikos, which means sausage in Greek, barks in front of riot police in central Athens in 2010.

PHOTO Aris Messinis/AFP/Getty Images

ABOVE Mary Zournazi at the Acropolis.



Download the *Uniken* app to watch the video



Listen to the ABC Radio National documentary

A climate for change

On the eve of international climate change talks in Paris, *UNSW magazine* sat down with friends and climate scientists UNSW's Matt England and Potsdam University's Stefan Rahmstorf to discuss the likelihood of a legally binding global agreement, climate change denial and the importance of staying positive.



Climate change is the first of the global “Grand Challenges” identified in UNSW’s 2025 Strategy, which aims to position the University as an international leader in research and as a premier forum for debate and thought leadership.

Representatives of around 190 nations will meet in Paris in December to negotiate a binding agreement to limit global warming to 2°C above pre-industrial levels, in an effort to avoid the worst impacts of climate change. Yet to date the carbon emissions reduction pledges appear to fall short of the crucial 2°C target. What does a 3°C warmer world look like?

Stefan: I’m concerned about what more than 2°C warming will do to the large-scale functioning of our Earth systems, such as the global ocean circulation system or the monsoon system. There are many non-linear systems that have a critical point. When you cross that they fundamentally change.

The Greenland ice sheet is likely to be destabilised if we go to 3°C. West Antarctica probably already has crossed its tipping point but there are further huge ice masses that may be destabilised in East Antarctica.

There is already a significant decline in the Gulf Stream system of the North Atlantic. When we get beyond 2°C things get highly risky. We would be far outside the relatively benign stable climate regime we have enjoyed for the past 10,000 years.

Matt: All of the worst impacts of climate change in a 2°C world become even more costly and damaging at 3°C. And as Stefan said, more and more tipping points would pass, locking in irreversible changes. For Australia, the risk of catastrophic bushfires, severe drought, intense storms and damaging coastal inundation would be substantially ramped up under 3°C global warming. Major ice sheet stability would be at risk.

Stefan: The loss of Greenland ice alone means seven metres of global sea level rise and thus the loss of large coastal cities and small island states. This has to be said very clearly.

Is it possible at this late stage to stay below 2°C?

Matt: I’m doubtful, but it is possible. It is estimated if we stopped all emissions right now globally, the lag in the climate’s response would bring us in at 1.5 to 1.6°C above pre-industrial times. But it could come in as high as 2.5°C.

With drastic emissions reductions we can give ourselves a good chance of staying below 2°C. My pessimism comes from current global emissions trajectories and the lack of political will.

A war-like response is required to address climate change – requiring intensive effort and innovation. Until that happens I think the 2°C target is highly unlikely to be achieved.

Stefan: One shouldn’t mix up political pessimism with what is physically possible, what is technologically possible or what is economically possible. From the point of view of geophysics and climate science, there is nothing stopping us keeping warming below 2°C, or even below 1.5°C. Technologically it is entirely possible. We need to tap less than 1/10,000th of the solar radiation reaching Earth to generously supply the whole of humanity with energy, and we have the technology to do it.

How much it would cost to stay below 2°C has been thoroughly answered by the last Intergovernmental Panel on Climate Change (IPCC) report. The estimated costs are very moderate – just 0.06% of global GDP each year.

Matt: Or another way of framing it is whatever level of economic wealth the world achieves by 2100 would be delayed by only two years. That’s a tiny price to pay. And of course, you have to realise the cost of doing nothing is significantly higher.

Stefan: In short, it is physically feasible, technologically feasible and economically feasible. But many people are pessimistic about the political process. Colleagues in the United States are more pessimistic because every day they experience a highly polarised debate and little progress.

In Germany we are more optimistic. Last year, German greenhouse gas emissions were 27% below the 1990 level and our economic output, GDP, has almost

doubled since 1990. The German experience shows you can decouple the growth of emissions from economic growth and still prosper.

What is the key issue most people fail to understand about climate change?

Matt: The painfully long time that carbon dioxide remains in the atmosphere. For some gases, like methane, their atmospheric lifetime is pretty short, like decades.

Unfortunately CO₂ remains in the atmosphere for many thousands of years.

Stefan: People don't understand it is irreversible. You can't decide 20 years down the line that it's time to do something about global warming. By then it will be too late.

Our current emissions are committing us to metres of sea-level rise, unfolding over hundreds of years into the future.

Also not so well known is the ocean acidification caused by our CO₂ emissions, which will destroy ocean ecosystems such as coral reefs. That alone should be enough reason to stop emitting CO₂.

You have both worked in climate for a quarter of a century. When did you first realise the scope of the danger we face?

Stefan: I have been aware since the early 1980s. As an example, I spent four years in New Zealand in the 1980s doing my PhD and despite being homesick never flew home because I didn't want to emit more CO₂ by flying. The only time I went outside New Zealand was to present my first ever conference talk, in Hobart.

Matt: For me it started back in the late 1980s reading papers projecting global warming and sea level rise. But I was perhaps first truly confronted by the pervasive impacts of climate change when I led the Copenhagen Diagnosis in 2009. Seeing the changes across a portfolio of sectors was confronting. It was also scary to see the lack of action on something that would fundamentally change the lives of all humanity.

What is it about the lead-up to these talks that gives you hope?

Stefan: There are a lot of optimistic signs now. The United States and China have agreed on what they are going to do. There are emissions reduction commitments from countries representing 88% of global emissions and 88% of global population.

I think we will reach a meaningful agreement in Paris, but it alone will not deliver enough to stay below 2°C. It would be utopian to hope that. Thus it is critical that Paris agrees on mechanisms to tighten up the commitments later, just like for the Montreal Protocol [which protects the ozone layer by phasing out the production ozone-depleting substances].

Secondly, after Paris we will need a strong coalition of decarbonisation pioneers to go ahead and set an example by more ambitious reductions.

We are much further along in renewable energy development now than we were in Copenhagen in 2009. Last year, more than half of all investments in energy infrastructure went into renewables. The tide is turning.

Matt: That is despite many nations not even having the policies in place to encourage growth of the renewables sector.

Stefan: At the moment, 19% of global electricity supplies are renewable. Renewable energy has been growing exponentially and has now reached a level where it is mainstream. Investment in fossil fuels will probably collapse in the next few years as investors realise they have no future and there will be stranded assets.

Matt: My hope is the business sector will rush away and lead with this. Investment in energy infrastructure isn't about making a short-term profit; it's to make money over the next 20 or 30 years. Such long-term investments make it too risky to invest in fossil fuels.

Germany has led Australia on the adoption of renewable energy, despite Australia having far more opportunities. How do you explain that?

Stefan: A British analysis of international media coverage of climate-sceptic misinformation may give a clue. It found the space given to denial of human-caused global warming is a particularly Anglo-Saxon phenomenon. In other countries, like Germany, Brazil and some Asian countries, media reports better reflect the overwhelming scientific consensus on the issue.

Back in the 1980s, Australia was actually very enlightened about climate change.

✓ Leading on renewables. The German experience shows you can decouple emissions from economic growth and still prosper. PHOTO © Patrice von Collani





Climate change denial is a particularly Anglo-Saxon phenomenon. In other countries like Germany media reports reflect the scientific consensus.

< Environmental activists protest against coal in front of Berlin's Brandenburg Gate. PHOTO © Florian Boillot / Demotix/Corbis

But the well-funded denial effort has really slowed down progress and polarised the debate here and in Britain, the US and New Zealand. In Germany we have all parties in parliament agreeing to limit global warming to 2°C. They just argue about how to do it and whether the government is doing enough.

Matt: Britain's leaders recently came out and said this is no longer a political issue. The three parties held a press conference to declare climate change as something that had to be dealt with in a tri-partisan way.

In Australia the fossil fuel sector has been strong and vocal. They have effectively campaigned by getting behind some well-known Australian climate change sceptics. These self-appointed experts can make a lot of money being climate change deniers. They get flown around the world to give talks. Careers that were ending are suddenly revitalised. Stefan's point about this being an Anglo-Saxon phenomenon is interesting because you also see this in the US.

Stefan: In Europe, we have more public media and you don't have to be a millionaire to become German Chancellor. You can just be the son of a worker or daughter of a pastor, like Angela Merkel. We don't have quite as much influence of money in politics.

Where does communicating science end and advocacy begin?

Stefan: There are double standards applied to climate scientists. The term advocate is often used to discredit scientists who speak openly.

But when a lung expert recommends not to smoke no one would say: "You are an advocate, I don't trust you anymore."

In Bavaria we had a popular vote on new anti-smoking laws and the professional organisation of lung experts actively campaigned. It would be unthinkable for an organisation of climate scientists to get involved in a political campaign in the same way.

Matt: I don't understand the problem with advocacy. Some years ago, Senator Kim Carr, when he was science minister, held an advocacy forum for scientists across a broad spectrum of disciplines. He more or less said, "I don't want to hear this ridiculous comment that scientists shouldn't advocate. You are the most expert people across a suite of sectors that impact society. Get out there and tell us what we should be doing. Don't hold back." We have to advocate for the science. How will people judge us in 100 years time if we don't get out there to secure a safe climate future?

Finally, there is an argument that geo-engineering can save us from the worst impacts of climate change. Should we be having a conversation about that?

Stefan: No, it is a desperate measure. We have much better alternatives. The whole geo-engineering debate simply makes the general public think there is some kind of technological fix down the line. It is another excuse not to reduce emissions now.

Matt: I completely agree. It shouldn't be discussed because it ruins the momentum of addressing the problem. Every single geo-engineering technology proposed either has potential impacts that are worse than the original problem, or they are way more costly than decarbonising via renewables. In short, geo-engineering is either too costly, too risky or both. We already have good solutions, it is time to enact them. ▣

Professor Stefan Rahmstorf is visiting UNSW as a guest of the Climate Change Research Centre (CCRC) until March 2016. Named by the *Financial Times* as one of the top 10 climate scientists in the world, he has been a member of the German Advisory Council on Global Change (2004–2013), an author for the Intergovernmental Panel on Climate Change, and a co-founder of the climate science blog RealClimate – described by *Nature* as one of the world's top five science blogs.

Professor Matthew England is equally well known for his science and communications. In 2007 he established the CCRC with UNSW Professor Andy Pitman. Today he is an ARC Laureate Fellow, winner of two Eureka Prizes and a Fellow of the Australian Academy of Science.



Out of the heat

Regardless of the outcome in Paris, UNSW researchers are forging ahead with multidisciplinary solutions to help us avoid the worst impacts of a warmer future. Alvin Stone reports.

By the time you read this, 2015 will have been established as the hottest year on record. It will be the fifth time the global average temperature record has been broken in the past decade. Looked at over a longer time frame the trend is even starker. Since 1911, the global record for the hottest year has been broken a staggering 19 times.

“Each decade has been warmer than the last,” says Professor Steve Sherwood, director of the Climate Change Research Centre at UNSW, headquarters of the Australian Research Council Centre of Excellence for Climate System Science (ARCCSS). “A big new record like this has been inevitable sooner or later.”

UNSW leads the world in producing the science and models that predict how the planet will change under global warming. It is also leading on providing climate change solutions.

In a radically warmer future, one of the biggest impacts Australia faces is changing coastlines driven by storm surges and sea-level rises – problems being tackled by UNSW’s environmental engineers. Another is the increased frequency and intensity of heatwaves.

“A lot of people think it’s just hot weather,” says UNSW extreme weather researcher Dr Sarah Perkins-Kirkpatrick. Yet heatwaves kill more people worldwide than any other natural disaster, causing tens of thousands

of deaths from dehydration each year. And a 2013 study suggested heat-related deaths will quadruple by 2050.

Hot weather can also damage infrastructure, and lead to increased bushfire risk and food and water insecurity.

Scorcher, an interactive website created by Perkins-Kirkpatrick, plots historical and real-time heatwaves at more than 100 sites across Australia. “By investigating heatwaves using different characteristics, we’re able to understand more about what drives them, as well as provide the most appropriate information to the people who need it most, such as health researchers, ecologists and engineers,” she says.

UNSW is also working with the NSW Office of Environment and Heritage to create a web portal that generates data from models to help farmers and agricultural researchers understand the impacts on crops and biodiversity.

On the policy front, researchers in UNSW Law are ensuring the world’s international legal frameworks can deal with increased movements of people forced from their homes due to climate change and natural disasters (see breakout box page 15).

In the Faculty of Arts and Social Sciences, political philosopher Professor Jeremy Moss is part of an international push to ensure the world’s most-vulnerable people are not unduly burdened by government responses to climate change.

In September, Moss helped organise an official COP21 event in Paris to look at the justice and moral issues involved in transitioning from a high-carbon to a low-carbon society, and policy responses that minimise inequality. “It has become more than a scientific and economic question,” Moss says.

Some of the ideas discussed included new models of ownership of energy resources and infrastructure, and ways to account for the impact of climate change on future generations.

Moss says Australia has a moral responsibility to constrain its production and export of fossil fuels, particularly coal. “There’s an inconsistency here. No matter what cuts to emissions we agree to make, if we continue to produce these fossil fuels then we’re really not solving the problem.

“We have an opportunity with this transition, to not only reduce our reliance on fossil fuels, but also give people access to something that’s necessary to live a decent life – a clean, renewable, cheap form of energy.”

Here, too, UNSW is world leading.

Solar photovoltaic (PV) researchers, working under Scientia Professors Martin Green and Stuart Wenham have set 25 world records that have improved the efficiency of solar power generation since 1975. Recently a team led by Green and Dr Mark Keevers, reached a new milestone with a sunlight-to-electricity conversion rate of 40%.

A lot of people think it's just hot weather, but heatwaves kill more people worldwide than any other natural disaster.



Meanwhile, falling costs associated with the Passivated Emitter Rear Cell (PERC) developed by UNSW researchers in the early 1980s, mean the technology is expected to be in the majority of all solar cells by 2020.

“The costs of solar PV have declined by 80% in the past five years alone,” says Associate Professor Iain MacGill, from UNSW’s Centre for Energy and Environmental Markets (CEEM), in a recent piece for *The Conversation*.

“Solar’s installed global capacity hit 177 gigawatts in 2014, and has grown at an average of 50% a year over the past five years. PV is still only contributing an estimated 1% of global electricity demand, however, countries such as Germany are showing the way with PV contributing around 7%. In Australia, PV’s contribution is now approaching 3% and we likely have the highest penetration of residential PV systems in the world.”

As PV and other renewable generation penetrations grow, we will need to reconsider our present electricity market arrangements, a major research area for CEEM and the School of Photovoltaic and Renewable Energy Engineering.

But can intermittent renewable energy sources generate enough power when and where it is needed?

The answer, according to work done by MacGill, and UNSW collaborators Associate Professor Mark Diesendorf and Ben Elliston, is “yes it can”. If scaled up, wind and solar could reliably meet 100% of Australia’s electricity needs.

Using thousands of computer simulations based on data from 2010, the trio has shown scaled-up wind and solar generation could meet national electricity demand with only a handful of gaps. These would be during peak demand on winter evenings following overcast days that also happened to have low wind speeds across the region.

“Since the gaps are few in number and none exceeds two hours in duration, there only needs to be a small amount of generation from the so-called flexible renewables (those that don’t depend on the vagaries of weather): hydro and bio-fuelled gas turbines,” the trio wrote in *The Conversation*.

Crucially, their calculations showed there was little need for batteries.

Even so, the development of efficient low-cost batteries is a game changer, allowing renewable energy to be stored and distributed on demand, drastically reducing the need for fossil fuel-driven, baseload power.

Today batteries created by Tesla, Panasonic and a host of smaller companies have put residential storage of locally generated renewable energy within reach of most households. UNSW chemical engineers are also investigating new ways to store energy, including a new generation of sodium battery that would run on seawater, making renewable energy storage even more affordable.

Homes, businesses and manufacturing are also undergoing transformations.

Scientia Professor Veena Sahajwalla is leading a green manufacturing revolution, recycling waste into valuable material and using high-temperature reactions in the steel-making process to replace non-renewable coking coal with carbon from discarded tyres.

She is leading a new \$8.8 million ARC green manufacturing research hub, working with industry to transform discarded plastic and glass materials into useful alloys and ceramics.

“Buildings and cities present the largest opportunities for carbon reductions around the world. So investing in design, planning and policy innovations can deliver huge returns,” says the head of UNSW’s Cooperative Research Centre for Low Carbon Living, Professor Deo Prasad. “Not only will design incorporate low-carbon materials, there will be a lot of ‘intelligence’ in buildings. Smart ICT and Apps will allow you to manage systems, like heating, lighting and electrical components that recognise when you are home and when you are not.”

These new technologies and designs are being trialled and community acceptance is being studied at Living Laboratories around the country so that low-carbon solutions can become mainstream.

“We are also likely to see a new kind of sharing economy develop, with community gardens, energy, water and waste systems the norm,” Prasad says.

He believes even without the need to fight climate change, a low-carbon world gives an opportunity to build smarter and closer communities.

“That alone offers a powerful incentive to start making changes today.” ■

– Myles Gough

People forced to relocate need legal protection

Climate-related displacement is already happening, says UNSW PhD candidate and human rights lawyer Tamara Wood.

“More than 19 million people were displaced by disasters in 2014 – we don’t necessarily attribute this to climate change, but the two are interrelated,” she says.

“Because the majority of existing climate-related displacement is within individual countries – not involving people crossing borders – the problem is not on most people’s radar.”

Together with her research supervisor, Scientia Professor Jane McAdam, director of the Andrew & Renata Kaldor Centre for International Refugee Law at UNSW, Wood is helping shape international thinking and policy development around forced displacement, especially as it relates to climate change and disasters.

The researchers are part of the Nansen Initiative on Disaster-Induced Cross-Border Displacement, an intergovernmental initiative led by Norway and Switzerland. Last month, the Nansen Initiative released a Protection Agenda for people forcibly displaced across borders by disasters and climate change. McAdam, who was one of the meeting Chairs, explains: “Over 100 governments endorsed the agenda, affirming the need to better protect people displaced across borders by disasters.”

McAdam and Wood have been looking at the existing tools that can be used to help displaced people, and shortcomings in international and human rights law that might prevent them from migrating safely and legally, while maintaining their dignity.

“If you want to think about displacement in a human rights framework, what we need are much stronger guarantees that people being forced from their homes in this context will be able to not only access territory, but also sustain their lives,” Wood says.

– Myles Gough



The psychology of climate change

How we react to the greatest challenge of our generation is all in the mind. **Ben Newell** explains.

Climate change has been labelled the greatest challenge of our time. But it could also be our greatest opportunity because it gives us the chance to change the way we think, the way we act and the way we work together.

But to seize that opportunity we need to overcome barriers within our own minds. These psychological foibles have the power to impede our ability to think about our future selves and lead us to be “stuck” in the here and now.

The ‘psychological distance’ of climate change

In a paper forthcoming in the *Journal of Environmental Psychology* my colleagues Rachel McDonald, Hui Yih Chai and I explore the construct of psychological distance as a means of understanding our reactions to climate change.

Psychological distance is a well-established construct referring to the extent to which an object is removed from the self. It might seem strange to think of climate change as an “object” – but in this context it refers to all of the thoughts, feelings and reactions we might have when we think about the problem of climate change.

Psychological distance has four distinct dimensions. Objects can be psychologically distant in terms of certainty (hypothetical distance), time (temporal distance), space (spatial distance) and people (social distance).

Thus psychological distance leads us to think about if something is going to happen, when it might happen, where it might happen, and to whom it might happen.

Is climate change happening?

A large body of literature now documents the efforts of various industries and lobby groups in raising doubt about the basic science of global warming. The fact 97% of currently active, publishing climate scientists endorse the claim that the globe is warming, largely due to human activity, appears to do little to discourage these hardline deniers.

This seed of doubt can be enough, for some of us, to dismiss climate change as nothing to worry about.

When is climate change going to happen?

Many climate scientists argue the effects of serious climate change are already being seen and felt. But it can be hard for us to distinguish

between short-term fluctuations in the weather and long-term changes in the climate.

The imperfection of memory and the difficulty in picking up signals from noise can make climate change appear a long way off.

Where is climate change going to happen?

Even if we think climate change is real and will happen at some point, we can still attempt to psychologically distance ourselves by imagining it will only happen in other (far-off) places – such as the low-lying Pacific islands, or the Arctic Circle.

Such reasoning belies the interconnectedness of a global phenomenon like climate change. Out of sight might be out of mind, but it does not diminish the reality of the widespread impacts of climate change.

Will climate change happen to me?

If one accepts the reality, imminence and relative locality of climate change impacts, one might still distance oneself personally from those impacts. That is, treat them as *socially distant*.

“It won’t happen to me” – perhaps I’ll be able to move, or build a wall, or buy a better air conditioner. This kind of thinking can again insulate us – distance us – from the required sense of urgency and the need to act now to reduce CO₂ emissions.

Closing the gap – overcoming psychological distance

Our analysis suggests a fine line between ‘bringing climate change home’ and invoking demotivating emotional reactions from making climate change *too* psychologically close. Fear can lead to avoidance; too much doom and gloom can lead to disengagement.

One solution appears to be getting us to think of our future selves, our legacy. Recent work by Elke Weber and colleagues at Columbia University, shows how inviting people to think about ways in which they would have a positive impact on future generations leads to stronger belief in climate change, and greater pro-environmental intentions.

To seize the opportunities climate change offers we must first dispel any uncertainty about its reality – close the hypothetical distance – and then focus on the things we can do NOW, not for our immediate gain, but for the benefit of our future selves. ▣

Star turn

It took 10 years and several billion kilometres for space systems engineer Sean Tuttle to learn if his ingenuity had paid off. **Chris Sheedy** reports.

Dr Sean Tuttle is not likely to forget the events of 20 January 2014. That summer it felt as if everyone on Earth was watching to see if he had done his job. Indeed many people were.

Ten years earlier, Tuttle had been part of a European Space Agency team that launched a spacecraft called *Rosetta* in Europe's most ambitious space endeavour. The mission: to send a probe on several fly-bys of Earth and Mars before eventually tracking billions of kilometres towards comet 67P/Churyumov-Gerasimenko, where *Rosetta* would land a module on the comet's surface.

As the space systems engineer in charge of the mission's thermal design, Tuttle was responsible for ensuring everything in the spacecraft would be kept at the right operating temperature throughout the 6.5 billion kilometre journey.

The biggest challenge: *Rosetta* was entirely solar powered, so on its way to rendezvous with the comet from beyond the dark orbit of Jupiter, it had to go into hibernation. Only when it was back within the reach of the sun's rays could the probe wake up again, a nap of some 150 million kilometres.

So in January last year Tuttle, who by then was a senior lecturer developing a space engineering research program at UNSW Canberra's School of Engineering and Information Technology, was waiting along with the rest of the world to see if *Rosetta* would survive its long, cold sleep.

He knew that even though his work had taken place in Europe more than a decade earlier, if *Rosetta* didn't come to life as planned, fingers of blame would point all the way to Canberra – and at him.

"Thermal design is a black art within the industry," says Tuttle of his 15-year career in the European space industry. "It is not clear-cut. You have to look at everything at every point in the mission under all conditions of operation."

The outside of the spacecraft is subject to massive variations in temperature, he explains. The inside is packed with electronic systems creating their own heat, which must be dissipated.

And there are the competing problems. "All the electronics like to be around normal room temperature, but the batteries want to be cooler. But they can't get too cold or they'll stop working," Tuttle says.

"Then you've got propulsion systems, liquid propellants etcetera, that can't be allowed to freeze and moving parts that will have bearings and need different kinds of lubricant, depending on the temperature ranges.

"Basically what you've got is a big box of things that need to live together comfortably, but that don't like to."

In order to create harmony in this "big box of things" Tuttle had to innovate, using processes that have since been adapted into other technologies and industries.

These techniques included placing thermal blankets on the exterior made from a material called Kapton and louvers over the spacecraft's radiators that opened and closed when necessary, to release or retain heat.

On the day *Rosetta* was scheduled to awaken, Tuttle admits he was suffering a case of the nerves. That night he logged into the space agency's live webcast to watch the unfolding events. There was an excruciating wait as *Rosetta*'s key instruments warmed up. The spacecraft took its time to aim

^ Thermal design is a black art ... space systems engineer Sean Tuttle. PHOTO Sean Davey

What's most important is the journey. We stretched ourselves and did things that hadn't been done before.

its radio antenna at Earth but eventually a signal was picked up by ground stations in California and Canberra. *Rosetta* was awake. Keepers of *Rosetta*'s Twitter account tweeted "Hello World" and Tuttle finally breathed out.

Ten months later, *Rosetta*'s module *Philae* successfully landed on the comet, achieving a first for humankind. The mission continues to today, returning data from both *Rosetta* and the comet's surface.

"I think what's most important is the journey," says a philosophical Tuttle, who as part of the *Rosetta* team received the 2014 Sir Arthur Clarke Award by the British Interplanetary Society. "We stretched ourselves and did things that hadn't been done before."

"Comets are so old and so little disturbed from the earliest time after the big bang that by taking samples we'll learn a lot more about the early stages of the formation of the solar system. But to me the journey is like the early voyages of discovery – you learn along the way about yourself." □



Fishing for peace

In the PNG highlands, lives have been changed and clan wars averted through the introduction of an unlikely peacemaker – fish. Myles Gough reports.

In the linguistically diverse highlands of Papua New Guinea, many people still belong to customary clans and bloodshed between them is commonplace.

“It’s the old pig in the vegetable patch story,” says Associate Professor Jes Sammut from the UNSW School of Biological, Earth and Environmental Sciences.

“Someone’s pig gets into someone else’s garden and eats everything, then people want compensation and a fight starts. Someone gets killed and it sparks a vicious cycle of payback.”

Since 2010, Sammut has been leading a project in PNG, along with Jacob Wani from the National Fisheries Authority (NFA) of PNG, which is training people in remote villages – including clans that have been at war for decades – how to farm fish for income and food security.

The project team is turning adversaries into unexpected business partners.

“We know of at least three tribal wars that have come to an end as a result of our project interventions,” Sammut

says. “Men who were in the past trying to kill each other are now working together in fish farming co-operatives, sharing shovels, water pumps, equipment ... and knowledge.”

Women are also thanking them for saving their sons, husbands and fathers from the violence, he says, and the money they’re making from fish sales is enabling them to send their children to school.

The project, which is funded by the Australian Centre for International Agricultural Research (ACIAR) and NFA, has been designed to provide an affordable source of protein for locals.

Around 80% of PNG’s population is unemployed and live off less than \$2 per day. Rural villagers farm vegetables, but protein deficiency is a big problem – it prevents people with HIV/AIDS from responding to medical treatment, and leads to malnourishment and stunted growth in children.

Havini Vira, who recently took leave from the NFA to complete a Masters at UNSW, says 55% of child deaths in PNG hospitals are from malnutrition.



While pigs are present, Vira says they cost up to \$5,000 each, and are only killed at big ceremonies. This is because of a lack of refrigeration, which means the meat can't be stored. "You have to eat it in one shot," says Vira. "It's just too expensive."

Farming chickens commercially is also out of reach, says Sammut, as it requires a lot of money for feed and ongoing disease control programs.

Fish, by comparison, provide protein at an affordable cost and can be caught and cooked when needed, without refrigeration.

When Sammut and Wani started their program of research, there were 10,000 fish farms, but the fish weren't growing to table size due to a lack of feed, and inbreeding.

Sammut and another UNSW Masters student from PNG, Justin Narimbi, have been researching how to make fish feed – which accounts for up to 80% of costs – more affordable, by supplementing it with food sources in the ponds, such as plankton, algae and insects. The project is also developing family lines of one fish species, tilapia, that can grow well across many generations.

Meanwhile, on the ground, the project team members are teaching farmers how to dig and stock their ponds, and also training local technicians, scientists and community engagement officers, some of whom are taking fish farming into literally unexplored valleys.

Today there are more than 60,000 fish farms in PNG, and they're growing in popularity. Even the church is on board.

Sammut, Wani and their team have been working with the Sisters of Notre Dame, who run the Maria Kwin Training Centre – a place where drug addicts and vulnerable members of society can go for help.

The nuns, and the wider project team, have been training their clients to farm fish so they can create their own businesses, kick their drug habits and "regain status in their communities".

Through the NFA and the ACIAR project, they also run a Fish for Prisons program, teaching inmates how to farm fish.

"We've seen released prisoners go from being outcasts to community leaders ... and none of them have committed crimes again," Sammut says. "It's given them a better option in life."

^ ABOVE LEFT The Sisters of Notre Dame help teach vulnerable clients to farm fish and regain their status in the community. PHOTO *Jes Sammut*

TOP RIGHT Justin Narimbi, UNSW's Jes Sammut and Havini Vira. PHOTO *Leilah Schubert*

BOTTOM RIGHT Locally farmed fish can be caught and cooked when needed without refrigeration. PHOTO *Jes Sammut*

Sammut's research career began in the early 1990s when he was doing a PhD on fish diseases. Part of that work led him to India, where he discovered shrimp farms were failing, not due to recurring diseases, as locals suspected, but because of high acidity in the soil.

He was drawn into the world of aquaculture, and ever since, he's worked across South-East Asia and the Pacific. In 2005, following the devastating Indian Ocean tsunami, Sammut set up several ACIAR-funded projects in Aceh, in western Indonesia, rebuilding technical capacity in aquaculture.

"A lot of people in the fisheries industry lived very close to the coast, and were killed by the tsunami and the facilities were destroyed – including 25,000 hectares of aquaculture farms," he says. This work has been ongoing for more than a decade.

While his work across the region has a development focus, Sammut says the work in PNG is particularly important because "even a little change can make an enormous difference".

Vira remembers one trip he took to a remote western province. When he arrived with fish, the women started crying.

"I didn't know why," he says. "They were speaking in a language I didn't understand."

After asking someone to translate, he discovered they were tears of joy. The people had been eating tadpoles and frogs, and only now – with the introduction of fish farming – did they have an alternative.

"Some of these things really start your heart when you see what's happening – seeing the impact fuels the desire to keep going." □

Gone bush

UNSW medical students have committed to working in some of Australia's most remote locations. For second-year student **Amy Coopes** her work in an Indigenous community has been a revelation.

Blink and you'll miss it. About 120 kilometres north-west of Alice Springs, a modest, green signpost indicates the turn-off for Napperby – a cattle station sprawling across some 5,700 square kilometres of Central Australia's red sand desert.

It's not always passable – just one day of rain can transform it into swirling rapids as I will soon discover – but 83 kilometres down the Napperby road, nestled in an undulating landscape of rocky hills, dunes and the ochre stalagmites of termite mounds, is an Aboriginal community called Laramba.

This is Anmatyerr country, and it's unlike anywhere I have ever been. For the next few years it will be a home of sorts: I'll be doing medical placements in the clinic here as part of the John Flynn Placement Program (JFPP) managed by the Australian College of Rural and Remote Medicine.

I'm one of 98 UNSW students currently on the JFPP, a government scholarship for people interested in working at some of Australia's most far-flung outposts.

Twelve of us have been assigned to the Northern Territory and one is even stationed with Australia's Antarctic Division in Tasmania, with the option to travel to the icy continent for her final placement.

It may not be Casey Station, but Laramba certainly is remote.

Medical emergencies are flown to Alice Springs by the Royal Flying Doctor Service (RFDS). After dark, the airstrip – a cleared patch of red earth sporting a lone windsock – is not safe for the RFDS and we have to drive an hour or so down the rutted dirt road to Ti Tree, where planes can land at night.

^ This is Anmatyerr country, and it's unlike anywhere I have ever been.
PHOTOS Amy Coopes

The nearest doctor is 100 kilometres away, at Yuendumu, and the ambulance is a Toyota LandCruiser Troop Carrier with a stretcher in the back.

Blood tests are about as advanced as diagnostics get and the pathology run goes just twice a week – an esky full of blood and urine samples we drive out to load on to the bush bus into Alice, chancing flat tyres, floods and everything in between.

Aboriginal health gets top billing in the Australian medical curriculum. We are taught about cultural competence and safety, drilled on the statistics, and well versed in the chronic diseases endemic in the Indigenous population. But it isn't until I arrive in Laramba that I realise how little – nothing – we actually know.

I am conferring with nurses over a patient one day when the Aboriginal health worker strides in, a supermarket chiller bag in hand.

"What should I do with this?" he asks, reaching into its depths.

All I see is reptilian tail, a metre of it, as I leap clear from my chair into the storeroom. Eventually a head emerges from the bag or, where the head should be, a VB can.

Using surgical scissors, we cut the goanna free and return him to the dry bed of Napperby Creek. Some lizards just can't hold their drink.

Everyone in this community of 230 is related through a complex web of skin and kin, making a mockery of my carefully constructed "family history". In consults, silence



is golden and I become aware of how uncomfortable it makes me to sit in a room without making a sound.

Gradually, through the silences, the most incredible stories emerge.

Like the tales of survival from the 1928 Coniston massacre, Australia's last mass killing of Aboriginal people. Estimates range from 31 to more than 100 dead at the hands of police and settlers. Many young Aboriginal kids survived only after being hidden in the long grass by their mothers.

Others in the community recall the removal of siblings during the Stolen Generations, or the arrival of soldiers during the 2007 Intervention. The academic becomes starkly, unflinchingly personal.

Some ailments are definitely seen as white fella problems that require attention at the clinic, but bush medicine and traditional healing also have their place. I have the privilege of watching a ngangkari (traditional healer) minister to a haemorrhaging renal patient before she is airlifted out by the RFDS.

There is a strong belief in the kadaitcha man, a vengeful spirit thought responsible for all manner of misfortunes, and in the power of "pointing the bone", or fixing someone with a curse.

Even in the blazing, 46-degree heat the elderly women keep their hair tucked under a beanie; a single strand can be used to target people for 'boning'. I quickly learn to sweep up and bag the offcuts from our impromptu after-school hair salons for parents to take home for safekeeping.

The kids are the best part of the job. Like clockwork, a riotous gaggle bursts through the clinic's doors at 3pm every day, clamouring for their chewable vitamin C.

Living on country is humbling, overwhelming. It's an assault on the senses.

The vivid rust of the earth contrasts with a sky so blue it defies the lens. Children, silhouetted by the sinking sun, dig for lizards and kick a threadbare Sherrin football on the dusty oval.

The smell of ochre and wood smoke lingers for days after Elders perform a cleansing of the clinic during sorry business following a death.

This is the land of Clifford Possum Tjapaltjarri, one of Australia's most celebrated Aboriginal painters. It was also home to Clifford's stepfather Gwoya Jungarai, whose likeness graces Australia's \$2 coin.

There are snakes, camels and thorny devils; roos and perentie by the hundreds, too, if you know where to look for their tracks.

I have so much to learn. I can't wait to go back. ▣



^ ABOVE Amy Coopes with one of her younger patients.

ABOVE LEFT The best part of the job – the kids.



^ Blink and you'll miss it. The turn-off to Laramba, 120 km from Alice Springs.

Arts



In their element: Wild Researchers

Wild Researchers is a unique collaboration between UNSW and award-winning photographer **Tamara Dean** that transports us outside the lab and into the elements.

Most of the 17 researchers featured in the striking portraits, currently being exhibited at the Australian Museum, are working in scientific areas – from mathematics and astronomy to climate change and biotechnology – along with a landscape architect and a philosopher.

An initiative of the UNSW Media Office and supported by the Division of Advancement, the exhibition features an essay by journalist and author **Ashley Hay** – ‘The Fieldwork of Looking and Seeing’. In this edited excerpt, Hay writes about how Dean’s vision casts our subjects in a new “heroic” light, busting stereotypes along the way.

^ Marine mathematicians – Nina Ribbat, Paulina Cetina-Heredia and Amandine Schaeffer. PHOTO © Tamara Dean

Almost 60 years ago, the anthropologist Margaret Mead described a scientist – necessarily male, she felt – as someone who “wears a white coat and works in a laboratory. He is elderly or middle aged and wears glasses ... He may wear a beard, may be ... unkempt ... He is surrounded by equipment. And most children agree with that shorthand when you ask them to take a “draw-a-scientist-test”.

This is how we understand researchers to look – when we don’t know; when we’re not sure who they are or what they do. But look here: a woman leans down towards the surface of the sea, her reflection reshaped by the grey-glass water. A man stands with a bird on his arm – both man and bird still beyond the freezing of this frame.

Here they are, pinned to paper as securely as any Linnaean specimens: a concurrence of researchers. Us looking at them – and them looking at the landscape that contributes to their professional lives. Not a lab coat or a test-tube in sight. And all these people – all the people in this *Wild Researchers* suite by Tamara Dean – work in the worlds of science and research in fields as diverse as Indigenous astronomy (Duane Hamacher), marine ecology (Adriana Vergés), philosophy (Thom van Dooren) and climate science (Sarah Perkins-Kirkpatrick).

The things they seek to understand through the data their landscapes contain – in Australia and around the world – are intrinsic to their work. They seek the appearance of meteors, supernovae, aurorae and more in Indigenous Australian traditions. The restoration of underwater forests. The ethical impacts of the extinctions and resurgences of various species of crow. The heatwaves of the future. And these landscapes feed both the questions they ask and, often, the means they have of answering them.

For years, Tamara Dean recorded the world for the news, her creative work carefully corralled. As a staff photographer with the *Sydney Morning Herald* her portfolio ranged from protests to terrorists to disasters to arrests to portraits to tsunamis and more. Immersed entirely in her own artistic practice since 2014, she records the world still – leaning more towards some of its particular places and the ways in which people connect to them, or cherish them, or are inspired by them.

She’s spoken of a sense of “conjuring” something – “finding images in the air and light. Waiting for energetic points to come to a head ... holding for breath ... pausing for space” in the context of other photographic series she’s created. And there’s a sense of this in her work here too – and of a certain grandeur. There’s something vast in their conception: they evoke the richness of painted canvases, or perhaps something cinematic. The same grandeur imbues their poses and their grace.

“Heroic” is how she describes it. A quest to “represent the ways these people related to landscapes in a way that makes a heroic image of them and the way that they work”.

These words are not the usual descriptors of fieldwork – fieldwork is a thing of busyness, of collection, of immersion, of data. Yet fieldwork is a necessarily various thing too. Fieldwork has required Thom van Dooren to dress up as a whooping crane so as to be able to spend time with these critically endangered birds without introducing them or habituating them to humans. He calls the work he does “field philosophy” and finds it very difficult to “think philosophically without a connection to the landscape”.

If I could have any piece of knowledge, I would ask for what these subjects thought about as they sat still – pinned, pressed – while Tamara Dean fixed these richly made images. I would ask for the train of thought that looped and twisted through those minutes: Hayley Bates remembers hers. To sit and look at the landscape without having to undertake the work that she usually associates with it – “checking traps, catching animals or conducting habitat surveys; focusing on collecting data and making observations” – allowed her to look around and immerse herself in the beauty of the landscape she was in. When she’s not there, she says, she thinks of that place, the Snowy Mountains, with pure awe.

Photographs catch and store something essential: the images themselves and all their different components, and the stories that the photographer – the artist – hopes these frames will transmit. And the loveliest thing? If you can’t see those stories straight up, you can always imagine your own versions. Imagine the stories told to Duane Hamacher by Aboriginal people about the skies above. And imagine standing in that water with those three chilly mathematicians – literally dipped into the information they unravel and expound at their work each day.

Imagination: it’s not the first word usually associated with research – with science itself – but it’s a vital one. Perhaps these images can serve as new shorthand for the richness and necessity of its load. These workers paused and caught in a landscape they help to define. ▣

Wild Researchers is at the Australian Museum until 13 December. The exhibition will be on campus in early 2016. See all the images, video and read Ashley Hay’s full essay at wildresearchers.unsw.edu.au



^ The possum whisperer: Hayley Bates – Biological, Earth and Environmental Sciences. PHOTO © Tamara Dean



^ Sea change: Adriana Vergés – Biological, Earth and Environmental Sciences and Sydney Institute of Marine Sciences. PHOTO © Tamara Dean



^ Rethinking extinction: Thom van Dooren – Environmental Humanities. PHOTO © Tamara Dean



Download the *Uniken* app to watch the video

Death becomes her

The landscapes of loss and memory are fertile grounds for researcher Katrina Simon, writes **Fran Strachan**.

Katrina Simon has an encyclopaedic knowledge of some of the world's most historic memorials and burial sites.

It could be considered morbid, but the landscape architect insists it's not. "The popular idea of cemeteries as places of rest and repose intrigues me. Cemetery landscapes are actually very dynamic places – constantly moving and evolving."

From the moss that transforms tombstones to the way graves subside, Simon sees an "incredible tension in cemeteries, which are designed to perpetuate memory but can also quickly decay".

"I'm fascinated by how the memory of human life can be embedded in constructed landscapes and in what happens to those landscapes over time. As a designer I want to know how I can respond to both memory, and the loss of memory."

In 2013 the academic took up a residency at the Cité Internationale des Arts where she spent three months researching the Catacombs of Paris and the sprawling Père Lachaise Cemetery, the final resting place of such luminaries as Frédéric Chopin, Gertrude Stein, and Oscar Wilde.

"There's a history of great movement and change in the landscape of Père Lachaise," says Simon, who is a senior lecturer at UNSW Built Environment. "The remains of doomed lovers Abelard and Heloise were literally transported there as a tourist attraction in the 1800s."

Père Lachaise was the first European cemetery to be planned as a landscape, Simon says. Prior to that, over-crowded cemeteries were often located within the city walls with bodies buried on top of each other and regular exhumations to create space.

That changed towards the end of the late eighteenth century, following post-plague hygiene concerns and fears of contagion. Cemeteries were then moved to the outskirts and allowed to develop as planned necropolises.



^ Katrina Simon. PHOTO Grant Turner/Mediakoo

Cemetery landscapes are actually very dynamic places – constantly moving and evolving.

The UK-born and New Zealand-raised academic has studied other cemeteries including the Barbadoes Street Cemetery in Christchurch and Auckland's Waikumete Cemetery. Barbadoes Street is famous for its "bleeding gravestone", (oxidisation of an 1871 tombstone exposed a red mark in the shape of a bloodied handprint).

In contrast Waikumete Cemetery is known for its "eco-burials" in which people are wrapped in a shroud and can elect not to have a tombstone at all.

These different types of burials have developed because of changing attitudes, Simon says. The growing popularity of cremation has led to an increased demand for urn storage sites, called columbarium walls, for example.

How we choose to design our public memorials and remember those we've lost as a community can also change over time.

Simon says there is a growing interest in temporary memorials internationally – where change is part of the design, or where interaction between visitors and the memorial is encouraged.

She was part of a team, including UNSW's Russell Rodrigo and architecture graduate

Kate Irwin-Faulks, that developed a design to commemorate the 185 people killed in the 2011 Canterbury earthquake. Their project was one of six shortlisted designs from 337 entries from around the world.

Call and Response encouraged viewers to reflect on the impact of the earthquake using acoustic mirrors that directed people to a grove of trees beside Christchurch's Avon River.

"Natural disasters erase familiar landmarks and leave people feeling very lost and disorientated. Memorials can offer a new focal point," says Simon.

After recently presenting her research at three European conferences, including the International Conference of Historical Geographers in London, she was asked to chair a panel at the Australian Institute of Landscape Architects Festival entitled *Life + Death*.

Simon says the invitation gave her insight into the universal relevance of her research.

"It's important for landscape architects to continue thinking about how the design of cities and cemeteries can accommodate the experiences of loss, recollection and remembering." ▣



Download the *Uniken* app to watch the slideshow



One Degree

Final-year Bachelor of Design student James Lim's *One Degree* harks back to the heyday of neon lighting. Standing at over one metre tall, Lim says his dramatic piece plays on the popular corporate buzz phrase "boiling the ocean", meaning to take on an impossible task.

The designer says the work is a comment on global warming and how climate change has progressed since the 1940s when neon lighting became popular in advertising.

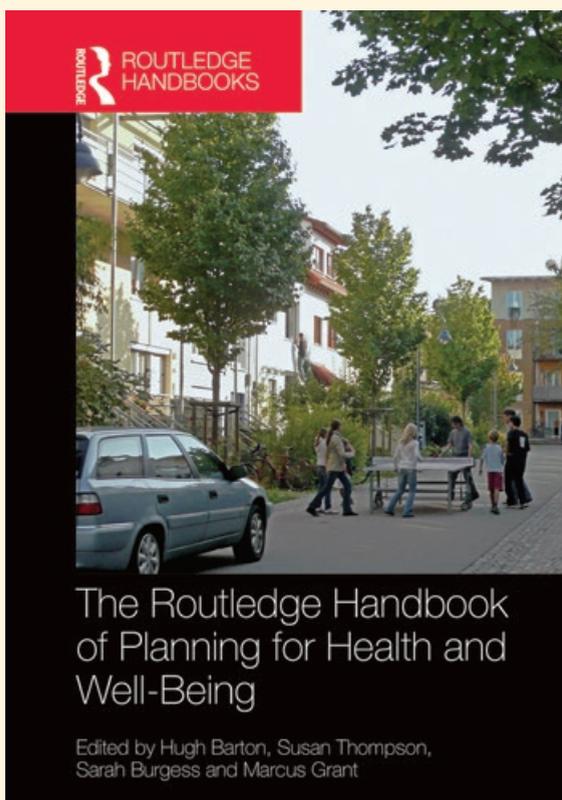
"I'm a bit nostalgic about neon, it reminds me of a less complicated time. I decided to use a fun, light medium to communicate a serious message – the danger of climate change denial."

One Degree is one of more than 200 works on display at UNSW Art & Design's ANNUAL 2015, the largest national showcase of graduate works, which opens across multiple sites at UNSW's Paddington campus and runs until 12 December.



Download the *Uniken* app to watch the slideshow of graduating students' works

^ IMAGE James Lim – *One Degree*, neon lighting



Routledge Handbook of Planning for Health and Well-Being

Co-edited by Susan Thompson, UNSW Built Environment with contributed chapters from Robert Freestone and Linda Corkery

Endorsed by British designer and *Grand Designs* TV presenter, Kevin McCloud, the *Routledge Handbook of Planning for Health and Well-Being* authoritatively argues the importance of incorporating health into urban planning. Deeply implicated in the planetary crisis of climate change and the personal crises of unhealthy lifestyles, poor urban planning has contributed to worldwide health issues such as obesity, mental illness, growing health inequalities and climate vulnerability. McCloud describes the book as “a manifesto for how we should plan our neighbourhoods, towns and cities”.

This book champions the objectives of health and well-being – time-honoured values in the history of planning.

“It champions the objectives of health and well-being – time-honoured values in the history of planning – as the core means to achieving well-made, rich, beautiful and happy places. I'd like to see every politician, planner and developer given a copy. I'd like every household in the country to understand its message.”

Routledge

Sex in China

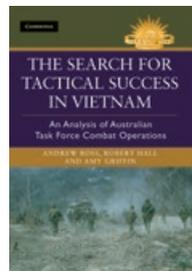


Haiqing Yu, UNSW Arts and Social Sciences with Elaine Jeffreys

Sex in China introduces readers to some of the dramatic shifts that have taken place in Chinese sexual behaviours and attitudes, and public discussions of sex, since the 1980s. The book explores what it means to talk about “sex” in present-day China, where sex and sexuality are becoming more and more visible in everyday life. The authors situate China's changing sexual culture, and how it is governed, in the socio-political history of the People's Republic of China. Chapters focus on sex studies; marriage and family planning; youth and sex(iness); gay, lesbian and queer discourses and identities; commercial sex; and HIV/AIDS.

Polity Press

The Search for Tactical Success in Vietnam: An Analysis of Australian Task Force Combat Operations



Andrew Ross, Bob Hall and Amy Griffin, UNSW Canberra

From 1966 to 1971 the First Australian Task Force was part of the counterinsurgency campaign in Phuoc Tuy Province, South Vietnam. Though considered a small component of the Free World effort in the war, these troops from Australia and New Zealand were in fact the best trained and prepared for counterinsurgency warfare. However, until now, their achievements have been largely overlooked by military historians. *The Search for Tactical Success in Vietnam* sheds new light on this campaign by examining the thousands of small-scale battles the First Australian Task Force was engaged in. Original maps throughout the text help to illustrate how the task force's tactics were employed.

Cambridge University Press

Justice Reinvestment: Winding Back Imprisonment

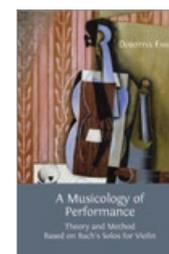


David Brown, Chris Cunneen, Melanie Schwartz, Julie Stubbs, Courtney Young, UNSW Law

Justice reinvestment was introduced as a response to mass incarceration and racial disparity in the United States in 2003. Taking a comparative approach to justice reinvestment, this book examines the differences in political, legal and cultural contexts between the US and Australia in particular. It argues for a community-driven approach, originating in vulnerable Indigenous communities with high imprisonment rates, as part of a more general movement for Indigenous democracy. While supporting a social justice approach, the book confronts the problematic features of the politics of locality and community, the process of criminal justice policy transfer, and rationalist conceptions of policy.

Palgrave

A Musicology of Performance: Theory and Method Based on Bach's Solos for Violin



Dorottya Fabian, UNSW Arts and Social Sciences

Dorottya Fabian explores the contributions and limitations of theoretical, cultural, historical, perceptual

and analytical approaches to musical performance. Through a detailed investigation of recent recordings of J. S. Bach's *Six Sonatas and Partitas for Solo Violin*, she demonstrates that music performance functions as a complex, dynamic system and only by crossing disciplinary boundaries, can we put the aural experience into words. *A Musicology of Performance* provides a model for such a method by adopting Deleuzian concepts and various empirical and interdisciplinary procedures. Fabian provides a case study in the repertoire, while presenting new insights into the state of baroque performance practice at the turn of the twenty-first century.

Open Book Publishers

The 26-year-old lecturer in International Relations and Development talks about starting university at 13 and why age shouldn't dictate capability.

I was home-schooled from the age of 10 when my family returned to Thailand after living in Singapore, Fiji, and New Zealand. It was a leap of faith on my mother, Panadda's, part. In Thai society at the time it was considered extremely revolutionary or even slightly mad, to home-school your child. It was only possible because of the collective effort of Mum and my older siblings. They taught me everything from biology and Marxism to history and French.

I've always had nerd tendencies. I could read a book in a day from a young age, but I don't recall there being a particular moment when anyone decided I was academically gifted. It was when I was about 11 that Mum thought I needed structure and to experience a live exam situation, so I sat the Cambridge IGCSE exams.

Mum wasn't a tiger parent she was very relaxed and cool. My family were surprised I passed the IGCSE. They had no expectations. I put all the pressure on myself, it was purely self-inflicted.

I was 13 years old when I was accepted into a Bachelor of Arts majoring in British and American Studies at Thammasat University, Bangkok. An hour before the panel interview the heel of my shoe broke ... I can still feel the adrenaline when I think about it. The first question they asked was would my age impact on my ability to perform well? I told them, "I respect your concerns but I don't think age should determine a person's capabilities".

I was 17 when I started my Masters in International Relations at ANU. Mum had to come and live with me because I needed a legal guardian. I was incredibly fortunate to meet people who understood my circumstances.

I was selected as an Oxford-Princeton Global Leaders Fellow after I'd completed my PhD at ANU. I spent a year at each university. At Oxford you can literally feel the weight of history. Princeton has a distinctive charm that's hard to describe. I couldn't believe I was living in the same town that had been home to Albert Einstein and John Nash.

Coming to UNSW felt right to me. I've been exposed to different systems in the UK, the US and Asia and I know they each have strengths and weaknesses. UNSW is relatively young and very dynamic. I like the Aussie way of doing things. Australia feels like a second home to me now.

I'm a huge procrastinator so I try not to give myself any down time. I play the piano and prefer to play by ear. I play some classical, a bit of jazz and a lot of contemporary show tunes. I like listening to J-pop and Mandopop when I'm working. I also love PlayStation: I'm a *Final Fantasy* fan.

My research focuses on Chinese foreign policy and the environment: climate change, resource security, natural disasters and trans-boundary water governance. I'm particularly interested in how normative ideas like "responsibility" and "legitimacy" feature in China's engagement with global governance. I'm not a "panda hugger" but I think we are seeing China becoming more responsive to global expectations and (to quote Uncle Ben in *Spider-Man*), recognising that "with great power comes great responsibility". ▣

– Fran Strachan

Mum and my older siblings taught me everything from biology and Marxism to history and French.



PHOTO Grant Turner/Mediakoo

2015: A bumper year

From quantum qubits to research role models, 2015 was a year of outstanding achievements. Here are some of the UNSW stories that made headlines.

Polymer chemist wins PM's Science Prize

Academics named as top Women of Influence

RESEARCHERS OVERCOME CRUCIAL HURDLE IN QUANTUM COMPUTING

UNSW joins national equity program for women in science

UNSW ranks 46 in the world

Three scientists awarded Laureate Fellowships

HONOURS FOR STEPHEN AND LUCY HAWKING

UNSW Canberra opens doors to Engineering students

UNSW defeats Germany to win RoboCup world title

TOP CSIRO HONOUR FOR RESEARCH STAR

\$10 MILLION GIFT FOR CHAIR IN ARCHITECTURE

Lake Eyre Basin partnership wins \$500,000 International River Prize

UNSW Science shines at Eurekas

UNSW TOPS THE COUNTRY IN INDUSTRY-LINKED RESEARCH GRANTS

RACING ON SUNSHINE: SUNSWIFT TURNS 20

UNSW dominates list of Australia's top engineers

PANCREATIC CANCER RESEARCHER NAMED NSW WOMAN OF THE YEAR

Law wins fourth Rhodes scholarship in three years

UNSW home to new population ageing centre

UNSW launches 2025 strategy

300 RESEARCHERS OPEN AUSTRALIA'S PREMIER SOCIAL POLICY CONFERENCE

Record number of Fulbrights

UNSW opens Australia-first innovation hub

\$13 million to help fight dementia

ART & DESIGN GRADUATE WINS ARCHIBALD PRIZE

Academic chairs UN Indigenous forum

UNSW tops the state in medical research grants

TOP SCIENTISTS AND ENGINEERS WIN PREMIER'S PRIZES

UNSW sweeps ARC Discovery funding

The media team looks forward to reporting on an even brighter 2016.

Happy holidays!