

UNSW

ISSUE 2 2018

magazine

Something special is brewing

Meet the UNSW students
going into business with
Ugandan farmers
to change our
coffee habits

Voices of reason

Kaldor Centre marks five years
of influencing refugee law

Power to the people

Australia's first winner
of the Global Energy Prize

Stopping the croaks

Using DNA to end the cane
toad's long march

From the Vice-Chancellor

Welcome to the second edition of UNSW Magazine for 2018.



I've reflected a lot this year on the contribution education makes to reducing inequality. The economist Surjit Bhalla calls education the 'new wealth of nations', arguing that the benefits education brings by developing human capital, rather than financial capital, are key to achieving equity and prosperity in 21st century societies.

At UNSW, nurturing those benefits so we can make a positive impact locally, nationally and globally is our most important role. In this issue of UNSW Magazine, you will encounter stories of our people who are using the opportunities UNSW has provided to direct their creativity and intellect towards improving our world.

Our cover story is the inspiring tale of Brody Smith and Darcy Small, who along with fellow UNSW students are helping farmers in Uganda bring their coffee to Australia. The students say the financial security that the business provides to the farmers makes this collaboration so meaningful, but I can confirm the coffee tastes pretty special too.

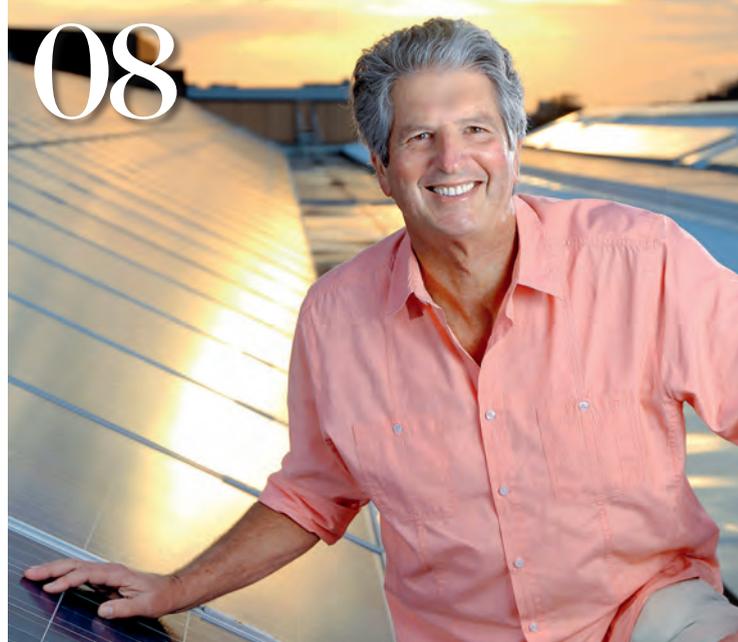
Another outstanding UNSW person profiled in this edition is Scientia Professor Martin Green, who has been a giant of solar energy technology for more than three decades. His reflections on becoming the first Australian to win the prestigious Global Energy Prize are well worth reading.

Continuing the focus on global impact, this issue also celebrates five years of the Kaldor Centre for International Refugee Law, profiles waste warrior Scientia Professor Veena Sahajwalla, and follows the work of UNSW's Institute for Global Development in tackling the UN's Sustainable Development Goals.

There is a wealth of amazing talent at UNSW and so much to be proud of at the end of another year. I hope that you feel as much pride in our community as I did when reading this issue.

Professor Ian Jacobs

08



Professor Martin Green, the Director of the Australian Centre for Advanced Photovoltaics, was awarded the Global Energy Prize in Moscow – but it was not just his award. He thanked the “thousands of solar researchers” who had worked at UNSW and elsewhere to make advances in photovoltaics available commercially to people around the globe.

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Cover image: Brody Smith and Martin, a member of the Zukuka Bora farmers' collective in Uganda.

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Professor Rosalind Dixon: “Being a great academic is only possible when you have great colleagues and students.”

Dixon named best legal academic in Australia

For the second year in a row, a UNSW Sydney law professor has won the prize for best legal academic in Australia.

Professor Rosalind Dixon has been named 2018 Academic of the Year at the 18th Annual Lawyers Weekly Australian Law Awards. It is a repeat for UNSW Law after Associate Professor Michael Legg won the same prize in 2017.

The awards recognise the year’s best work across 30 categories including programs from in-house, corporate, business, innovation and pro-bono areas. UNSW Law is a partner for the Awards.

Dixon, who was recently elected as co-president of the International Society of Public Law, says the award reflects the outstanding people at UNSW.

“I feel very honoured to receive the award,” Dixon says. “Being a great academic is only possible when you have great colleagues and students and I feel deeply fortunate to have both.”

Dixon’s research and teaching focuses on comparative constitutional law and constitutional design, constitutional democracy, theories of constitutional dialogue and amendment, socio-economic rights and constitutional law and gender. Her current focus is on fragile democracies, or the threat posed by democratic backsliding, and what law and legal institutions may be able to do about it.

Dixon, with UNSW Economics Professor Richard Holden, is leading UNSW’s Grand Challenge on Inequality.



Professor Sally Dunwoodie accepts the Eureka Prize for Scientific Research. Photo: Eureka Prizes

Biomedical discovery earns Eureka Prize

UNSW Professor Sally Dunwoodie, a world-leading biomedical researcher at the Victor Chang Cardiac Research Institute, is the winner of the 2018 Eureka Prize for Scientific Research.

The Australian Museum Eureka Prizes recognise 10 finalists from UNSW and their affiliated teams for excellence in science innovation and research, leadership, science engagement and school science.

Dunwoodie and her multidisciplinary team have been recognised for their discovery of the potential of vitamin B3 to treat a molecular deficiency causing miscarriages and complex birth defects.

The finding could prevent developmental defects through a common dietary supplement, which might transform the way pregnant women are cared for around the world.

In a separate category, filmmaker Adam Geiger has won the Department of Industry, Innovation and Science Eureka Prize for Science Journalism.

He won for the ABC film *Can We Save the Reef*, hosted by UNSW Dean of Science Professor Emma Johnston.

The documentary explores the massive impact of coral bleaching on the Great Barrier Reef.

Johnston, an award-winning marine ecologist, examines the issues of when and how science should intervene to put hardy new coral species on the Reef, and whether the pitfalls of new genetics could do more harm than good.

DOUBLE AFR AWARD SUCCESS

UNSW Sydney has taken home two awards at the AFR Higher Education Awards, for UNSW’s Hero Program and The Maker Games. The awards identify leading programs in areas of innovation, education, student wellbeing and community engagement. The UNSW Hero Program won in the Learning Experience category for helping build the graduate capabilities of students. The Engineering faculty’s Maker Games took out the Industry Engagement category for pioneering a cross-disciplinary team-based prototyping competition.



PURSuing MIND-MACHINE LINK

UNSW Sydney researchers Dr Leonardo Silvestri and Professors Francois Ladouceur and Nigel Lovell from UNSW Engineering (pictured) have been awarded a US Naval Research grant to advance the development of chips to read neural activity from the brain. This could lead to the creation of a brain-machine interface to restore lost functions in disabled people. The researchers are pioneers in neural interfacing, inventing the first chip that uses fibre-optic technology to measure signals from the brain and which could revolutionise the way millions of people interact with technology.

\$8M BOOST FOR CHINA TECHNOLOGY PARTNERSHIP

The development of the Torch Innovation Precinct at UNSW has taken another significant step with the signing of an agreement between UNSW and Jiangsu Industrial Technology Research Institute. The UNSW-Jiangsu Industrial Technology Research Institute Collaboration Fund is an \$8 million investment that will support 10 major projects in technological innovation undertaken by UNSW researchers and Chinese institutes. Professor Ian Jacobs, President and Vice-Chancellor of UNSW Sydney, says the investment will provide a further boost to collaboration between UNSW and China that will drive innovation in the fields of advanced materials, biotechnology, energy, and environmental engineering.



Dr Aliza Werner-Seidler, Dr Michelle Tye and Dr Jelena Rnjak-Kovacina.

Researchers are Tall Poppy winners

Three UNSW researchers have won 2018 NSW Young Tall Poppy Science Awards from the Australian Institute of Policy and Science (AIPS), recognising their commitment to the country's scientific research and communication.

Dr Jelena Rnjak-Kovacina, a senior lecturer from the School of Biomedical Engineering, has been recognised for research into effective treatments for damaged heart tissue caused by heart attacks. Her research explores the use of bioengineered tissues, such as cardiac patches, that can replace dead and damaged heart tissue.

Dr Aliza Werner-Seidler and Dr Michelle Tye, both from UNSW Medicine and the Black Dog Institute, have been recognised for their work in mental health, including depression and anxiety prevention programs for young people.

Werner-Seidler has developed a smartphone application called Sleep Ninja, a gamified app to prevent insomnia and depression symptoms based on cognitive behaviour therapy. The intervention is being taken to trial in 400 NSW schools.

Tye has been recognised for her recent work on improving early detection and prevention of suicide. She has been trialling innovative, evidence-based prevention programs such as the Good Behaviour Game (GBG) in primary schools, which is based on behavioural and emotional regulation through delayed, shared reward. She is also using suicide data to develop suicide risk profiles for local regions.



Professor Jason Abbott and Health Minister Greg Hunt at the launch of the National Action Plan for Endometriosis.

Abbott set to lead endometriosis trials

UNSW Sydney Professor of Gynaecological Surgery Jason Abbott is to chair Australia's first National Endometriosis Steering Group for the next five years.

Australia's first National Action Plan for Endometriosis has been launched to improve the quality of life of patients through better treatment and diagnosis, and to provide an outline for the path to ultimately find a cure.

Of the \$4.7 million in funding pledged by the government, \$2.5 million is dedicated to rolling out the National Endometriosis Clinical and Scientific Trials Network (NECST Network), allowing patients to take part in a coordinated national research program to improve diagnosis and treatment plans.

Abbott will lead the national trials network, which will include an online capability, matching biological samples and databases to facilitate the roll out of large-scale clinical trials.

"Ten percent of women have endometriosis," Abbott says. "It is a substantial cause of morbidity and lost productivity. It has a major impact on fertility and often occurs when women are establishing careers, further education and family. One of the most difficult things is it can stop women reaching their full potential."

"The spotlight on the disease makes it easier for women to talk about it and helps debunk the myth that endometriosis is just bad period pain."

UNSW LEADS MAJOR PROJECT IN NEW AIRPORT PRECINCT

In an Australian first, the NUW Alliance (the University of Newcastle, UNSW Sydney and the University of Wollongong) and Western Sydney University will jointly deliver a world-class higher education and research presence in Western Sydney. The 'Multiversity' will be part of the Aerotropolis precinct at Badgerys Creek. The universities have signed a Statement of Intent with the NSW government to deliver the new higher education institution, a campus that will create strong links to local industry, tailored vocational education and training, and STEM-focused schooling. The Western Sydney Aerotropolis will be a thriving hub for education and leading industries including advanced manufacturing, aerospace, defence and agribusiness.

REES APPOINTED TO THE SUPREME COURT



UNSW Law alumna and Eleven Wentworth chambers member Kelly Rees has been sworn in to the bench of the Supreme Court of NSW. Justice Rees

(pictured) is the 11th woman appointed to the Court, having been a commercial barrister at the Bar for 20 years. She took silk in 2012. "As a specialist in commercial disputes, property and insurance law, professional liability, and commissions of inquiry, Ms Rees brings a wealth of legal knowledge to the bench," NSW Attorney General Mark Speakman said before the appointment was made.

RETHINKING ORIGINS OF LIFE EARNS FILM FESTIVAL AWARD

The UNSW TV documentary *Life on Earth – and Mars?* was named Best Documentary at the inaugural Cano Mocs and Docs 2804 Film Festival, an event for documentaries and mockumentaries on STEM themes. The documentary explores how a discovery in the Pilbara region by a team from the Australian Centre for Astrobiology at UNSW challenges the belief that life on Earth originated in the oceans, and what that means for the search for evidence of life on Mars. The film festival was held at The Age of Fishes Museum in Canowindra, in central western NSW, and supported by the Country Education Foundation, which supports young people to pursue post-high school education and training. The documentary can be seen at – <https://youtube/UdMKO2l-DzA>



Delegates from UNSW Sydney join the China Centre team at the official opening, from left: Laurie Pearcey, Fiona Docherty, An Daochang, Professor Ian Jacobs, Graeme Meehan, Xie Jiangang, Ding Huanhuan and Rachel Wei.

New China innovation centre to become research hub

UNSW Sydney has opened a new interdisciplinary centre focused on innovation in the heart of one of Shanghai's major hubs for higher learning, modern industry and technology.

The UNSW China Centre in the Yangpu Changyang Innovation Valley was opened by UNSW President and Vice-Chancellor Professor Ian Jacobs.

The Centre will support the University's mission by advancing research and education partnerships, recruiting international students and developing opportunities for UNSW students in China.

The University's China-based alumni will also benefit from employment and networking opportunities. The Centre will work with leading companies to identify industry trends and prospects.

Jacobs said the new office solidified UNSW's links to China and gave UNSW an edge in one of the world's largest economies.

"As a leader in international education and in the China market, it is critical for UNSW to have a permanent presence in China's largest city," said Jacobs. "We believe in the potential of global partnerships to transform society for the better."

The Centre is managed by UNSW International China Country Director Rachel Wei and puts UNSW closer to its strategic partner Shanghai Jiao Tong University. It will also put UNSW in the same business park as key Torch Innovation Project partner TusHoldings.



Associate Professor Lucy Marshall is looking to change attitudes and correct misperceptions.

Engineering faculty takes the lead on equality

Associate Professor Lucy Marshall has been appointed Associate Dean for Equity and Diversity for the Faculty of Engineering at UNSW Sydney, the first such position created by any UNSW faculty.

Marshall, until recently a Future Fellow in the School of Civil and Environmental Engineering, will work with Professor Eileen Baldry, who holds the corresponding role for UNSW. Together they will work on plans, practices and policies to provide an inclusive, equitable and respectable environment for all staff and students.

Marshall will also chair the faculty's equity, diversity and inclusion committee.

"This role is really important for the faculty – and it's well aligned with the University's 2025 strategy," Marshall says.

Gender equity is high on her agenda. Reaching the target of women holding 40 per cent of senior positions in the faculty by 2025 will require changes in attitude.

"I think there's a perception that the number of women who come through engineering ... is quite small and that this is the reason why the proportion is small at academic levels as well," she says.

"But that's not correct. If we have a look at our PhD students, we have 40 per cent women, for example, in my school."

But gender equity won't be her sole focus. "Socioeconomic diversity is something that I think is particularly important. We've also looked at cultural diversity and we have some plans to make sure that our PhD population is representative."

TRIO CHARGES INTO 40 UNDER 40 LIST OF SOLAR LEADERS

• Three rising stars from UNSW's School of Photovoltaic and Renewable Energy Engineering (SPREE) have made the prestigious "40 Under 40" list for solar professionals. The award recognises those aged under 40 whose work is influencing solar technology development at a global level. Faculty of Engineering Dean Professor Mark Hoffman says Associate Professor Bram Hoex (39), Scientia Fellow Dr Brett Hallam (32) and Post-Doctoral Fellow Dr Alison Ciesla (32) thoroughly deserve the recognition and prestige that comes with the award.

SIMMONS ADMITTED TO ROYAL SOCIETY OF LONDON



• UNSW Sydney Scientia Professor Michelle Simmons has joined nine other Australian scientists officially admitted this year to the world's oldest independent scientific academy, the Royal Society of London. The Royal

Society is a self-governing fellowship made up of the most eminent scientists, engineers and technologists from the UK and the Commonwealth.

Simmons (pictured), the 2018 Australian of the Year, is believed to be the first female quantum physicist to join the academy in its 358-year history.

DE SOMER APPOINTED MEDICINES CEO



• UNSW Medicine alumna Elizabeth de Somer has become the first woman to be appointed chief executive officer of Medicines Australia, the country's peak body representing

the innovative medicine industry.

Ms de Somer (pictured) has worked at the front lines of the medical field for decades, as an intensive care nurse, clinical trials coordinator and Clinical Research Associate. After completing her Master of Pharmaceutical Medicine, she moved away from clinical research into regulatory affairs and manufacturing, before entering the world of medicines policy.



The Australian High Commissioner to India, Harinder Sidhu, speaks at the opening of the new India Centre.

New India Centre supports landmark research partnerships

The new UNSW India Centre in New Delhi is part of the University's efforts to build a strong presence in India and further build Indian-Australian relations.

Under the India 10 Year Growth Strategy, UNSW has been making targeted investments in developing transformative partnerships in India.

Led by distinguished Indian diplomat and former Consul-General to Sydney, Ambassador Amit Dasgupta, the centre will support the University's efforts to build research and education partnerships in India and will be a hub to facilitate the recruitment of high-quality students spanning undergraduate, postgraduate and higher degree research cohorts.

The centre will also support UNSW's growing portfolio of in-country programs such as the Global Business Practicum.

UNSW Pro Vice-Chancellor International Laurie Pearcey says the office solidifies UNSW's links to India at an exciting time in the Australia-India relationship.

"In order to build our engagement with India in the long-term, it is essential that we become part of India's rapidly evolving academic and research ecosystem and an active partner in building India's intellectual and social capital," he says.

The opening came within a week of the release of Australia's India Economic Strategy to 2035, which is set to shape Australia's India policy. Education featured as the priority sector to drive ties between the countries over the coming decades.



Timothy Walker, Christos Tsiolkas and Mary Journazi at the NIDA workshop.

Tsiolkas and Zournazi dementia play workshopped at NIDA

A simpatico moment over a casual meal sparked an artistic collaboration between Christos Tsiolkas and Mary Zournazi that has spanned more than seven years.

The award-winning author and the UNSW academic and filmmaker met at a Greek authors' event 20 years ago. Tsiolkas – now best known for his international success, *The Slap* – was discussing the work that would become his novel *Dead Europe*.

Zournazi was struck by the power of his writing and they stayed in touch. Years later, she discussed with Tsiolkas ideas for a play about family, dementia and the ethics of care. In 2011, they began exploring characters and situations.

The work-in-progress script centres on Augie, a father with dementia, and his relationship with his carer, as well as issues of care, responsibility and inheritance.

In September this year, having written three drafts, Zournazi and Tsiolkas presented their manuscript for a workshop.

"We've been the actors, now we actually have to have other people embody the roles so we can start to see the characters, start to see the language, and what's working and not working," Zournazi says.

Actor Lex Marinos, a UNSW alumnus, read the role of Augie in the NIDA workshop, with Camilla Ah Kin reading his carer, Yuli.

The workshop explored elements of the drafts under the dramaturgy of acclaimed Australian playwright and screenwriter Stephen Sewell (*The Boys*, *Chopper*).

WONG APPOINTED TO MALAYSIA'S TOP COURT

- An alumnus of UNSW Law is the first person in the school's history to be appointed to the apex court of a nation. Justice David Wong, who graduated from UNSW with a Bachelor of Commerce in 1976 and Bachelor of Laws in 1977, has been appointed to the Federal Court of Malaysia. Justice Wong, who has just ended five years of service on the Court of Appeal of Malaysia, says the Law Faculty has been instrumental in his career.

KAYESS' UNITED NATIONS DISABILITY POSITION



- Rosemary Kayess, the Interim-Director of UNSW's Disability Innovation Institute, has been elected to the UN Committee on the Rights of Persons with Disabilities. An internationally respected lawyer, researcher and academic, Kayess (pictured) is a

Visiting Fellow at UNSW Law, and Senior Research Fellow at UNSW's Social Policy Research Centre. Her research and advocacy include access to justice, social inclusion, housing and employment. Kayess says she is proud and humbled at her election and looks forward to the task ahead.

LEADING THE CHARGE ON DISRUPTIVE CHANGE



- UNSW Law has partnered with KPMG and King & Wood Mallesons to establish the Chair in Disruptive Innovation and Law. The five-year partnership supports research and education in the financial technology

(fintech) and regulatory technology (regtech) sectors. UNSW Scientia Professor Ross Buckley (pictured), a world-leading scholar in international financial regulation, is the inaugural chair. The establishment of the Chair places UNSW, and Australia, at the forefront of disruption and technological change that is significant to legal, banking and other sectors globally.



Professor Deborah Lupton will conduct research relating to digital health and translational research.

Lupton to research how data helps track health

Professor Deborah Lupton, UNSW's newest hire under the Strategic Hires And Retention Pathways (SHARP) program, will explore how digital health technologies, big data and self-tracking apps are changing the way we manage our health.

Lupton was a third-year sociology undergraduate at ANU when she studied two subjects that would set the direction of her academic career.

"One was Sociology of Health and the other one was Sociology of Everyday Life, and I just found them fascinating," says the internationally renowned researcher, who will start at UNSW next year.

"They both raised really interesting questions about how people engage with their experiences with health and illness, their practices of trying to protect their health, or if they are sick, where they seek support and information."

Lupton will conduct research relating to digital health and translational research, heading up two programs: Critical Digital Health Studies and Living Data.

Lupton says Living Data will investigate the data generated by people using digital health technologies – and how people make sense of it. In Critical Digital Health Studies, she will build on her research in digital health technologies.

"What I'm finding ... is that even though everyone Googles initially, they still value medical expertise and want to place their trust in what their doctor can tell them."



Members of the UNSW Business School alumni panel Yanti Ropeyarn and Rebecca Harcourt.

Business plays big role in NAIDOC women's conference

UNSW Business School played a vital role in this year's NAIDOC Aboriginal and Torres Strait Islander Women's Conference, which organisers say was the largest gathering of Indigenous women in more than 32 years.

The school was a major sponsor and students, staff and alumni were involved as ambassadors, speakers, panellists and curators. More than 600 Aboriginal and Torres Strait Islander women attended the conference, which had the theme Because of Her, We Can.

UNSW Business hosted a panel of alumni that discussed how Aboriginal and Torres Strait Islander women are navigating change. It was chaired by Rebecca Harcourt, UNSW Program Manager for Indigenous Business Education.

The panellists stressed that, despite a lot of work having taken place towards improving Indigenous representation in the workforce, there was still some way to go.

Lucy Brereton, Indigenous Programs Coordinator at the Commonwealth Bank, said people who are employed should aim for decision-making roles – and be supported to make their way up.

"We need to work towards our own businesses and build intergenerational wealth," Brereton said.

Also on in NAIDOC Week was UNSW's Indigenous Winter School program, which provides Indigenous high school students with a week-long taste of university life, aiming to foster lifelong learning.

ENGINEERING HUB OPENS DOOR FOR WESTERN SYDNEY STUDENTS

• UNSW Sydney is launching an Australian-first collaboration with Western Sydney University to develop a world-class Engineering Innovation Hub in Parramatta. The universities are developing a custom-designed, 15-storey Hub in the Parramatta CBD to house a joint undergraduate engineering program, and corporate offices, to be completed by 2021. Announcing the enterprise, the Premier, Gladys Berejiklian, said it was a "visionary concept". UNSW President and Vice-Chancellor Professor Ian Jacobs noted the joint venture would create a new standard in engineering students. "We are proud to partner with Western Sydney University to deliver a state-of-the-art facility for teaching, research and industry collaboration in the heart of Parramatta."

HARCOURT AWARDED AC



• One of Australia's most eminent economists, UNSW Business School's Professor Geoffrey Harcourt, has been awarded the highest honour in the Queen's Birthday 2018

Honours List. Harcourt (pictured) was made a Companion (AC) of the Order of Australia "for his eminent service to higher education as an academic economist and author, particularly in the fields of Post-Keynesian economics, capital theory and economic thought". Harcourt has had a distinguished academic career spanning almost 60 years, including several decades at Cambridge University.

ALUMNA APPOINTED MACQUARIE CEO



• In what's been hailed as one of the most significant female appointments of the year, UNSW Law and Business alumna Shemara Wikramanayake

has been named CEO of Australia's biggest investment bank, Macquarie Group. The 56-year-old rises to the role, replacing the retiring Nicholas Moore, from her position as Head of Macquarie Asset Management. Wikramanayake, who graduated from UNSW in 1985, was last year recognised for her achievements and leadership with a prestigious UNSW Alumni Award.

GLOBAL REWARD FOR THE FATHER OF PHOTOVOLTAICS

Martin Green's groundbreaking career has been recognised with a new international honour.

By Louise Caldicott

UNSW Professor Martin Green has become the first Australian to receive the prestigious Global Energy Prize. In a ceremony in Moscow, he was recognised for his research, development and educational activities in the field of photovoltaics.

The annual Global Energy Prize was presented to Green by Russian Minister of Energy Alexander Novak in Moscow, Russia. The award honours outstanding achievement in research and technology and is designed to address some of the world's most pressing energy challenges.

Reflecting on his award, Green thanked his wife, "my own renewable resource", for giving him the freedom to pursue his passion. He also paid tribute to the "thousands of solar researchers

Director of the Australian Centre for Advanced Photovoltaics Martin Green with his award in Moscow.



who have worked in the field for many years, including those at UNSW and elsewhere who have helped not just make PERC [solar cells] a reality, but also to bring it to market and to have driven such scale”.

Green, who is Director of the Australian Centre for Advanced Photovoltaics at UNSW, was honoured for having “revolutionised the efficiency and costs of solar photovoltaics, making this now the lowest cost option for bulk electricity supply”.

He shares the prize and RUB39 million (\$820,000) prize money with Russian scientist Sergey Alekseenko, an expert in thermal power engineering.

They were selected from 44 contenders from 14 countries by a committee of leading scientists.

The prize is rated as one of the world’s 99 major science awards by IREG List of International Academic Awards with a reputation score of 0.48 (a Nobel Prize has a score of 1.0). The 10 finalists this year included businessman and engineer Elon Musk.

Green is a world-leading specialist in both monocrystalline and polycrystalline silicon solar cells, and the research group he founded in UNSW Engineering is the largest and best-known university-based photovoltaic research group in the world.

The enormous reductions in costs in photovoltaic solar systems in recent years directly related to his scientific efforts,

largely through the work of his students in establishing manufacturing centres in Asia.

His record-breaking achievements stretch across decades. In 1989, his team supplied the solar cells for the first photovoltaic system with an energy conversion efficiency of 20 per cent. And in 2014, he headed the development team that first demonstrated the conversion of sunlight into electricity with an energy conversion efficiency of 40 per cent.

‘We are proud of Martin’s inspirational leadership and pioneering research which is helping address the challenge of climate change.’

PROFESSOR MARK HOFFMAN

Among his many breakthroughs, he invented the PERC solar cell, which accounts for at least a quarter of the world solar cell manufacturing capacity and has a rapidly increasing market share due to its greater efficiency over other types of cells. PERC solar cells are now becoming a commercial standard throughout the world, with sales exceeding US\$10 billion in 2017 and predicted to exceed US\$1 trillion by 2040.

“The time of solar has arrived and this is good news for the world,” Green said in his acceptance speech.

“The PERC cells pioneered by UNSW now reflect 50 per cent of world production. During that time, we’ve seen solar move from expensive energy to inexpensive energy. Our work on PERC has driven that.”

UNSW President and Vice-Chancellor Professor Ian Jacobs congratulated Professor Green on his achievement.

“This award cements Martin’s position as the leading photovoltaics researcher in the world. His work has delivered transformational outcomes in renewable energy for more than three decades and will continue to produce major economic and social benefits.

“This honour is as exceptional as it is fitting and we warmly congratulate him.”

UNSW Dean of Engineering Professor Mark Hoffman said: “The global impact of the work of Martin and his research team has been profound. They have created the highest efficiency solar cells using techniques that have made them accessible to the world through commercialisation. And all of this has been achieved in Australia.

“We are proud of Martin’s inspiration leadership and pioneering research which is helping address the challenge of climate change.”



Energy award is the latest in a long line

The use of Professor Martin Green’s PERC solar cells (solar cells with passivated emitter and rear surface) is predicted to save at least \$750 million in power-production costs in Australia alone over the next decade.

Green is also co-inventor of the laser-doped, selective emitter solar cell, used in solar panels which were sold by the company Suntech between 2009 and 2011.

He is also a pioneer in the area of perovskite photocells, which he believes could be used as a supplement to silicon solar panels, with a combination of the two materials potentially able to further reduce the cost of electricity.

So it’s no surprise that Green is the winner of many scientific and industry awards. In 2003,

he was awarded the Karl Boer Solar Energy Medal of Merit for “significant pioneering contributions to the promotion of solar energy as an alternative source of energy”.

In 2004, he received the World Technology Award in the field of energy, and in 2007 the SolarWorldEinstein Award for “outstanding work in the field of solar energy”. He is the holder of many patents and the author of eight books as well as more than 750 publications.

The Global Energy Prize was established in Russia in 2003 through the Global Energy Association, with the support of Russian Energy companies Gazprom, FGUCES and Surgutneftegas. The winners are chosen by a committee of 20 leading scientists from 13 countries.

From the grounds up

Student-led coffee start-up Bugisu Project is thinking big, with gender equality, fair distribution of profits and a zero waste policy as defining goals of the business, write *Kate Stanton and Penny Jones.*

Driving development in Uganda: Bugisu Project's Darcy Small and Daniel Okinong.



Some of the world's best coffee grows along the fertile slopes and valleys of Mt Elgon, an extinct volcano in eastern Uganda, students Brody Smith and Darcy Small learned when they visited the country last year.

Sydney's coffee connoisseurs have since confirmed it. "It just has a really nice, unique taste," says Smith, a sixth-year Biomedical and Mechatronics Engineering student.

The pair travelled to Uganda to work with local agriculture students as part of an exchange between UNSW Engineering and Uganda's Gulu University.

They were particularly struck by the disconnect between coffee-obsessed Australians back home and the people growing coffee beans in Uganda.

"It was just the absurdity of how little these farmers are paid for their produce and how much we pay for a cup of coffee in Australia," says Small, a fifth-year Photovoltaics and Solar Energy Engineering student.

The two learned of the Bugisu coffee-growing region surrounding Mt Elgon through their conversations with Daniel Okinong, a Gulu University student who grew up nearby.

"Daniel blew us away, not only with his knowledge of local agricultural practices but also world economies and business," Smith says. "He told us about the experiences of the coffee farmers and the multiple challenges they face.

"They're creating this high-quality product. But for a lot of geographical, historical and political reasons, they have not been able to get their product out there."

Their conversations with Okinong were the catalyst for Bugisu Project, a student start-up that aims to supply ethically-sourced coffee from Ugandan farmers to Australian businesses.

"Australia has an \$8 billion coffee market and people are becoming more ethically aware and interested in transparency with the supply chain," Smith says.

"With Daniel's early help, we realised we could generate ongoing impact in Uganda through an ethical business that satisfies Australia's love of coffee."

This month, Bugisu Project commenced their soft-launch with five Australian workplaces on board. They're planning for a large-scale launch in early 2019. As a not-for-profit, the enterprise plans to channel

funds into charities and NGOs in Uganda.

In Australia, Bugisu Project will also be a zero-waste coffee supplier by packaging coffee in reusable jars and composting coffee grounds they collect from the partner businesses.

Small says Bugisu Project has been a labour of love, but one they couldn't have pursued without the help of their UNSW contacts.

"We are by no means experts in ethical procurement, or setting up an import/export business," says Small. "But that's been the exciting thing. We're talking to as many people as we can and learning as we go.

"It's a complex space that even experts make errors in, so we want to do our research properly."

When Smith and Small returned to Australia, they consulted with the UNSW Engineering Student Opportunities team, recruited a few more students and started firming up their business model.

They joined a UNSW pre-accelerator program and undertook a one-week coffee trial with several Sydney workplaces, which were able to give their stamp of approval to the Bugisu beans.

"That's when we realised that, yes, it

A taste for it: Bugisu project's Monica Wang, Brianna Kerr, Brody Smith and Darcy Small hope to have 15 companies on board by January.



Photo: Chrissie Hall

'We're giving people coffee that is more than just coffee ... There are profits being generated for good.'

BRIANNA KERR

really is high-quality stuff," Small says.

In July, Smith and Small travelled back to Uganda to visit farmers, potential development partners and experts in the international coffee trade.

They spent the first week in Mbale, the town beneath Mt Elgon, visiting farmers and researching how the coffee is produced – with Okinong as their guide and cultural advisor.

"It was really cool to be running this trip ourselves, and Daniel was excellent at interacting with local people and helping us learn as much as we could."

The team also met with Zukuka Bora, a farmers' collective that educates farmers and makes sure they're being fairly paid for their produce.

"We visited several of the large coffee companies in the town, to cross-check what we'd learnt about Zukuka Bora and we spent a few days on the mountain visiting the farmers themselves to verify everything we'd heard first hand," Small says.

They spent the second half of the trip in the Ugandan capital, Kampala.

"We met as many different experts in the development space, the cultural space and the environmental space as we could to

make sure that what we are planning to do is aligned with what the experts in Uganda think is important," Small says.

Back at UNSW, students Brianna Kerr and Monica Wang joined the project as Director of Impact and Director of Finance. Kerr, in her final year of Development Studies, says the team signed their first official funding partnership with the Love Mercy Foundation, a Uganda-focused organisation run by UNSW alum Caitlin Barrett.

Love Mercy runs Cents for Seeds, a program that provides loans in the form of seeds for Ugandan women to plant crops.

"When the boys went to Uganda, gender equality was something they identified as an issue, particularly in terms of unrewarded and informal labour," says Kerr. "Women in Uganda can use the seeds they receive from Love Mercy to grow enough produce to feed their families, repay their loan and use the excess to send their children to school or invest in a small business.

"We're giving people coffee that is more than just coffee. When they drink Bugisu, they are doing more than waking themselves up. There are profits that are being generated that are doing good. So it's a no-brainer for

companies to jump on board," she says.

By January of 2019, Bugisu Project hopes to have partnered with 15 companies, all paying to provide Ugandan coffee to their employees.

They are also working on a system that will allow them to collect coffee grounds and use them as ingredients in skin care products, which can then be delivered back to the businesses for their use.

"Our ongoing vision is to demonstrate the idea of circularity – the way our coffee grounds go back into useful products and our finances go back into Uganda," says Small. "We want to use our business to demonstrate that you can successfully run a not-for-profit, pay your staff and generate amazing impact."

If your workplace would like to generate lasting impact by drinking specialty coffee with a smaller footprint, get in touch with the team for a trial.

Go to www.bugisuproject.co or email team@bugisuproject.co for more information.

Bugisu's captivating Virtual Reality showcase of the coffee's origins is also available on request.

Voices of reason on refugees

Frustrated by the distortions, two refugees funded a centre focused on the facts about people seeking asylum.

It was October, 2013 just a month after Tony Abbott had won the federal election on the back of his ‘stop the boats’ campaign. Within days of coming into office, the new government had created Operation Sovereign Borders – a military-led, border security operation – which was the first step in a series of hard-line asylum policies.

It was hard to believe that this was the same Australia which, after the Second World War, had taken in 170,000 refugees from Europe, and which had welcomed Vietnamese refugees in the 1970s.

Over the course of the past two decades, this wealthy, multicultural country had drifted away from well-established principles of protection for refugees, and from the international leadership it had shown in shaping and supporting the 1951 Refugee Convention. Now, Australia’s backslide was accelerating at speed, driven by the momentum of ugly politics. As sharply as borders defined its territory, border policy was dividing its community.

Into this atmosphere UNSW Sydney launched the Andrew & Renata Kaldor Centre for International Refugee Law. It was supported by two philanthropists who had come to Australia as post-war refugees. “We didn’t hesitate,” says Andrew Kaldor AM. “We had become increasingly frustrated by the misinformation, the lack of evidence in the debate about asylum-seeker issues.”



‘One of the vital roles a centre like ours can play is in keeping governments to account.’

JANE McADAM

The prevailing, proliferating politics gave an immediate urgency to the Centre's mission, which is to produce rigorous research on refugee law, and to bring the results of that work to bear on public policy and debate at the Australian, regional and international levels.

"It was an enormous privilege to be charged with creating and leading the Centre," says its director, Scientia Professor Jane McAdam. "But I also felt the weight of responsibility."

The Kaldor Centre quickly became a global go-to source for insight and analysis, noted for its in-depth academic research, its accessible popular books, and its now-essential weekly brief on refugee news from around the world.

"In an increasingly polarised debate around forced migration, a voice of reason, based in evidence, in law, is an incredibly valuable thing – and that's what the Kaldor Centre brings," says *Guardian* journalist Ben Doherty. "This is not just an issue for Australia, this is not just an issue for this region, or for rich countries or poor countries, but this will be one of the great global challenges of the 21st century."

The need for the Centre is arguably ever greater: the number of people displaced worldwide has reached a new record high each year since the Centre was established.

At the same time, some world leaders – United States President Donald Trump, Hungary's Prime Minister Viktor Orbán, and Marine Le Pen, leader of France's far-right National Rally party – have stoked fears about people seeking asylum. Other leaders, meanwhile, have shepherded and championed two new international instruments designed to engender greater international cooperation on people movement: the Global Compact for Refugees, and the Global Compact on Safe, Orderly and Regular Migration, which will be adopted by the United Nations General Assembly in December.

The Kaldor Centre deals directly with all of these contemporary dilemmas.

"One of the vital roles a centre like ours can play is in holding governments to account," says McAdam, who has been joined by a

team of outstanding researchers, including Professor Guy S Goodwin-Gill from Oxford, recognised as a pre-eminent scholar on international refugee law, and senior research associates Madeline Gleeson, Dr Claire Higgins and Dr Sangeetha Pillai.

"The legal and policy landscape has shifted considerably in the past five years, and the Centre has been at the forefront of debates, reminding governments of the international legal obligations they have voluntarily



'Public and policy engagement is really part of our DNA at the Kaldor Centre.'

FRANCES VOON

accepted, and by which they remain bound," says McAdam, lauding the team for not only continuing their longer-term research, but also for the reports, policy briefs and parliamentary submissions produced in response to current debates.

"Public and policy engagement is really part of our DNA at the Kaldor Centre," notes Executive Manager Frances Voon. "We exist to generate research with impact – and that means that we are constantly making sure the findings of our research are shared with those who are able to influence policy ... through media commentary, engaging with policymakers through briefings and high-level round-tables and convening events

that can help to highlight good practice and inform the general public."

The Centre's research also feeds into strategic litigation – and it is in the process of creating a new network of scholars who can support that more widely. Likewise, the Centre's growing global Emerging Scholars Network helps rising academic stars learn from one another, including through an Asia-Pacific Research Group that is encouraging further scholarship within the region. The Centre also has formed partnerships with the Refugee Studies Centre at the University of Oxford, and the UN High Commissioner for Refugees (UNHCR).

UNHCR's Regional Representative, Thomas Albrecht, has called the Kaldor Centre the best organisation of its kind he has seen around the world in the past 30 years. "No other entity has achieved such a catalytic role," he says.

UNSW Dean of Law George Williams AO is immensely proud of the Kaldor Centre's accomplishments. "It has rapidly established itself as the leading research Centre of its kind anywhere in the world. It is distinctive not only for the quality of its research, but for the impact it is having on public debates in Australia and around the world."

This is particularly so when it comes to the links between climate change, disasters and displacement, an area where McAdam's scholarship has been pioneering. "The Global Compact on Migration contains important language on protecting people moving the context of climate change and disasters. [That] would not have been possible without the conceptual work done by the Kaldor Centre," says Walter Kälin, Envoy of the Platform on Disaster Displacement.

"Everything we do at the Kaldor Centre is ultimately about securing safe, durable and humane outcomes for the world's displaced people," McAdam says.

Andrew Kaldor agrees. "Renata and I are delighted by the Centre's success. We feel privileged to be involved with such a brilliant team. But attitudes and policies toward refugees and displaced peoples are hardening around the world," Kaldor says. "The work of the Centre is needed now, more than ever before."

WASTE NOT, WANT NOT

If waste is burned for energy, recyclable material is lost forever. There are better solutions, writes *Veena Sahajwalla*.



The vast recycling problem facing communities around Australia has been a ticking time bomb.

With China's restriction of imports of foreign waste now responsible for increased stockpiling around the nation, prices for waste streams such as glass are at a low point. It is now cheaper to import than recycle glass.

The realisation that something needs to be done about this growing waste problem has come slowly to governments around Australia.

The call by former federal Environment Minister Josh Frydenberg for the incineration of waste to generate energy should only be part of the solution. Similarly, while Senate committee recommendations of a ban on single-use plastics by 2023 and a national deposit container scheme are commendable, a solution is available.

The process of burning waste to create energy means that recyclable materials are lost forever as renewable resources. This isn't the ideal way to look at materials – metals can be repurposed, and many plastics can be reused a number of times.

Microfactories with a footprint of just 50 square metres could turn waste into valuable resources, says Professor Veena Sahajwalla, Director of the Centre for Sustainable Materials, Research and Technology.

A team of researchers at the Centre for Sustainable Materials, Research and Technology (SMaRT), have developed a range of technologies to reform waste into valuable materials to be used in existing and new manufacturing processes.

In a paper published in the international publication *Journal of Cleaner Production*, the team reveals our latest research about a cost-effective new process for transforming mixed waste glass into high-value building panel products such as engineered stone, without high-temperature processing technology.

The people speak

The first of a series of surveys by UNSW to assess community attitudes to recycling finds that 65% of people still believe that recyclables they put in council bins will end up in landfill. The survey highlights growing disillusionment with recycling.

Just under half of respondents believe ecofriendly initiatives will have no effect in their lifetime. Just over 70% say they will recycle more if material is more reliably recycled. More than 90% say it is important for Australia to invest in microfactory technology to reform the most common waste.

This new recycling process has the potential to deliver economic and environmental benefits wherever waste glass is stockpiled, and is modelled on our recently launched electronic waste microfactory. Microfactories can operate on a site as small as 50 square metres and can be located wherever waste may be stockpiled.

We are now building the world's first microfactory that can effectively take recycled containers and materials put out in council bins and convert them into reformed materials such as metals alloys, plastic filament, particle boards and glass panels for building products.

Our microfactories eliminate the need for costly machinery, save on the extraction of yet more natural materials, and reduce the impact of burning and dumping waste.

A solution is at hand to treat the problem at the sites where the stockpiles are growing, addressing the waste and recycling problem and create revenue.

This article was originally published in the Australian edition of *The Guardian*.

A head start on trauma

UNSW's participation in Sculpture by the Sea was a major step in improving understanding of post-traumatic stress disorder, writes *Lucy Carroll*.



Sculpture by the Sea, one of the world's biggest outdoor sculpture exhibitions, this year featured a work by a UNSW team exploring the complexity of mental illness through video and sculpture.

It was only the second time a video installation was part of the exhibition, now in its 22nd year and visited by about half a million people annually. The work was among 100 sculptures by artists from around the world on the two-kilometre coastal walk from Bondi to Tamarama.

The interactive installation, *Look Inside My Mind*, was a collaborative work by UNSW's visual content manager Matthew Gill and his team, with UNSW Medicine, UNSW Psychology and UNSW Canberra.

Positioned at the steps on the edge of Tamarama's Marks Park, *Look Inside My Mind*, was a 2.5 metre androgynous, ageless resin head that gave visitors an imagined glimpse into an experience of post-traumatic stress disorder (PTSD) through a looping video seen through multiple viewing stations.

"On closer inspection the viewer realised there were three viewing holes positioned around the head," said Gill. "Within the sculpture is a three-minute audio and visual

sequence that depicted the lived experience of PTSD from the viewpoint of a returning soldier."

The video was based on research from UNSW Medicine's School of Psychiatry, UNSW Psychology, and interviews with male and female ex-service personnel who are UNSW Canberra alumni.

One of the contributors whose experiences of living with PTSD informed the video was Benjamin Farinazzo, a former Australian Army Officer and UNSW graduate who was diagnosed with PTSD after his return from East Timor where he served as part of the INTERFET Forces.

Experiences of PTSD, such as intrusive thoughts and flashbacks, heightened physiological reactions such as hyperventilation and anxiety, and dissociative symptoms such as derealisation, numbing and detachment, were represented through the video.

Professor Zachary Steel, from UNSW Medicine's School of Psychiatry, emphasised that raising public awareness of PTSD was crucial in improving understanding about the mental health disorder and removing stigma at a community level.

"PTSD is a major global challenge and capturing an experience of PTSD through video and the eyes of someone who has the disorder is highly valuable in providing a window for others to better understand the debilitating nature of this condition that often can go undiagnosed," Steel said.

"We are all familiar with the term PTSD. What we don't often understand is how someone can shift from high functioning to sudden impairment. PTSD can dramatically change a life, disconnecting people from family and friends. While it may resolve for some people who develop the condition, all too often it can become a chronic condition and cause difficulties not only for those directly affected but those who support and care for them," he said.

Professor Steel, a psychologist and the inaugural St John of God Professorial Chair for Trauma and Mental Health, a partnership between Richmond Hospital, UNSW Medicine and the Black Dog Institute, leads a joint research program in mental health, working closely with veterans and emergency service first responders as well as refugees, asylum seekers and populations affected by displacement.

TRIES & TUTES

UNSW student Ned Hanigan's rugby career is going so well that he jokes he might still be in lectures when he is an old man.

Hanigan, 23, started his Bachelor of Science degree back in 2014 as part of the Elite Athlete Support Program – attracted by UNSW's partnership with first-grade club Randwick.

But he is still only about three-quarters of the way to graduating after powering his way into the NSW Waratahs side and more recently becoming a regular in the Australia squad – to put himself firmly in contention for selection for the 2019 Rugby World Cup.

Thanks to the flexibility on offer within the Elite Athlete program, Hanigan has been able to defer university subjects as he has increasingly been required to travel around the world playing for the Wallabies and in Super Rugby competition with the Waratahs.

"I've worked out that the last quarter of my studies will take almost as long as the first three-quarters, so I will be at it a fair bit longer yet," Hanigan says. "I might end up being that middle-aged bloke that all the undergraduates hate, sitting at the front of the lecture asking all the questions!"

"I get a fair bit of advice about what's the best subject to do at a certain time. For example, at the start of 2018, our first six weeks of the Waratahs season we were playing a lot of away games in South Africa, Argentina and Japan, so to go into a laboratory-based subject where it would be three hours in the lab, plus a two-hour tute, plus a couple of lectures – I just would not be around for those contact hours," he explains.

"But if I look at the rugby fixtures and I'm only going to be away for a couple of weeks in the semester, then we can work out where I can catch up on that stuff. Helen Bryson [UNSW Elite Athlete Support Program manager] is very helpful to me and puts me in touch with a lot of the course co-ordinators to try to work these things out."

Hanigan, whose studies have focused on physiology and psychology, admits he is still



Ned Hanigan, Bachelor of Science undergraduate, explains to Neil Martin how the UNSW Elite Athlete Support Program helps him study while also playing rugby union for Australia.



TOP: UNSW student Ned Hanigan comes from the country town of Coonamble on the central-western plains of NSW. **ABOVE:** Hanigan (left) celebrates his Wallabies debut against Fiji in 2017 alongside Bernard Foley and Scott Higginbotham.

pinching himself to believe how far he has progressed in his rugby career in a short time.

Born in Dubbo and raised in the country town of Coonamble, he moved to Sydney at the age of 12 as a boarder at St Joseph's College – but only got into the first XV rugby side once he switched positions from outside centre to loose forward around the age of 16.

He was quickly noticed and selected in representative sides such as the Australian Schoolboys, which convinced him to stay in Sydney and start his degree at UNSW –

enticed especially by the partnership with Shute Shield powerhouse Randwick.

During his time studying at UNSW, Hanigan has become a regular with NSW Waratahs in the elite Super Rugby tournament and made his Australia debut against Fiji in 2017. He was then one of the youngest members of the Wallabies squad for their spring tour of Japan, Wales, England and Scotland, before being named 2017 Rookie of the Year at the Rugby Australia Awards, and is now a regular in the international set-up.

And it only promises to get even more exciting with the ultimate prize – the World Cup – on offer in Japan in September 2019.

"At the moment, rugby is obviously the most important thing in my life, but that doesn't take away from the importance of doing study – even just to keep your mind ticking over," Hanigan says.

"It still feels surreal to me every time I get the chance to pull on the Australia jersey. Even though I've had a bit of experience with it now, it's not like a normal game of footy."

"In terms of the 2019 World Cup, it's obviously something you aspire to get to, but if you look too far ahead of yourself you can miss what's in front of you and there's a lot of footy to be played between now and then."

Support a key to success

For one family, the resources available to support Indigenous people – including the Shalom Gamarada Residential Scholarship – have been especially valuable, writes *Diane Nazaroff*.

Danielle Captain-Webb says it's hard for her to say she's a role model for Indigenous youth.

But the 25-year-old mother-of-three, lawyer and UNSW graduate says she would like to think that she "can inspire people to overcome what they think are barriers and achieve what they want".

"I like to think that I'm able to show young Indigenous kids that no matter where you come from and no matter what people say about you or your abilities, you can achieve whatever you dream to do, you can do it," Captain-Webb says.

She says she also wants to inspire Aboriginal women, especially mothers, who think that they are not able to do things for themselves or study because they have children who they are caring for.

Like her husband, Jonathon, a Dughutti-Gomeri man, Captain-Webb was the first person in her family to attend university. They met at Shalom College, where they were both recipients of the Shalom Gamarada Residential Scholarship.

Her brother Steven Hobday, a second-year medicine student at UNSW, is also a recipient of the scholarship, which was founded 13 years ago by Shalom College's former president Ilona Lee AM and former UNSW Lecturer in Aboriginal health Professor Lisa Jackson Pulver AM.

More than 40 Indigenous students have benefited from a Shalom Gamarada scholarship – a partnership between Australian Indigenous Education Foundation, UNSW's Nura Gili Indigenous Programs Unit and the Muru Marri Indigenous Health Unit – which provides free accommodation, meals and tutoring support.



TOP: Jonathon Captain-Webb and Danielle Captain-Webb, with baby Djuralye, at the inaugural Aboriginal leaders dinner at Government House in July. ABOVE: Steven Hobday (centre) with the 2014 Australian of the Year, Adam Goodes, and Shalom Gamarada director Dr Hilton Immerman OAM at a fundraising event for the Wolper Hospital Foundation.

More than half of the scholarship recipients are now doctors, seven are lawyers and the balance a mixture of graduates from commerce, social work, architecture, optometry and aerospace engineering.

Captain-Webb was initially enrolled in a UNSW Diploma of Humanities bridging course, and was commuting three hours each way between Mangrove Mountain on the Central Coast and UNSW four days a week.

"It was crazy, I was leaving home at five in the morning," she says. "My marks were really average, I was so exhausted and I wondered how long I could keep doing this."

That changed after she received the Shalom Gamarada Residential Scholarship midway through her first year, she says. "By the end of that year, I got the marks I needed to transition into my law degree. I continued to get better marks, and by the time I finished my criminology degree I was getting distinctions and high distinctions."

She is now in her first rotation of the Legal Aid graduate program in Crime – Local Court at Gosford.

Her husband Jonathon, one of nine children from Redfern, says the scholarship was stabilising as it took away a lot of the pressures that come with being a university student.

"I was very lucky, as UNSW has a lot of support networks in place for Aboriginal people," he says. "The Nura Gili Centre was a great help to make the transition easier."

The 25-year-old says he spent a gap year in the Army – "a place that I could go to get those fundamentals to be the leader that I wanted to be" – before doing a transition program at UNSW, and then a double arts/law degree.

He now works at the NSW Aboriginal Land Council, where he is the design and implementation lead on the Western Sydney indigenous business and employment hub.

Danielle's brother Steven, 21, has served as a mentor on the Smith Family's Indigenous Youth Leadership Program and is keen to help his community through a career in medicine.

"I've always known that Indigenous health is garbage, compared to the rest of the Australian population," he says. "So my ultimate goal is to work in the community, preferably in the Aboriginal Medical Service."

Building on co-operation

The Institute for Global Development was a steadfast supporter when Pacific Island nations came together in Fiji to collaborate on improving facilities for residents.

By *Belinda Henwood*.

Sustainable infrastructure, better housing and poverty reduction were the goals when Pacific Island nations came together in Fiji. Seed funding from the Institute for Global Development (IGD) enabled UNSW Sydney to join forces with the Asian Development Bank Institute to hold the symposium, on Capacity Building in Green Infrastructure and Housing for Poverty Reduction.

Since 2016, the IGD has been co-ordinating the work of the UNSW community to contribute to achieving the UN Sustainable Development Goals. The aim is to develop local capacity in communities of greatest need through teaching, research and collaboration, both in Australia and overseas.

Last year, the IGD provided seed funding to nine projects across the University, including the first phase of a project led by Dr Sarath Mataraarachchi, Senior Lecturer in the Faculty of Built Environment. The objective was to bring together government and NGO representatives, academics, students and community members from all over the Pacific region and Australia. They would then collaborate on building capacity in developing sustainable infrastructure and housing maintenance to improve the quality of life of local communities.

As IGD project lead and symposium co-chair, Mataraarachchi worked with Senior Economist Dr Wawan Juswanto from the Asian Development

RIGHT: Permanent Secretary David Kolitagane with the Dean of the Faculty of Built Environment, Professor Helen Lochhead.

BELOW: Dr Sarath Mataraarachchi, Senior Lecturer in the Faculty of Built Environment.

Bank Institute (ADB) to identify and invite participants across the region as well as representatives from NGOs. IGD and ADBI then partnered with the World Bank, the University of the South Pacific, the University of Fiji and Plan International to hold the symposium in Nadi, Fiji, in June. Academics and industry practitioners from Australia also travelled to Fiji to present at the symposium.

Infrastructure challenges in the Pacific Islands differ from village to village, district to district and country to country. They range in scale from roads, bridges, submarine IT cables and waste management to housing with basic plumbing like sinks and tap fittings, and enough water for flushing toilets to operate – and they all need to be cyclone resistant.

Land tenure systems across the region are complex. Some countries share building codes as well as the construction-related skills needed to develop and maintain infrastructure. Covering the diversity is ambitious, and capacity building is key.

“There were a couple of reasons why we wanted to bring every Pacific country to the symposium,” Mataraarachchi says.

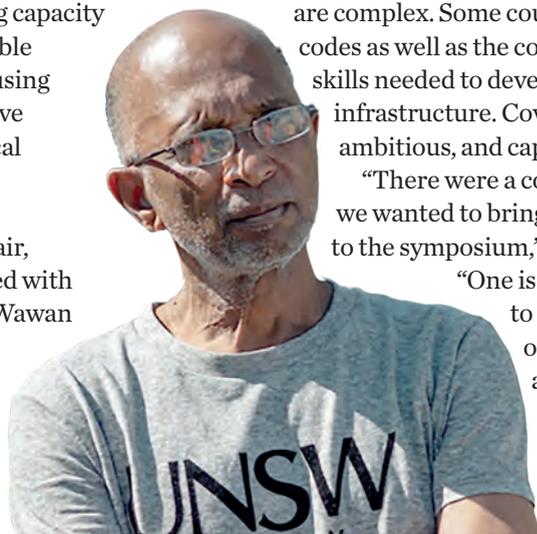
“One is for the representatives to understand each other’s challenges in achieving sustainable

infrastructure, adequate housing and poverty reduction. Secondly, we need to work as a group because these countries are small, and the scale isn’t there.”

As well as presentations about frameworks, assessment tools and accreditation, the formal program included practical workshops where participants identified their country’s most pressing infrastructure needs and their major obstacles. They then used the outcomes to build business cases, applications for funding and submissions. The focus was on improving community wellbeing using modern know-how and technology while not forgetting traditional knowledge and ways of living.

Site visits to a village, town and informal settlement in Nadi enabled members to see first-hand how the proven model links household health to basic infrastructure.

“I strongly believe we achieved the objective we set out to achieve,” Mataraarachchi says. “We wanted to show how planning can play a critical role in infrastructure development. And, as some of the public servants and community members said, for the first time, they understood how many aspects and elements are involved in infrastructure planning, and particularly in sustainable infrastructure planning.”



Graduate dines out on a series about cannibals

Chris Thompson's TV/web series about a young Australian girl growing up in a family of cannibals gets plenty of bites, writes *Lachlan Gilbert*.



A visit to Namotomoto village reinforces the power of small data

By *Belinda Henwood*

After her presentation at the Nadi symposium, Dr Simone Zarpelon Leao uncovered some significant small data being collected at the village level.

Leao is a Research Fellow in Urban Modelling and Simulation in the City Futures Research Centre whose work focuses on smart cities and big data. However, in a Fijian village she saw the value of small data.

"In Namotomoto village, which we visited during the symposium, I discovered that it has about 700 inhabitants and has had its own annual digital census, collecting demographics, employment and other information, for the past eight years," she says. "The information is detailed, about health issues such as when people get sick and those who have disabilities, as well as children who are attending school.

"It is more comprehensive than the official national census – in the Pacific Islands, the censuses are very intermittent and inconsistent."

Leao says the symposium presentations, workshops and site visits were a fantastic opportunity to look at sustainable infrastructure in a situation with limited economic resources and a high demand for infrastructure, as well as high vulnerability to natural disasters and climate change.

UNSW Art & Design Digital Media graduate Chris Thompson is bringing an unusual Australian cinematic venture to our screens, not least for its startling premise.

Patricia Moore is a coming-of-age horror flick about a young girl coming to terms with her itinerant family's dark secret: they're cannibals. Travelling around outback Australia in an old converted school bus, the family scrounges for prospective meals by using Patricia as bait.

But when the fridge in the bus breaks down near remote Charlton, the family is forced to spend time among the townsfolk ... who are becoming increasingly appetising. Patricia is drawn to a local teenager, Toby, and finds herself challenged by the family's No.1 rule: Never fall for the food!

Adding to the novel storyline is the innovative format used in the storytelling: nine 10-minute episodes to be consumed on mobile and streaming devices.

Thompson was the sole producer on this Aussie production which was born after winning a pitch to MIP TV, the Cannes Film Festival equivalent in the digital TV space.

The primary funding source was BlackPills, a digital streaming platform targeted at Millennials that enables them to download the episodes via an app on their mobile devices, or watch on smart TVs. The film also received backing from Screen Australia and Create NSW. Thompson says production costs of the first series topped \$1 million.

Patricia Moore had its first preview screening for cast and crew at the Chauvel in Paddington. Internationally, it has screened in Europe and America.

Shooting a film in 10-minute instalments posed some interesting challenges for Thompson and his crew.

"Because it's episodic, there is a dramatic shift in the storytelling process," Thompson



TOP: Writer/director Blake Fraser, actress Marlo Kelly (who plays Patricia Moore) and producer Chris Thompson. **ABOVE:** The family consider their intended meals to a freezer in their bus.

says. "Now you're looking at a cliffhanger every 10 minutes. That was a big learning curve. We've got a lot of great mentors and they make TV series, or they make feature films, while this is both and neither at the same time."

Confronting as the film's premise may be, Thompson sees it more as a sentimental family drama than straight horror.

"As much as we love her ... Patricia is somewhat of a monster conflicted about what the right and wrong thing to do is," he says. "Does she do what's right for her family or does she do what she feels is right?"

HALTING THE TOAD'S LONG MARCH

A group of scientists from UNSW Sydney, the University of Sydney, Deakin University, Portugal and Brazil have unlocked the DNA of the cane toad, the poisonous amphibian that is a threat to many native Australian species.

“Despite its iconic status, there are major gaps in our understanding of cane toad genetics, and up until now, no one had put the genome together,” says Peter White, project leader and Professor in Microbiology and Molecular Biology at UNSW.

A decade ago, researchers in WA had already tried to sequence the cane toad genome, but they encountered obstacles when it came to assembling it, and didn't complete the project.

For this project, the UNSW-University of Sydney team worked at the Ramaciotti Centre for Genomics at UNSW, which has played a role in decoding the genomes of other iconic Australian species, including the koala.

“Sequencing and assembling a genome is a complicated process. By using the cutting-edge sequencing technology and expertise available at UNSW, we sequenced 360-odd billion base pairs and assembled one of the best quality amphibian genomes to date,” says Senior Lecturer Dr Rich Edwards, lead author of the study.

“We managed to decipher more than 90 per cent of the cane toad genes using technology that can sequence very long pieces of DNA, which makes the task of putting together the genome jigsaw much easier.”

Having a draft cane toad genome will help to close key knowledge gaps and accelerate cane toad research. More toads can now be sequenced at a fraction of the cost, and the genome is freely available – anyone can access it now and conduct further research.

“Future analysis of the genome will provide insights into cane toad evolution and enrich our understanding of their interplay with the ecosystem at large – it will help us understand how the toad spreads, how its toxin works, and provide new avenues to try to control its population,” says cane toad

A group led by UNSW's Peter White has unlocked the DNA of the cane toad, arming scientists to stop the unloved species' spread in Australia.
By Isabelle Dubach.

expert and Emeritus Professor Rick Shine from the University of Sydney.

“Very few amphibian genomes have been sequenced to date, so this is also great news for amphibians. Having a reference genome could provide valuable insights into how invasive species evolve to adapt to new environments.”

Having the genome will also help researchers to find new options for controlling the toad population.

“Current measures like physical removal haven't been successful, but new methods to teach native species not to eat the toad – called taste aversion – give new hope. However, we need more approaches to control this invasive species,” White says.

For one such alternative measure – biocontrol, i.e. using a virus to help control the toad population – the toad's genetic material is essential.

“To find a virus for biocontrol, we need access to the toad's DNA and RNA,” explains Alice Russo, a PhD student at UNSW who specialises in finding potential viruses to control the toad. “DNA contains ancient fragments of viruses – the DNA of every animal can sometimes catalogue past infections.”

Viruses have previously been successfully used to control the European rabbit

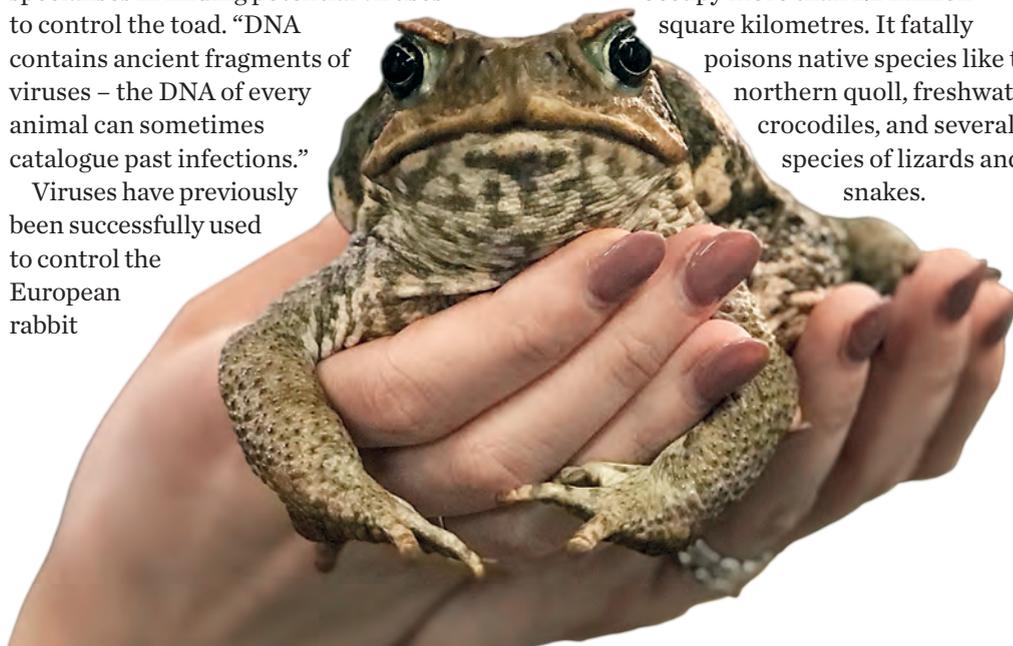
population. The issue with cane toad viruses studied so far was that they could potentially infect native amphibians – which is why this study aimed to find a cane toad-specific virus.

In a paper published this month in the *Journal of Virology*, the researchers describe how they sampled cane toads from different Australian locations and, using a combination of DNA and RNA sequencing, found three new viruses.

“Until we published this paper, only one family of viruses was known to affect the cane toad. This is the first paper that has found different viruses, which is very promising,” Russo says. “[It] has opened the door: we found a retrovirus, a picornavirus and a circovirus which are genetically similar to viruses infecting frogs, reptiles and fish. For two of them, we found a full genome – both could potentially be used as biocontrol agents.”

“There's a lot more work to be done. However, these two papers are the first – but most important – steps in finding an effective way to control the cane toad,” White concludes.

Cane toads are highly adaptable and have destructive impacts on native fauna in invaded regions, of which there are many; they are present in 138 countries. Since the toad was introduced in Queensland for control of the cane beetle in 1935, it has spread widely – millions of toads now occupy more than 1.2 million square kilometres. It fatally poisons native species like the northern quoll, freshwater crocodiles, and several species of lizards and snakes.



Fellowship a high note

Nicole Murphy, the inaugural recipient of the Australia Ensemble Emerging Composer Fellowship, is composing for some of UNSW's finest musicians. By *Belinda Henwood*.



Learning the piano as her first instrument, Nicole Murphy just assumed that if you played music, you wrote music.

“One day my mum heard me playing music that wasn’t my exam pieces. When I reluctantly told her that I wrote it, she took it to my piano teacher who photocopied it and gave it to other students,” she says.

“It felt strange, because it was just something I did for myself. That was the moment I realised there was a distinction between a performer and a composer.”

Murphy continued to write music. Then, towards the end of high school, her school choir attended a workshop with the composer Sarah Hopkins, who is based on the Sunshine Coast.

“It was the first time I understood that being a composer was a job – that there was someone who was alive, who was female, who was living in my local community and who wrote music for a living.”

Murphy is the inaugural recipient of the Australia Ensemble Emerging Composer Fellowship, which has been made possible by the generous support of Emeritus Professor of Marketing Roger Layton AM.

Layton is a long-time supporter of the Australia Ensemble at UNSW and

of Australian composition, as well as a member of the Australia Ensemble Advisory Committee. He and his late wife, Dr Merrilyn Layton, attended the ensemble’s concerts from its very early days.

“We enjoyed their music, we enjoyed their company and we were part of their development, and I would like to contribute to that,” Layton says.

‘There are so many composers worthy of an opportunity like this, so I feel really fortunate to work with these great musicians and to be more involved with UNSW.’

“I am particularly impressed with the first recipient, Nicole Murphy. She has outstanding talent and I find her work very touching and very stimulating. I think she is an extraordinary choice.”

During the one-year fellowship, Murphy will write two works for different instrumental combinations and hold a public workshop on at least one of those works. She will also have mentoring sessions with Dr John Peterson,

a composition staff member from the UNSW School of the Arts & Media.

Having recently finished her PhD, Murphy is forming her creative practice, which is a combination of teaching and composing.

“It’s trying to find that balance and make sure the scales don’t tip one way or the other. This fellowship gives me the chance to spend more time on the composing side.”

Murphy says every composition depends on finding something new to say in an expressive way that interests the audience and is a combination of challenge and reward for the performers. She takes a lot of her inspiration from other art forms – “some beautifully written text or really fantastic artwork”.

“The challenge for this fellowship is that the standard of performers is so high, and they are such stalwarts in the industry,” she says. “They have commissioned so much Australian music and collaborated with so many composers.

“We have such a thriving emerging composer community in Australia. There are so many composers worthy of an opportunity like this, so I feel really fortunate to work with these great musicians and to be more involved with UNSW.”

Top-end plan to fight climate change

Urban overheating is a lethal threat in Darwin. Researchers from the Faculty of Built Environment have calculated how many lives could be saved by changing the city. By *Diane Nazaroff*.

UNSW researchers have discovered a way to reduce overheating in Darwin by up to 2.5 degrees, lowering the risk to lives and lowering energy costs.

The High Performance Architecture Research Cluster at the Faculty of Built Environment says that mitigation technologies such as light-coloured reflective materials in pavements and roofs, along with urban greenery and shading, could help lower temperatures enough to save lives.

A study for the Northern Territory government is “very significant as it shows the tremendous impact of urban overheating on mortality, morbidity and energy, and the potential to improve our cities”, the project’s team leader, Professor Mat Santamouris, says.

“We found that mortality increased by 5 per cent for every 1 degree increase in daily maximum temperature. Mitigation of overheating across the city could save about 10 lives per year, per 100,000 residents.”

Urban overheating has a serious impact on human health and the economy because it increases the concentration of urban pollutants, affects urban air quality, increases energy consumption for cooling purposes and raises carbon dioxide emissions.

The team found that when temperatures in Darwin were higher than 32 degrees and the humidity was more than 80 per cent, there was a sharp increase in health complaints, raising the number of hospital admissions by 263 per cent.

Santamouris says the use of heat mitigation



Darwin’s lack of green space and natural environment has a significant effect on temperatures. Photo: Shutterstock

scenarios such as cool/green roofs and pavements, fountains, pools, ponds, additional greenery and shading could reduce the peak electricity demand by up to 2 per cent and the total electricity demand over the summer period by 0.8MVA.

He says the annual cooling-load saving from

households and will improve the quality of life in the city.”

Darwin is one of 400 cities around the world suffering from dangerous overheating as a “heat island”, which is the most documented phenomenon of climate change to date.

The city centre can be up to 6 degrees warmer than the airport, particularly during daytime.

Due to the city’s replacement of trees, wetlands and grass with artificial surfaces such as concrete, asphalt and buildings, Darwin has ambient temperatures which are generally hotter



‘The lack of urban green spaces and vegetation decreases the cooling effect of shade and evaporation from the ground and trees, while tall buildings and narrow streets trap the heat.’

PROFESSOR MAT SANTAMOURIS

greenery is estimated to be 88.4GWh, while the application of cool roofs and pavements is 214GWh.

“The application of a combination of greenery and cool roofs and pavements is an annual energy load saving of 265.2GWh,” Santamouris says.

“This is a very significant reduction of the energy needs in the city that will lead to an important decrease of the energy cost of

than Cairns or Denpasar.

“The lack of urban green spaces and vegetation decreases the cooling effect of shade and evaporation from the ground and the trees, while tall buildings and narrow streets trap the heat in the city,” Santamouris says.

Waste heat from cars, air conditioners and industrial activities has also been found to increase temperatures.

Groundbreaking project in Myanmar

Building work is underway for a new football pitch and hostel in Hpa-An to develop important sport-for-social-change programs, writes *Neil Martin*.

UNSW Football United have broken ground on a new sports and community centre designed to help bring peace and social cohesion in Myanmar.

Football United, an initiative out of the School of Public Health and Community Medicine, is a sport-for-social-change program that was founded in 2006 and has been running in Myanmar since 2013.

Now, thanks to an initial grant from the UEFA Foundation – set up by European football’s governing body – Football United are building a permanent facility in Hpa-An to develop and widen the reach of their activities.

The groundbreaking ceremony heralds the start of the process to construct a football pitch and hostel that will accommodate people attending residential courses at the site, with a second hostel and main meeting hall and office building to follow once further funding has been secured.

“A seed grant from UNSW in 2013 helped us to start this ‘football for social inclusion’ work in different Myanmar universities – the same as we’ve done in Australia. We have been self-funding the program since,” says Dr Anne Bunde-Birouste, the founder of Football United at UNSW.

“Then last year we got funding from the UEFA Foundation to set up a community centre which will focus on peace building through football and related activities. The football brings the whole community together and from there we are able to offer all sorts of different opportunities – various training, some social enterprise to address poverty, as well as English language teaching.”



Dr Anne Bunde-Birouste (in yellow), founder and CEO of Football United, helps to break ground for a new permanent facility in Hpa-An, Myanmar.

Since gaining independence from the United Kingdom in 1948, Myanmar has been ravaged by civil war and conflict among the large number of different ethnic groups across the country.

Kayin (formerly Karen) State, where the new Football United centre is being built, declared war on central government to defend their independent status as soon as national independence was granted. The 67-year conflict only came to an end in 2015 when a nationwide ceasefire between a number of different factions was agreed.

Football United hope their facility – which is due to open officially on January 7 – will help to build a continued peace, assist with reconciliation in the community and provide a vital social cohesion program.

Dr Tun Aung Shwe, who was born and raised in Myanmar, is a UNSW PhD candidate who has led the program’s development in his homeland.

“There are four different villages around the centre, so we will bring the local community of about 2000 people together – but it is designed to serve the whole Kayin State and ultimately the whole country,” he says.

“Once the centre is fully built, we would be able to invite anyone from across Myanmar to bring a group to stay here for a few days and be involved in the football-for-peacebuilding program.”

“We’ve designed it so it’s all modifiable, so the early structure will be able to have some meeting space as well as lodging. And then as we grow, we reorientate that until we get to the final set-up,” Bunde-Birouste explains.

“We are looking for A\$120,000 to fund the completion of stages 2 and 3 of the project, but we are very encouraged and we’ve already seen the positive power these programs can have. One of our great successes already is that former conflicting factions are working all together on this project.”

Framework for star wars

As US President Donald Trump demands his nation achieve military 'dominance in space', UNSW Canberra is leading a global effort to determine rules of conflict beyond our planet.



Photo: Shutterstock

Space and military law experts from Australia, the United Kingdom and the United States have joined forces to take the lead on understanding how our Earth-bound laws will be applied in times of armed conflict in outer space.

Some of the best legal and policy minds at UNSW Canberra, the University of Adelaide, University of Exeter, and University of Nebraska College of Law will draft The Woomera Manual on the International Law of Military Space Operations.

The Woomera Manual will become the definitive document on military and security law as it applies to space. The project will be completed in 2020 and will draw on the knowledge of dozens of legal and space operations experts from around the world.

The founding leaders of the project are: Professor Rob McLaughlin (UNSW Canberra), Professor Melissa de Zwart and Professor Dale Stephens (Adelaide), Professor Michael Schmitt (Exeter), and Professor Jack Beard (Nebraska Law).

"Conflict in outer space is not a case of 'if' but 'when'," says Melissa de Zwart, Dean of the Adelaide Law School, University of Adelaide. "However, the legal regime that governs the use of force and actual armed conflict in outer space is currently very unclear, which is why the Woomera Manual is needed.

"The few international treaties that deal with outer space provide very little regulation of modern space activities, including both military and commercial uses of space. Therefore, we need to cast our

gaze more widely in our approach to determining what laws are applicable in space."

Rob McLaughlin, Professor of Military and Security Law at UNSW Canberra, says: "Space is a key enabler for communications, surveillance and early warning, navigation systems, and is a critical security and conflict domain.

"Such extensive use of space by military forces has produced a growing awareness that space-based assets are becoming particularly vulnerable to adverse actions by potential competitors."

Michael Schmitt, Professor of Public International Law at Exeter Law School, University of Exeter, says we can no longer afford to ignore the legal implications of the military use of space.

"The four universities who form the founding partnership of the Woomera Manual project are committed to developing



Woomera Manual co-leader Professor Robert McLaughlin.

an agreed understanding, and then subsequent articulation, of how international law more generally applies to regulate military space activities in a time of rising tension and even outright armed conflict," he says.

Jack Beard, Associate Professor with the University of Nebraska College of Law, says: "The Woomera Manual will be drafted in the full tradition of other

manuals that have been developed by legal and policy experts over the last 20 years, including the San Remo Manual on Naval Warfare, the Harvard Manual on Air and Missile Warfare, and the Tallinn Manuals (1.0 and 2.0) dealing with laws applicable to cyber operations and warfare.

"Such manuals have proven to have a significant impact ... and we envisage that the Woomera Manual will have the same impact for the military uses of space," Beard says.

The danger of space

UNSW Canberra academics Dr Stephen Coleman and Reverend Doctor Nikki Coleman are military ethicists who say US President Donald Trump's directive to form a "Space Corps" comes with its own costs.

"The biggest concern is that such a move risks an escalation of the risk of space war; unrestrained warfare in space could be disastrous for the planet, given that the debris produced through the destruction of satellites could render parts of Earth's orbit unusable for generations."

Why 'Woomera'?

The Woomera Manual is named after the Woomera township in South Australia, which has a long association with both Australian and multinational military space operations.

In 1967, Woomera was the site from which Australia successfully launched its first satellite, becoming only the fourth nation in the world to do so. In Australian Indigenous culture, a "woomera" is a traditional spear-throwing device. The name "woomera" originates from the Dharug language of the Eora people.

Two outback ideas for reliable energy

By Penny Jones.

For remote communities across Australia, and potentially the world, the dream of a reliable electricity supply is getting tantalisingly close to becoming a reality.

Funded by philanthropic powerhouse the Tyree Foundation and led by Professor Joe Dong, a national expert in smart electricity, 30-plus UNSW researchers are working on two significant electrical engineering projects to provide solutions for social issues, including those highlighted by the Bridging the Gap Initiative for Indigenous Australians.

The first project aims to develop safe, reliable microgrids for remote communities in Australia, while the second will vastly improve SWER (single wire earth return) power transmission to rural users.

Started in 2016, the \$3.5 million initiative is now well under way and, according to Dong, from UNSW Electrical Engineering and Telecommunications, is looking for the best location to pilot microgrid solutions.

“Microgrids are small-scale electricity supply networks which rely on a mix of power sources including PV solar, thermal, diesel generators, wind, fuel cells and battery storage. A microgrid can be connected to, or operate independently of, the national transmission network and they are seen as an excellent way to improve access to energy services in remote areas,” he says.

“We are developing models to plan for and optimise this broad range of energy sources to allow them to be interconnected. My role is to design different control methodologies and modelling for the microgrid while my colleagues are working on the power electronics, hardware, and systems side to operate and design it.”

The ideal outcome of the project, which Dong says they are well on the way to providing, is an affordable solution that links existing best-of-breed and locally developed components into an architecture that can be safely maintained by the community, rather than having to rely on support from afar.

In projects with global significance, particularly for developing countries, UNSW engineers are solving the problem of intermittent energy supply in outback and rural Australia.



Photo: Shutterstock

The second project to improve SWER power transmission to rural users will complement the microgrid system. Associate Professor Toan Phung is working on the project and says that SWER is commonly used to service sparsely-populated rural areas and remote communities.

“In these places it is too expensive to install the normal three-phase transmission/distribution system, so power companies use SWER,” he says. “Currently, there are about 200,000 kilometres of SWER lines throughout Australia with growing demand.”

SWER lines are long radial single-conductor lines, typically about 50-100 kilometres in length, with spur lines tapped off to supply individual consumers. The ground serves as the current return path. They are prone to poor reliability and Phung explains that traditional fault finding is difficult and time-consuming. It relies on customers reporting the fault and a line crew being sent out to physically check the lines to identify where the problem is.

Phung says their solution is a distributed wireless monitoring system with units mounted on the poles to monitor, in real time, the voltage, current, power, and overall condition of the line. This will enable engineers to accurately pinpoint faults over long distances and restore power sooner. The units also have “local intelligence”, which means they can process and store information as well as make decisions.

This will help stabilise supply and make the whole system more efficient and safer.

“The cause of a number of the devastating 2009 Black Saturday bushfires was attributed to power lines, so in addition to providing a reliable electricity supply, we are also improving safety for remote communities,” Phung says.

A safe, reliable electricity supply has the potential to vastly improve the lives of Australians living in remote areas but, Dong says, there are significant international implications too.

“If we are successful, and I believe we will be, our technology can be applied in remote areas the world over and could have positive social impacts particularly in developing countries. These projects could be a game changer for remote communities, giving them security and autonomy in their energy supply,” he says.

Humanity confronts a defining question: how will AI change us?

What will happen when we've built machines as intelligent as us? According to the experts this incredible feat will be achieved in the year 2062 – a mere 44 years away – which certainly begs the question: what will the world, our jobs, the economy, politics, war, and everyday life and death, look like?

Fortunately, Toby Walsh, Scientia Professor of Artificial Intelligence (AI) at UNSW has done the research for us.

An avid sci-fi fan from childhood, Walsh – who also leads the Algorithmic Decision Theory group at Data61, Australia's Centre of Excellence for ICT Research – has long been fascinated by robots, machines and the future. In 2017, he published his first book, *It's Alive!*, in which he tells the story of AI and how it is already affecting our societies, economies and interactions.

"After I published *It's Alive!*, people started asking me lots of questions about the social impact of AI, in



particular the increasing concerns about how it's encroaching into our lives," he says. "That's why I wrote my second book, *2062: The World that AI Made*, which ignores the technology, and focuses instead on ... where AI is going to take us."

According to Walsh (and, he says, the vast majority of his colleagues) this future looks less like the dystopian world of *The Terminator* and more like the sensitive world of *Short Circuit*.

"Most of the movies from

In his book *2062: The World that AI Made*, Toby Walsh urges us to choose wisely as we define the effects on our lives of the Fourth Industrial Revolution.
By Penny Jones.

Hollywood featuring AI paint a very disturbing picture of the future. But there is one movie that seems to get it right," Walsh continues.

He is referring to the 2013 American sci-fi movie *Her*, in which the protagonist falls in love with his intelligent computer operating system.

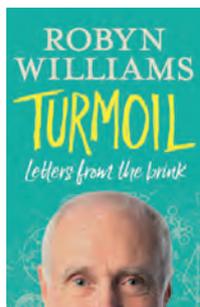
"One thing *Her* does really well is to demonstrate our deepening relationship with machines," Walsh explains. "As the Internet of Things gets more established and our

devices become interconnected, things like your front door, washing machine, fridge and TV, will all be voice activated," he says.

While Walsh makes a series of predications based on the way the technology is heading, he is very careful to emphasise that the future isn't fixed. There is no technological determinism and what happens next in AI is very much the product of the choices we make today.

"We are at a critical junction in history where there's a lot to play for. It's rightly called the Fourth Industrial Revolution, and we need to start making choices so that it turns out to be a revolution that everyone can benefit from," Walsh says.

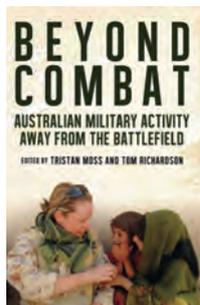
"If we make the right decisions now, we can build a future where we let the machines take the sweat and we can focus on the more important things in life; our families and art, for example. Just think about it. This could usher in the next Renaissance, a great flaring of creativity."



Turmoil: Letters from the Brink

Robyn Williams, NewSouth Books

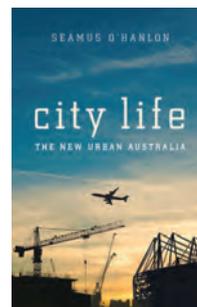
- Acclaimed broadcaster Robyn Williams believes we're in an era of turmoil, when everything he cherishes – particularly science, public broadcasting, conservation and tolerance – is under attack. In this searingly honest, and often blackly funny, reflection on life, Williams opens up about the people and things he loves and loathes, and a multi-faceted career that includes more than 40 years on ABC Radio National's *The Science Show*. Williams writes frankly about everything from his insights on David Attenborough to climate change denialism, in a revealing account of a life well lived.



Beyond Combat: Australian Military Activity Away from the Battlefield

Edited by Tristan Moss and Tom Richardson, UNSW Press

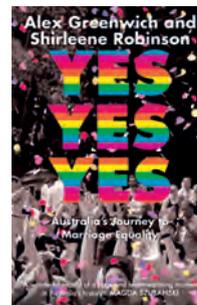
- War is just one part of military life. Away from the battlefields is a wide range of military operations, which are often overlooked in the writing of military histories. From an army nurse's letters home during World War I, to the recovery of air-force war dead and the experiences of LGBTIQ soldiers, *Beyond Combat* examines the all-important supporting roles of war. With contributions from historians and military personnel, this compelling behind-the-wars history is edited by ADFA lecturer Tom Richardson with his ANU colleague Tristan Moss.



City Life: The New Urban Australia

Seamus O'Hanlon, NewSouth Books

- Our cities are changing quickly. Focusing on Sydney and Melbourne, Seamus O'Hanlon, one of Australia's leading urban historians, tells the story of the major economic, social, cultural and demographic changes that have come with the globalisation of the Australian city and the opening up of the economy. Refraining from using stereotypes about mateship, the bush or Anzacs, O'Hanlon, examines how one of the most urbanised, multicultural countries in the world sees itself – and challenges received ideas about how Australia presents itself to the world.



Yes Yes Yes: Australia's Journey to Marriage Equality

Alex Greenwich and Shirleene Robinson, NewSouth Books

- Yes Yes Yes reveals the untold story of how the grassroots movement for marriage equality won hearts and minds and transformed a country. Based on personal memories and more than 40 interviews with key figures from across Australia, the book captures the passion that propelled the movement forward, weaving together stories of heartbreak, hope and triumph. It covers the movement's origins in 2004, when the Marriage Act was amended to exclude same-sex couples, through to the unsuccessful High Court challenge, a public vote in 2017 and the Parliamentary aftermath.

Detainee Behrouz Boochani defies the confines of Manus Island

Kurdish-Iranian journalist Behrouz Boochani described his book *No Friend but the Mountains* as “a victory against the system” at the official launch at UNSW Sydney.

“They tried to imprison me, but in fact, I’m not in prison – I’m free,” he said. “The system that governs [Manus] prison has tried everything it can to limit me, to restrain me. But I’ve managed to defy it at every turn.”

Literature is an act of resistance and a means to reclaim humanity for the author, scholar and filmmaker. Both its creation and consumption can drive change.

He asked readers to look beyond the political to see the book as a piece of cultural history, as “a piece of art”.

Boochani joined translators Omid Tofghian and Moones Mansoubi and poet Janet Galbraith for the panel discussion via Whatsapp from Manus Island, where he has been detained



since fleeing Iran in 2013. He was intercepted attempting to reach Australia from Indonesia by boat.

He wrote the book on various mobile phones over five years, in the one to two hours a day he was unobserved by officers. Mobiles were illegal in Manus Detention Centre until 2016; Boochani’s first phone was confiscated, his second stolen.

“There was always a danger of losing his writing if it remained on his phone,” Tofghian said. “The harassment, intimidation and

At the launch of his book at UNSW, Manus Island detainee Behrouz Boochani explained to the audience – via WhatsApp – that the creative process of writing empowered him to retain his humanity. *By Kay Harrison.*

degradation by the authorities made it hard [for him] to write.”

The poor internet connection on Manus further hampered communications between the author and his translators. Boochani sent the text in thousands of messages.

The book deals with displacement and diaspora, war and trauma, nature and homeland, within the context of Australia’s border politics.

Professor Martine Antle from the University of Sydney, who translated the book into French, sees its

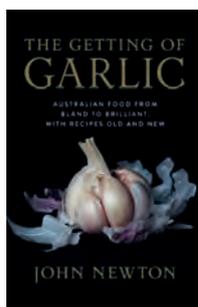
strategies of resistance as both “powerful and radical”. Written in Farsi, “it blurs the frontiers between journalism, philosophy and creative fiction”, she said.

In the book, Boochani writes: “Creativity is the only means of survival, being forced to straddle the border between human and animal.” He believes literature’s power to create change reaches beyond that of journalism.

In 2017 he wrote: “I publish a lot of stories in the newspapers and in the media about Manus, but people, really, they cannot understand our condition, not in journalistic language. Where we are is too hard.

“I think only in literary language can people understand our life and our condition.”

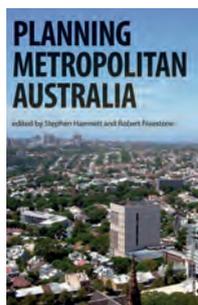
In a forward, Tofghian writes: “Behrouz recounts stories in order to produce new knowledge and to construct a philosophy that unpacks and exposes systematic torture and the border-industrial complex.”



The Getting of Garlic: Australian Food from Bland to Brilliant

John Newton, NewSouth Books

• Was there ever a world without garlic? Apparently so. The white colonisers of Australia suffered from alliumphobia, a fear of garlic. Local cooks didn’t touch the stuff and it took many generations for that fear to lift. Renowned food writer John Newton visits restaurants from haute cuisine to cafes as he ponders what everyday people have cooked and eaten for the past 200 years. His observations and recipes, old and new, show what has changed and what hasn’t, as our chefs are hailed as some of the best in the world.



Planning Metropolitan Australia

Edited by Stephen Hamnett and Robert Freestone, Routledge

• Australia has long been a highly (sub)urbanised nation. But most Australians live in a small number of large metropolitan areas focused on the state capital cities. This book examines case studies in Melbourne, Sydney, Adelaide, Perth, Canberra and the fast-growing metropolitan region of south-east Queensland, centred on Brisbane, and looks at how the future of Australian cities might play out. The book is co-edited by UNSW’s Built Environment professor Robert Freestone, with essays by some of Australia’s leading urbanists, including UNSW professors Bill Randolph, James Weirick and Ray Bunker.



Misfits and Me

Mandy Sayer, NewSouth Books

• At just three, Mandy Sayer fell in love with her first “misfit”, a man in a wheelchair who sold afternoon newspapers outside a Sydney hotel. *Misfits and Me* compiles for the first time a selection of Sayer’s non-fiction writing from the past 20 years. Each essay unveils a unique and hidden story. She talks to child gangs, carjackers, public housing communities, hoarders, pensioner drug dealers, as well as writers and artists. Exploring misfits in life, love, and literature and art, Sayer celebrates marginal characters with empathy, warmth, and pitch-black humour.



The Best Australian Science Writing 2018

Edited by John Pickrell, NewSouth Books

• The finest Australian science writing of the year is all in this book, a compilation of articles vying for the Bragg UNSW Press Prize for Science Writing 2018. The annual prize is for the best short non-fiction piece on science written for a general audience. The winner receives a prize of \$7000 and two runners up each receive a prize of \$1500. **Judges of the Bragg UNSW Press Prize 2018 are:** Professor Merlin Crossley, UNSW Sydney; Professor Lesley Hughes, Macquarie University; Professor Fred Watson, Australian Astronomical Observatory; Professor Mary-Anne Williams, UTS and Stanford University; John Pickrell, editor, *The Best Australian Science Writing 2018*.