SWEET SCIENCE
Preventing type 2 diabetes

AIDING INTEGRATION
Helping migrant women flourish

SPEAK NOW
Diversifying language tools

FUTURE-MAKERS

PAVING THE WAY

Engineering pioneer makes inroads in construction management

WESTERN SYDNEY UNIVERSITY

Spotlight on **women researchers**

ADMINISTRATION/ EDITORIAL BOARD

Professor Deborah Sweeney
Deputy Vice-Chancellor & Vice-President (Research, Enterprise and International)
T +61 2 9685 9822
E d.sweeney@westernsydney.edu.au

Professor Kevin Dunn
Pro Vice-Chancellor, Research
E k.dunn@westernsydney.edu.au

Dr Shantala Mohan
Executive Director, Research
E shantala.mohan@westernsydney.edu.au

Mr Craig Bromley
Production Coordinator
E c.bromley@westernsydney.edu.au

Ms Katrina Trewin
Impact Officer
E k.trewin@westernsydney.edu.au

ABOUT THIS MAGAZINE

Future-Makers is published for Western Sydney University by

nature research custom media

part of Springer Nature.
Level 8, 227 Elizabeth Street, Sydney, NSW 2000 Australia

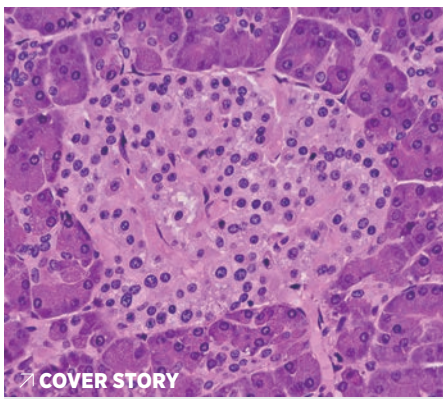
Some of the research contained in this publication was supported by the Australian Government through the Australian Research Council (ARC) or the National Health and Medical Research Council (NHMRC). The views expressed herein are those of the authors and are not necessarily those of Western Sydney University, the Australian Government, the ARC or the NHMRC. Aboriginal and Torres Strait Islander peoples should be aware that this publication may contain the images and names of people who have passed away.

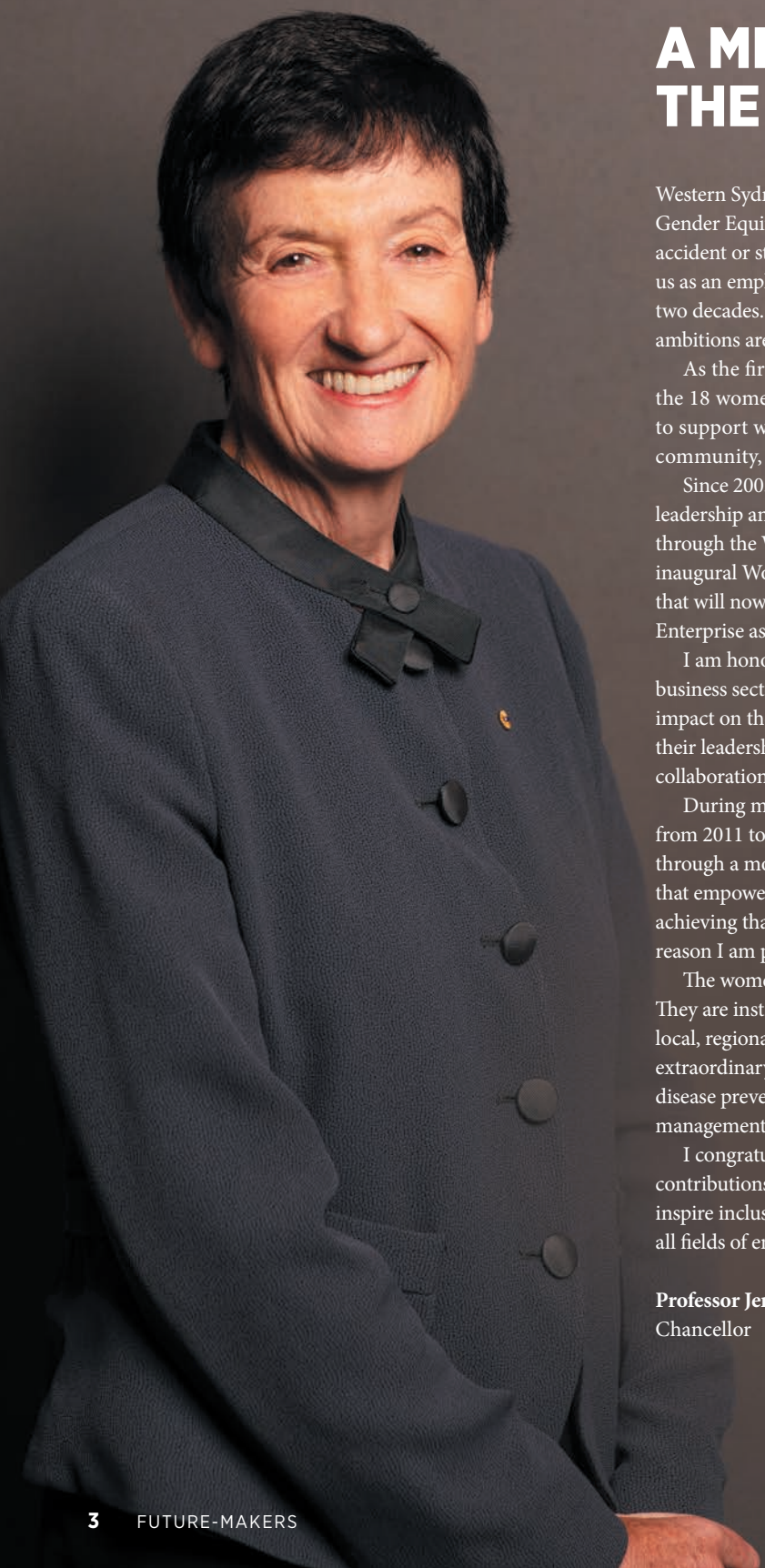
ABOUT

Western Sydney University is a large, student-centred, research-led university. Established in 1989, the University proudly traces its history to 1891 through the Hawkesbury Agricultural College. Today the University has more than 200,000 alumni, 47,000 students and 2,600 staff.

The University is now ranked in all major global university ranking systems, and is in the top 2% of universities worldwide. It has achieved number one in the world for its social, ecological and economic impact in the 2022 and 2023 Times Higher Education (THE) University Impact Rankings.

Through investment in its academic strengths and facilities, the University continues to build its profile as a research leader in Australia and is nurturing the next generation of researchers.





A MESSAGE FROM THE CHANCELLOR

Western Sydney University is proud to be ranked as number one in the world for Gender Equity in the United Nations Sustainable Development Goals. It is no accident or stroke of luck that positions us as a global leader, or indeed recognises us as an employer of choice by the Workplace Gender Equity Agency for almost two decades. Western has been considered, deliberate, and ambitious and these ambitions are paying off — for our staff, for our communities, and in our research.

As the first woman chancellor of Western Sydney University, and one of the 18 women who are university chancellors in Australia, I am delighted to support women from all walks of life to pursue success in business, community, and family life.

Since 2005, Western Sydney University has publicly celebrated the outstanding leadership and diversity of women who live and work in Greater Western Sydney through the Women of the West Awards. In 2024, the University will present the inaugural Women of Western Sydney Awards, an expanded awards programme that will now include recognition for Indigenous Leadership, Arts, and Social Enterprise as well as the Jennifer Westacott AO Woman of Western Sydney Award.

I am honoured to have this new award named for my contribution to the business sector in Greater Western Sydney. Every nominee has made significant impact on the economic landscape of the Western Sydney region through their leadership and influence on policy development and reform, cross-sector collaboration, equity, and business.

During my time as the Chief Executive of the Business Council of Australia from 2011 to 2023, the organisation advocated for a stronger and fairer society through a more prosperous Australia, armed with the undisputable knowledge that empowering women to advance in the workforce would be a key element in achieving that goal. This vision is one that is shared by Western and part of the reason I am proud to be its Chancellor.

The women researchers featured in this issue of *Future-Makers* are inspiring. They are instigating evidence-led change that tackles grand challenges faced by local, regional, and global communities. I know you will be as proud as I am of the extraordinary research, and the often life-changing impact in areas of healthcare, disease prevention, supply chain efficiency, construction, agriculture, ecosystem management, Indigenous equity, social relationships and more.

I congratulate the women of Western Sydney University on their outstanding contributions to knowledge and progress. I have no doubt they will continue to inspire inclusion long into the future and for future generations of women across all fields of endeavour.

Professor Jennifer Westacott AO
Chancellor

ON THE COVER

↗ Distinguished Professor Vivian Tam builds a new sustainable path in Australia's concrete industry.
page 27

Cover image:
© Cybele Malinowski

SHINING A SPOTLIGHT ON WOMEN RESEARCHERS

Welcome to our latest special issue of *Future-Makers,* which shines a spotlight on Western Sydney University's high-achieving women researchers.

The theme for International Women's Day 2024 is 'Inspire Inclusion'. Western takes inclusion seriously, and we're proud to have held an *Employer of Choice for Gender Equality* citation from the Workplace Gender Equality Agency for 21 years.

Our commitment to the advancement of equity and diversity in the fields of science, technology, engineering, mathematics and medicine is recognised by the *Science in Australia Gender Equity* (SAGE) programme's Athena SWAN Bronze Institutional Award. The Vice-Chancellor's Gender Equity and Respectful Relationships Advisory Committee, with help from the Vice-Chancellor's Equity Fund, supports initiatives which provide evidence for changes to inclusive policy and practice across the University.

Every day, Western's researchers embody inclusive research practice — leading by example and forging a path for those that follow. This issue features not only the inspirational stories of research undertaken by our leading women, but also the journeys they have taken and challenges they have overcome to get to where they are today.

You will learn about soil microbes, civil engineering challenges in Sydney, and cancer care for LGBTQIA+ Australians. You will read stories of midwives, of mathematical ecologists and pioneering Indigenous academics. Furthermore, you will be inspired by researchers who have balanced the demands of work and family to make concrete changes for the better on local and global levels.

We hope you enjoy this issue and encourage you to connect with our stellar researchers.

Professor Barney Glover AO
Vice-Chancellor and President

Professor Deborah Sweeney
Deputy Vice-Chancellor and Vice-President (Research, Enterprise and International)

SUSTAINABLE DEVELOPMENT GOALS

The UN Sustainable Development Goals (SDGs) are a blueprint towards a better, more sustainable future (see: sustainabledevelopment.un.org). Western Sydney University has many research projects aligned with these goals. We have indicated the most relevant SDG above each article in this issue of Future-Makers where applicable.

WESTERN WOMEN BY THE NUMBERS

Western Sydney University is a global leader in gender equality. In the 2023 Times Higher Education University Impact Rankings, out of 1,700 universities globally, it was recently recognised as first for Sustainable Development Goal (SDG) 5, Gender Equality; and third for SDG 10, Reduced Inequalities. The University is also recognised as an Employer of Choice by the Workplace Gender Equality Agency (WGEA).

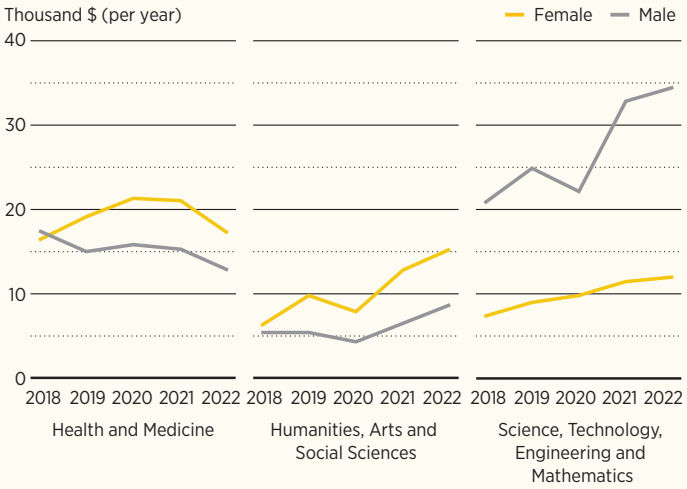
In line with the University's motto — 'Unlimited', Western is a participant in the Science in Australia Gender Equity (SAGE) programme, a nationwide initiative to promote gender equity and gender diversity in science, technology, engineering, mathematics and medicine (STEMM). In recognition, it received an Athena SWAN Bronze Award in 2019 and undertook a comprehensive action plan from 2019 to 2023 designed to provide further platforms of opportunity for women, as well as trans and gender-diverse staff within STEMM disciplines.

A WINNING DISPOSITION

Grants awarded to chief investigators who are women grew from $9.86 million in 2018 to $26.35 million in 2022.

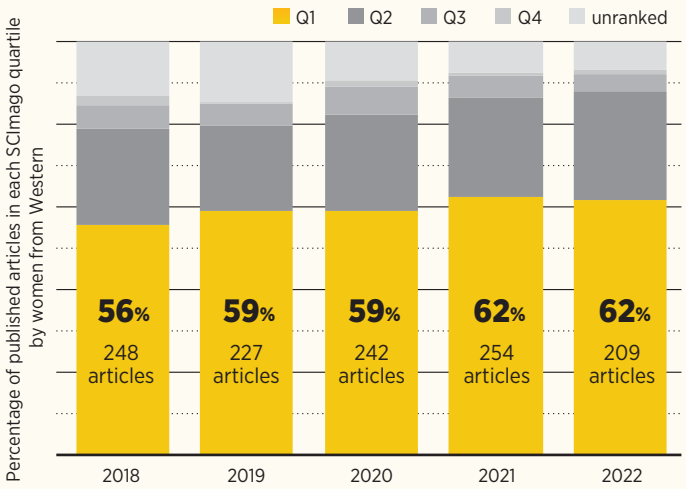
AVERAGE RESEARCH INCOME

Women from Western have consistently outperformed men in average reportable research income in Health and Medicine, and the Humanities, Arts and Social Sciences (HASS).



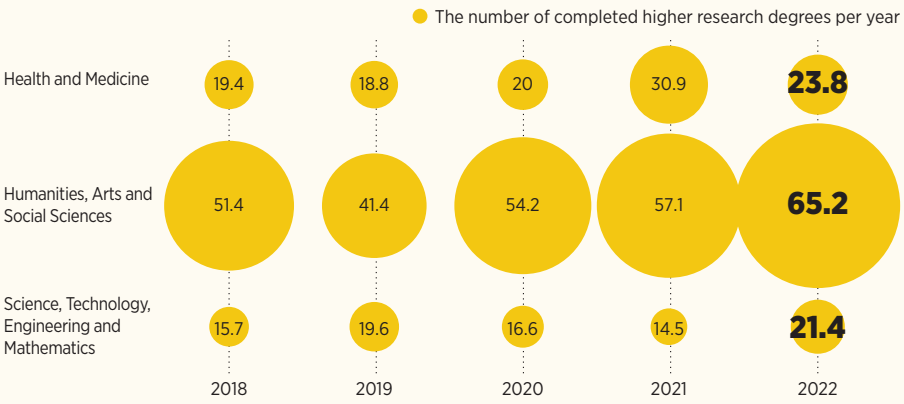
WHERE WE'RE PUBLISHING

Women from Western are consistently publishing the lion's share of their academic output in top quality journals, such as Q1 journals. Q1 journals are the top 25% of journals in the SCImago Journal Rank (SJR) indicator.



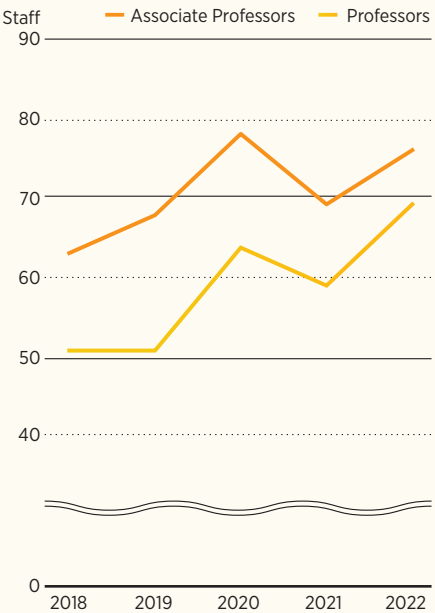
WESTERN: THE NEXT GENERATION

The graph below shows the number of completed higher research degrees per year that were supervised by women at Western. While the majority are in HASS, increases are being made in STEM as well as Health and Medicine.



REACHING NEW HEIGHTS

Women at Western are increasing their representation among the University's senior researchers. For example, the overall number of women Associate Professors and Professors increased from 114 in 2018 to 145 in 2022, despite a drop during the pandemic.



GENDER EQUITY

Our goal at Western Sydney University is to promote and embed **A GENDER-AWARE AND GENDER-RESPONSIVE CULTURE** that understands gender equality as a core value. That's our commitment.

"THERE IS A GLOBAL POLITICAL CONSTITUENCY OF CHILDREN."

Children and young people use digital technology to make connections and consume information.

PROTECTING CHILDREN'S RIGHTS IN A DIGITAL WORLD

Using digital technology to create a better world for children means including their perspectives and recognising their rights to protection and participation.

3 GOOD HEALTH AND WELL-BEING

"Any time we confront new technologies our first response is fear, and then we learn to moderate that and approach it differently. In the past few years the pandemic gave many people reason to pause and rethink technology," says **Amanda Third**, Professorial Research Fellow in Digital Social and Cultural Research at Western Sydney University.

One of the main drivers of Third's work is Article 12 of the United Nations Convention on the Rights of the Child (UNCRC), which specifies the rights of young people to be involved in the decisions that affect their lives. Stakeholders around the world, including children, want to harness the potential of technology to respect, protect and fulfil children's rights, she explains.

This approach, balancing children's rights to protection with their rights to participation, is at the heart of the work of Western's Young and Resilient Research Centre, of which Third is a co-director.

It draws on her work on large-scale qualitative studies that have been implemented in 79 countries focusing on children's and young people's use of digital technologies and other dimensions of their lives. A crucial feature of these studies is including children's perspectives, using artistic and play-based methods that allow them to explore topics and find a way to express what is important to them.

Third was involved in coordinating international public consultation and drafting UNCRC General Comment 25 on children's rights in relation to the digital environment. General comments provide evidence-based guidance to governments and NGOs about how to interpret the meaning and interpretation of the Convention of the Rights of the Child and help set agendas for policy and practice.

Her research has had extensive influence internationally and "engages young people, and a variety of partners across sectors and cultures, to contribute in tangible ways to positive, informed policy and practice outcomes," says Anne Collier, former chair of the US National Task Force on Online Safety, who is based in Utah.

A recent nationwide study in Australia, conducted by Third's team explored how young people think and feel about climate change, and provides an example of children's rights to participation.

"As the generation that will inherit the climate crisis, children want their insights and experiences to inform the climate change debate," explains Third. Social media allows young people to connect, share information and to see themselves as united in taking action. "Because of digital media, for the first time in history, children are now able to imagine themselves as belonging to a global political constituency of children," she adds.

NEED TO KNOW

- The UN specifies that children deserve to be involved in decisions that shape their lives.
- Their rights to protection must be balanced with their rights to participate.
- Western's Young and Resilient Research Centre involves children as participants in research.

(left) solidcolours/E+/Getty; (right) Irina_Strelnikova/iStock/Getty

FINDING THE WORDS TO PROMOTE COMMUNICATION

From speech development in children, to apps for the elderly, language experts are helping people to talk and listen to one another.

4 QUALITY EDUCATION

Australians use more than 400 different languages, and this linguistic and cultural diversity strengthens our families and communities. Professionals without multilingual expertise themselves, however, can find it hard to measure children's speech development, especially in the very early years of life, a crucial time for infants to develop speech and language skills.

Healthcare professionals including speech pathologists and researchers can miss the early signs of problems if they're not familiar with the language(s) that a very young child is learning.

NEED TO KNOW

- Early intervention is essential for language development.
- The tools used by speech pathologists are typically only designed for a country's majority language.
- Researchers are developing a speech pathology tool for multilingual communities.

"Health professionals really try to respond to multilingualism in the way that they assess and deliver services," says Professor **Caroline Jones**, a language researcher in the MARCS Institute for Brain, Behaviour, and Development at Western Sydney University. "But they are often hampered because they don't have the appropriate tools and technologies."

About one in ten children across the world — regardless of culture and language background — have difficulties with speech and language development, and might benefit from some assistance.

"But the tools that speech pathologists tend to use are geared towards the majority language," Jones says. "So, if it's a majority English-speaking country like Australia, the tools are mostly in English, and designed to measure the abilities of children in English."

PARENTAL HELP

To adapt these tools to reflect the more multilingual communities found in Sydney and elsewhere in Australia, Jones, her colleagues, and PhD students Kate Jones and Chantelle Khamchuang are developing approaches to more accurately assess children who are bilingual or multilingual.

A major part of that effort is to involve the parents of the child being assessed. That's important because it allows the child's language development to be measured against the parents' detailed day-to-day experience and expert knowledge of their child. To enable this, Jones and her team have adapted the OZI, an existing test of language learning, to produce a streamlined version that takes about ten minutes to run.

The test, called the 'Australian English Communicative Development Inventory — Short Form', or 'OZI-SF', uses pictures and a list of one hundred words, plus gestures and games/routines. In the app, the parent is simply asked which words their child understands and/or says, and which gestures, games and routines they use.

The words range from early-learned words such as 'mum' to later-learned words such as 'necklace'. Parents can then enter their child's score into a website, which gives guidance on their child's results that draws on a large dataset for Australian children. Parents are linked with resources they can use and help in finding a speech pathologist for a fuller assessment if they are concerned.

"By two years of age, easily, we can start to identify kids who are falling behind in their language development," Jones says. "The earlier you can start, then the more equal you can make the outcomes in the long term."

Dr Kate Short, a senior speech pathologist at Liverpool Hospital who collaborated on the tool development, has found OZI-SF to be particularly useful clinically in measuring the effectiveness of intervention with toddlers. "I often say to families that completing this tool is like having a blood test before and after intervention. It's a measure that tells us if we're making a difference," she says.

"Language development is the basis of literacy. It leads to stronger employment outcomes. It leads to stronger social outcomes. Kids can make friends, form relationships, navigate peer influences, and find success in education and employment," says Jones.

More approaches need to be developed to assess the language skills of children who are multilingual.

FatCamera/E+/Getty

Free to download, the checklist tool has been used across Australia more than 2,000 times. It's part of a broader effort in Jones' research to personalise the use of multi-lingual tools and approaches. That's especially important in a world in which online algorithms now offer a superficially easy route to translation between languages.

LISTEN AND TALK

"Language is always changing and doesn't always respect national norms. If you think about the ways we talk in Australia, and to kids, there are as many different versions of 'English' as there are many different forms of most languages," says Jones.

This evolution and diversity of language can present challenges when trying to communicate with elderly people, including those with dementia who might prefer to speak the language they learned as a child, rather than the English they learnt later in life.

"Google Translate will get you a certain way, but it might present that dialect as it's spoken now in that part of China, not how it was spoken when that person was a child," Jones explains. "They might need more personalised support offered in the way they normally talk."

To offer this kind of support, Jones and her colleagues, in work led by postdoctoral fellow Dr Mark Richards, have developed an app called 'Listen and Talk' that elderly residents can ask staff to use. "The app plays audio phrases for the kinds of greetings that they like to hear and the questions that help with care routines, that kind of thing," she says.

In another project, the team has worked with Australian Indigenous communities to create online talking dictionaries for the many languages that still don't have such a resource. For example, Jasmine Seymour and Corina Norman are currently leading a landmark collaboration to create a dictionary for their language, Dharug. The talking dictionaries are a resource for Indigenous adults to use language in everyday life and to learn and teach within language revitalisation initiatives.

Much of this multilingual work is enabled by decades of basic research and can have a major impact when the tool fits the context and the users. "It's a lot of fun to work with people and to hear what they need or what they're looking for," Jones says.

Leafy greens and other vegetables spoiling at Port Vila market Vanuatu, October 2022. Flooding had caused road closures, preventing access by consumers and the restocking of fresh produce.

UNDERSTANDING FARM-TO-MARKET FOOD LOSS IN THE PACIFIC

To understand and prevent food loss in the Pacific Islands farm-to-market supply chains, researchers need to ask both women and men in farming households to account for their time.

3 GOOD HEALTH AND WELL-BEING

Smallholder farmers in the Pacific Islands grow, harvest, grade, store and deliver fruits and vegetables to local markets. But their produce is often spoiled or damaged along the supply chain. Reducing agricultural food loss would make fruits and vegetables more abundant and affordable, and improve nutrition in urban and rural communities.

An Australian-funded research initiative is now sending survey teams across Samoa, Tonga, Solomon Islands, and Fiji, in both the dry and wet seasons, to record the wastage of different crops. The teams ask all members of farm households about their daily calendars to learn where losses happen.

"We need to understand when and how tasks are conducted," says Professor **Nichole Georgeou**, Director of the Humanitarian and Development Research Initiative (HADRI) at Western Sydney University. "That information will tell us who is responsible for which part of the supply chain. Then we can work with producers to identify interventions that could help them reduce food loss."

NEED TO KNOW

- For smallholder farms, food wastage along the supply chain is a significant issue.
- Historically, interventions have focused on men's tasks.
- The tasks of both women and men need to be considered to find out where losses are occurring.

"In the Pacific, women do most of the agricultural work," says Georgeou. Yet, historically, farm interventions have primarily focused on men. "Agricultural research has a problem with gender bias. Researchers assume that the starting point is a male perspective. Or they don't consider differences between male and female experiences."

The project, titled Reducing Horticultural Food Loss in the Pacific Region, is funded by the Australian Centre for International Agricultural Research (ACIAR). "Our research is done in a consultative, participatory, and cooperative way. It is funded by ACIAR but led by Pacific Islanders," explains Georgeou. She has studied food systems in the Pacific Islands for more than a decade and was the first to map the supply chains of fruit and vegetables in Solomon Islands, both under typical conditions and during flooding events. She has also analysed the value of agriculture in the nation's economy.

Georgeou and her colleagues are using a gender-transformative participatory approach in this current study. "We need to understand how social and gender relations interlock within agricultural communities, and how those relations affect the food supply chain," she says. "Men and women work together on household farms, relying on each other, but they often have different tasks and responsibilities. For instance, who is doing the picking or sorting or storing of produce? Who is moving it to market?"

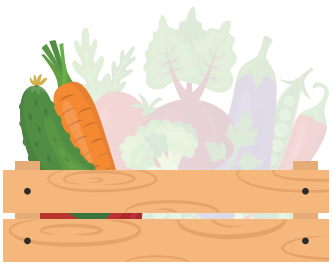
Transportation, which is typically limited in the Pacific Islands, could be a critical weak link in farm-to-market supply chains.

"Roads are often of poor quality," she says. "If produce is damaged during transport, and if only men are moving it, we would focus an intervention on men's roles in that part of the supply chain. We want to find out where produce is being lost and at the same time talk to men and women about their gender roles and see where they might intersect."

This study is a project of the Food Loss Research Program, which is a partnership between ACIAR and Canada's International Development Research Centre. The project aims to bring together researchers and stakeholders in developing countries who address food loss through innovative, locally driven solutions.

The expertise that Georgeou has brought to "gender-inclusive research has been instrumental in building the capacity of Pacific researchers to adopt a gender lens in compiling and conducting our vendor surveys, and in planning consultations with our stakeholders," says Dr Seeseei Molimau-Samasoni, research manager for the Plants & Postharvest Technologies Division of the Scientific Research Organisation of Samoa.

"In my work, I have tried to contribute to better nutrition in the Pacific, because it has one of the highest rates of diet-related noncommunicable diseases in the world," Georgeou says. "This project could help us identify food loss, find solutions, and keep more affordable, nutritious food in the system."



SMALLHOLDER FARMERS
in the Pacific can experience food losses of
AROUND 5-20% OF THEIR TOTAL PRODUCTION

Source: Dr Molimau-Samasoni, ACIAR
www.aciar.gov.au/media-search/news/reducing-horticultural-loss-south-pacific

Professor Nichole Georgeou in the Apia market Samoa, April 2023.

(illustration) Iuliia Borg/iStock/Getty

INCLUSIVE PLANNING CREATES MORE RESILIENT AND SUSTAINABLE COMMUNITIES

On a mission to help communities ensure a sustainable and healthy future, Professor Nicky Morrison is leading Western's efforts to transform urban spaces.

11 SUSTAINABLE CITIES AND COMMUNITIES

"To create long-lasting health and well-being outcomes for our communities, it's critical to design places well," says Professor **Nicky Morrison**, an expert in urban planning and co-director of Western Sydney University's Urban Transformations Research Centre. After establishing her career at the University of Cambridge in the United Kingdom, Morrison moved to Sydney with several goals, including conducting impactful research on inclusive planning that makes a tangible difference to communities.

"I'm interested in ensuring that decisions are made that suit a given community, that meet their needs in a sustainable way, and that allow their area to thrive," she says. "I relish the opportunity to shape planning and housing debates and to co-create strategies with city planners to generate positive, inclusive growth that benefits everyone."

Morrison's career has seen her work with national and local governments, industry, and communities across the world, from Shenzhen in China, to Accra, the capital of Ghana. In 2019, the Royal Town Planning Institute in the UK commended Morrison for her leadership and significant contribution to the planning profession.

Since arriving in Australia in March 2019, she has used her expertise to investigate how we can create vibrant, inclusive sustainable places here. These include ways to deliver healthy built environments and sustainable homes alongside preserving urban agricultural land; protecting local communities against flooding; and improving access to fresh, affordable food and local amenities, like safe swimming sites and green open spaces.

HEADING A NEW CENTRE

By far the most exciting and challenging project that Morrison has been involved in is the founding of Western's Urban Transformations Research Centre.

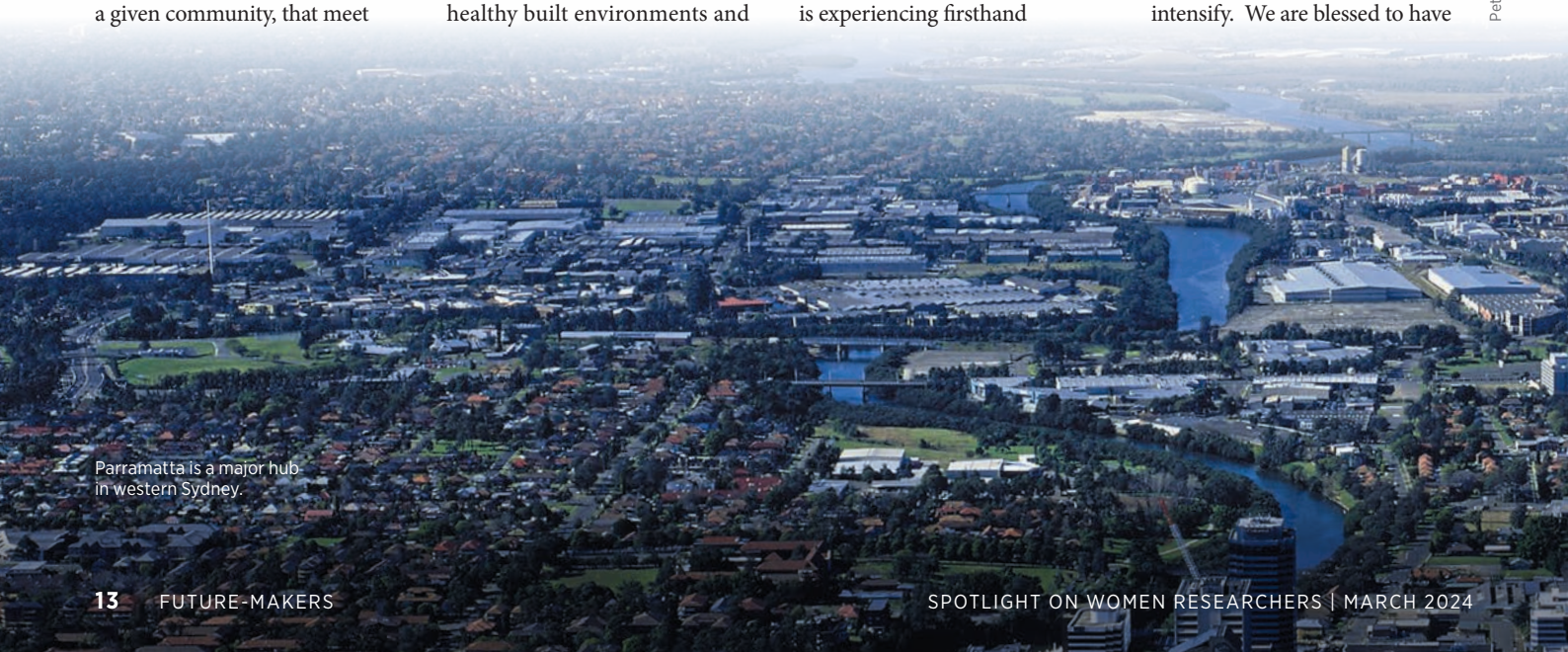
"We launched the centre in November 2022, at a time when our community was calling out for accelerated action on climate change, and demanding greater leadership and greater collaboration," says Morrison. "The time is right to make impacts at scale."

The western Sydney region is experiencing firsthand many of the sustainability and resilience challenges of the 21st century. Rapid urban growth, extreme urban heat, and entrenched inequalities mean that planners must work quickly and efficiently to resolve these and many other issues.

"The destructive impacts of climate change are being felt intensely in the western part of the Sydney Basin," says Morrison. "The rapid succession of shocks like bushfires, heatwaves and floods are putting real pressure on our local and state governments, which are already grappling with the needs of the growing and changing population."

Significant investment is being made to provide the jobs, homes, and infrastructure that the region needs, Morrison adds. The Centre's mission is to deliver action-oriented outcomes based on real-life, exemplary demonstration of research and innovation. This means putting years of theoretical research into practice, and using the University's campuses and the surrounding areas to showcase the creation of truly sustainable communities, with lessons shared across Australia and the world.

"As cities grow, urban problems intensify. We are blessed to have



Peter Harrison/Stone/Getty

Parramatta is a major hub in western Sydney.

someone of Nicky's expertise helping to address some of the high challenges facing our world and training a new generation of urbanists and planners to make safe, healthy and just cities for our future," says Rob Stokes, the former NSW Infrastructure, Cities and Active Transport Minister who, with Morrison, officially launched the Urban Transformations Research Centre.

A LONGER-TERM APPROACH

"Many developers are motivated by a 'build, sell, go' policy, and it's hard to hold them accountable once they've gone," says Morrison. "It's preferable to work with developers who consider the long-term stewardship of a place once it is finished. In our initiative to redevelop our Werrington campus into Penrith Sustainable Innovation Community, it's exciting to work closely with a development company like Stockland that is keen to raise the bar on placemaking."

However, the job of ensuring that future builds meet our sustainability goals requires careful negotiation with multiple stakeholders. This is a skill that Morrison has developed throughout her career.

"The question arises: do we have the best set of strategies in place to transform our communities and infrastructure into sustainable, equitable and resilient futures?" she asks. "We should be under no illusion that power relations exist and that vested interests fight hard to maintain the status quo, because they have the most to gain from it." Unpacking the thorny issue of planning, politics and power has driven Morrison's whole career.

Academics working in planning apply theoretical frameworks to different institutional contexts with objectivity, continues Morrison. But the most powerful tool researchers have is their academic independence and voice.

"We can question planning decisions and outcomes," says Morrison. "We have a social responsibility and civic duty to advocate on behalf of those who are rarely heard — the people who live and work in our communities."

NEED TO KNOW

- Western launched the Urban Transformations Research Centre in late 2022.
- They are working on solutions for destructive climate-change related impacts on urban environments.
- Their goal is to showcase the creation of truly sustainable communities.

BRINGING PEOPLE TOGETHER

A key goal of the Centre is to provide the means for all stakeholders to jointly define problems and devise solutions to urban challenges. Real progress can be made if people come willing to both listen and share information, notes Morrison.

One such co-funded initiative that Morrison is leading is on enabling green-space orientated housing developments across Sydney. The research is focusing on a critical issue that is often overlooked in the pressure to supply new housing — the financial conundrum around creating and upgrading green open spaces within areas that are intended for high-density residential accommodation.

"Well-designed and attractive urban green spaces are key to successful higher-density development. Green spaces can increase business productivity, enhance community well-being, and contribute to reducing severe urban heat," says Morrison. "Our forums can mobilise action and consensus on shared solutions around this critical issue and many other such challenges."

While Morrison spends a lot of time working for transformational change in urban planning, she also advocates strongly for the importance of personal change in forging a successful career.

"Western is a university that prioritises research that makes a difference to the community. First position for two consecutive years in the Times Higher Education Impact Rankings gives all of us working here a real sense of purpose. I'm passionate about embracing all the opportunities that working and living in Australia offer. I can only encourage others to take similar leaps."

Stokes agrees: "Nicky Morrison is a globally recognised expert in urban planning and housing — and she is based in the heart of Sydney. Rather than look overseas for the best advice and education, we are better off listening to the expertise we have right here."

EMPOWERING MIGRANT WOMEN WITH SEXUAL HEALTH EDUCATION

Migrant women want to take charge of their sexual and reproductive health, but learning to talk about their bodies can be a challenging step.

10 REDUCED INEQUALITIES

"This is the first time I've ever spoken about these things out loud."

Dr **Alexandra Hawkey**, Research Fellow at the Translational Health Research Institute at Western Sydney University, often hears this statement as she helps migrant and refugee women explore their sexual and reproductive health.

Hawkey would like all migrant and refugee women to have equitable access to preventative sexual and reproductive health services. That means women would know how to prevent sexually transmitted infections (STIs), unintended pregnancies, and even cervical cancer. Ideally, they would also have access to culturally tailored resources in their preferred language and support from healthcare professionals to make informed decisions about their own sexual health.

It turns out that gaining knowledge about prevention is just a starting point for migrant and refugee women, says Hawkey. "Women want to learn so much more, enough to take a holistic approach to sexual and reproductive health," she explains. "They want to learn how to navigate complex sexual relationships with their partners."

Hawkey was a lead author on a paper reporting these findings in the journal *Ethnicity and Health* in 2021. The paper was written as part of an Australian Research Council grant to study sexual and reproductive health across the lifespan of migrant women in Australia and Canada. The project collected migrant women's stories through interviews and focus groups, asking them what kind of sexual health support and education they wanted to receive.

One challenge that Hawkey and her co-investigators faced was that the women, from countries including Afghanistan, India, Sri Lanka and Sudan, found talking about sex to be deeply taboo.

"Women are trying to adhere to their cultural norms and still enjoy meaningful sexual relationships. They need support and new skills to negotiate this with their partners, who are also transitioning to a new country and experiencing new norms around gender roles and women's rights."

Many women described wanting to receive sexual and reproductive health education in a group format, particularly being able to discuss their experiences with other women from similar cultural backgrounds.

"Talking about these subjects and shared experiences in the context of a shared cultural understanding may help normalise these conversations," Hawkey says. "But some women thought the topics were too private to be spoken about in a group" and emphasised the need for empathetic healthcare professionals who take the time to address their concerns during consultations.

Indeed, a key finding was that women need varied access to health resources. "Their resettlement issues often come first," Hawkey says. "But sexual and reproductive health sessions could be incorporated in English lessons or held in conjunction with childcare to reduce additional barriers for them to access these resources."

Hawkey acknowledges that reaching intimate partners is also vital. "If women go home to a partner who's not receptive to new ideas, they will find it challenging to adopt the practices they learn about, like contraception — issues such as condom use," she says. "We need to get men on board. It's one of the key goals moving forward." This recommendation, and others, were included in guidelines for healthcare professionals in Australia who work with migrant and refugee women in sexual and reproductive health.

Recognising gaps in contraception knowledge, Hawkey is now undertaking an NHMRC Emerging Leadership Research Fellowship grant to delve deeper into migrant and refugee women's perceptions and experiences of fertility management.

NEED TO KNOW

- Discussing sexual and reproductive health is often culturally taboo for women migrants to Australia.
- They may be willing to discuss these issues in culturally sensitive group settings or one-on-one consultations with a trusted healthcare professional.
- Support to reconcile traditional and evolving gender roles may be beneficial both for migrant women and their partners.

Sexual and reproductive health education may be better received in a group format.

Iryna Veklich/Moment/Getty

EXPLORING SEXUALITY AND GENDER DIVERSITY FOR INDIGENOUS AUSTRALIANS

A Western researcher has found some Indigenous Australians feel that sex work helps them understand their self-identity and gender expression.

Corrinne Sullivan speaking at the Wiyi Yani U (meaning women's voices in Bunuba language) Thangani National Summit in Canberra in 2023.

5 GENDER EQUALITY

There is not a lot of literature on Indigenous people and sex work, and what does exist is often a negative narrative of exploitation. This is something that Professor **Corrinne Sullivan**, Associate Dean of Indigenous Education at Western Sydney University, hopes to change.

Sullivan is an Aboriginal scholar from the Wiradjuri Nation in Central-West New South Wales. She has published several journal articles and book chapters and wrote her PhD thesis on the topic. Her research has documented the lived experiences of Indigenous Australian sex workers and includes discussion on how sexuality and gender diversity can be explored through sex work. Her most recent paper was published in the *Journal of Intercultural Studies*.

Sullivan found that there are complex and nuanced reasons why some Indigenous Australians choose sex work. She learned that the reasons are often pragmatic, such as for economic freedom or to have flexibility to work around childcare commitments, but also that, for some people, sex work validates their gender expression and feelings about sex and sexuality.

It validated, "their body, their attractiveness and how they performed their gender expression," Sullivan explains. "Particularly for people who are trans, it was a very affirming space."

> "ABORIGINALITY IS NOT CONSIDERED AS BEING SEXY OR MARKETABLE."

Madi Day, a lecturer of Indigenous studies at Macquarie University in Sydney, says Sullivan's work offers a more nuanced picture of life for Indigenous LGBTQIA+ people and sex workers.

However, cultural expression still poses a challenge. None of the sex workers Sullivan spoke with advertised themselves as Aboriginal.

"Those who were more tan or darker skinned would advertise themselves as Hawaiian or Māori for example, which is viewed as less contentious than being Aboriginal. That kind of racism sat there still, in how Aboriginality is not considered as being sexy or marketable" she says.

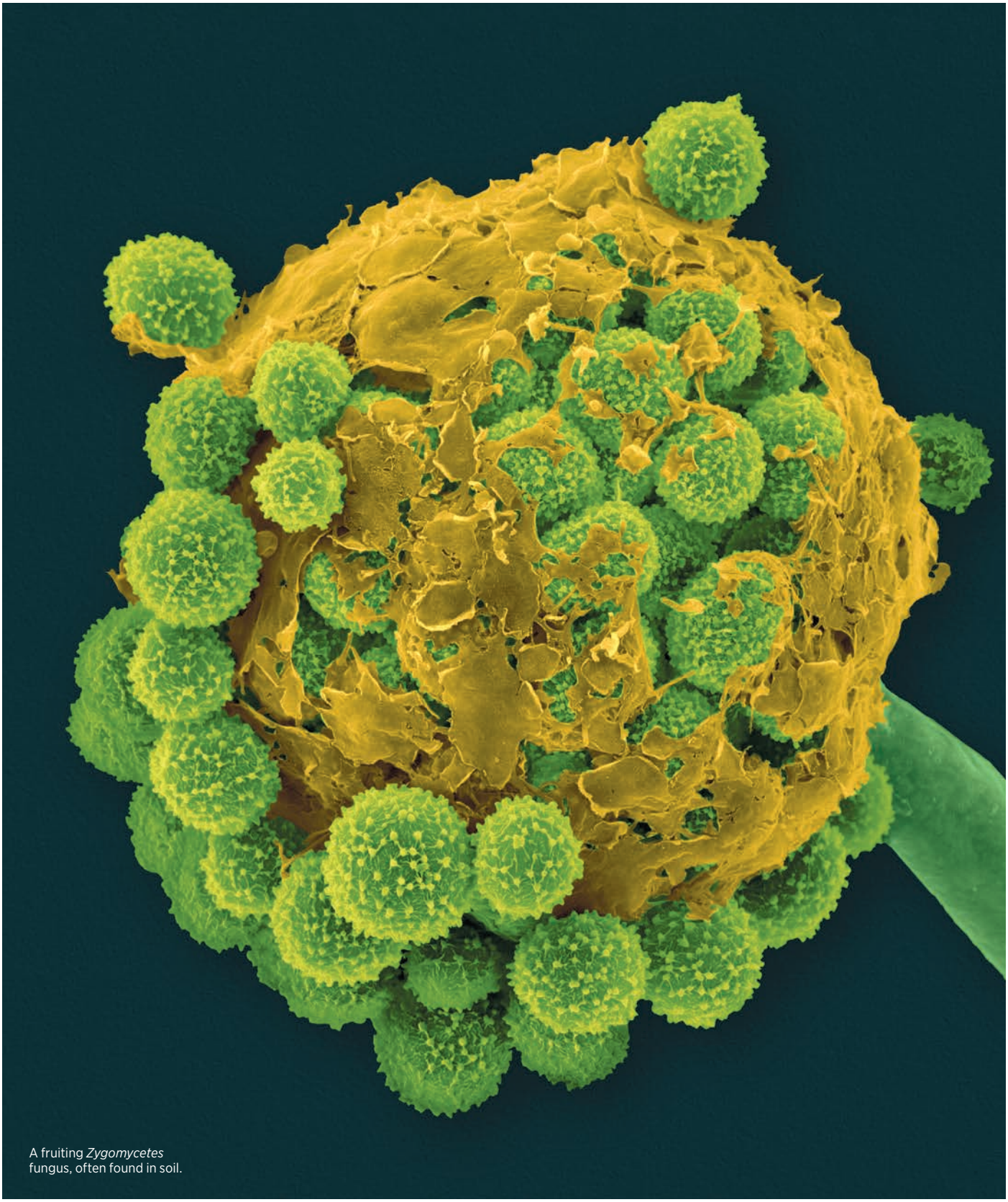
While sex work can help with self-identity, Sullivan says more needs to be done to assist those who would like access to resources and support. Many healthcare service and support providers are not adequately equipped to work with people who are racially, sexuality- and gender-diverse.

Sullivan is now working on a project that looks at ways healthcare service and support providers can be better educated and informed to help those who would like access to resources and support.

NEED TO KNOW

- For some Indigenous Australians, sex work validates their gender expression and feelings about sexuality.
- But cultural expression is an issue; many don't advertise themselves as Aboriginal.
- More needs to be done to help them access resources and support.

Jillian Mundy



A fruiting *Zygomycetes* fungus, often found in soil.

Dennis Kunkel Microscopy/Science Photo Library

EXPLORING THE MICROBIAL WORLD

Eleonora Egidi discusses her blossoming career in soil microbiology and the importance of advocating for women and underrepresented communities in science.

"We're just beginning to understand how much of our world is underpinned by microbial communities," says Dr **Eleonora Egidi**, microbial ecologist and bioremediation expert at Western Sydney University's Hawkesbury Institute for the Environment. "It's such a vibrant area of research to be involved in; we're uncovering the secrets that microbial communities hold, including how to harness their wide range of adaptive genetic capabilities."

Egidi moved to Australia from Italy in 2014. After a few years in Melbourne, she took a postdoctoral position at Western in 2018 and won a prestigious Discovery Early Career Researcher Award (DECRA) from the Australian Research Council in 2020.

"My PhD was in mycology, studying fungi in rock formations in extreme environments," says Egidi. "Through this, I became interested in the wider field of microbes in soils — particularly the drivers of diversity in microbial systems. I'm fascinated by the potential applications of microbes in terms of boosting agricultural productivity and regenerating ecosystems."

She feels she was in the right place at the right time, because she completed her PhD just as all the next-generation sequencing techniques were taking off. "I trained in using these techniques for soil microbiology and fungi, and this meant I was learning right at the cutting-edge of a fledgling field of study," she says.

Fungi activity and diversity has a major influence on the functioning of ecosystems. In 2019, Egidi and co-workers published the first atlas of dominant fungi groups found in soils from across the world. They sampled 235 soils from different locations, and identified 83 dominant taxa.

The most common fungi by far were species of the wind-dispersed, generalist group known as the Ascomycota. In further research into the fungi present in drylands specifically, she showed that both UV light and climate seasonality were key influences on the composition, turnover and health of these microbial communities.

"These findings highlight just how vulnerable these microbial communities are to climate and anthropogenic change," says Egidi.

NEED TO KNOW

- Soil microorganisms include bacteria, archaea, viruses and eukaryotes.
- They can be used to boost agricultural productivity and to help regenerate ecosystems.
- Eleonora Egidi is investigating whether they can help build drought resistance in native grasses.

MORE THAN JUST DIRT

Egidi's research feeds directly into several of the UN Sustainable Development Goals, from supporting life on

land to building sustainable communities. Egidi's current DECRA project examines the role of microbes in determining the fitness and spatial distribution patterns of grasses in Australia, and their ability to resist drought.

"Australian plants, particularly the native grasses, require resilience to drought," says Egidi. "But they also need to be resilient in the face of the oscillations caused by El Niño and La Niña. The drought spells caused by these phenomena are becoming increasingly intense and more frequent. It's very important that we learn the mechanisms that underpin the health of these grasses, and especially to find out whether microbes play a role in this."

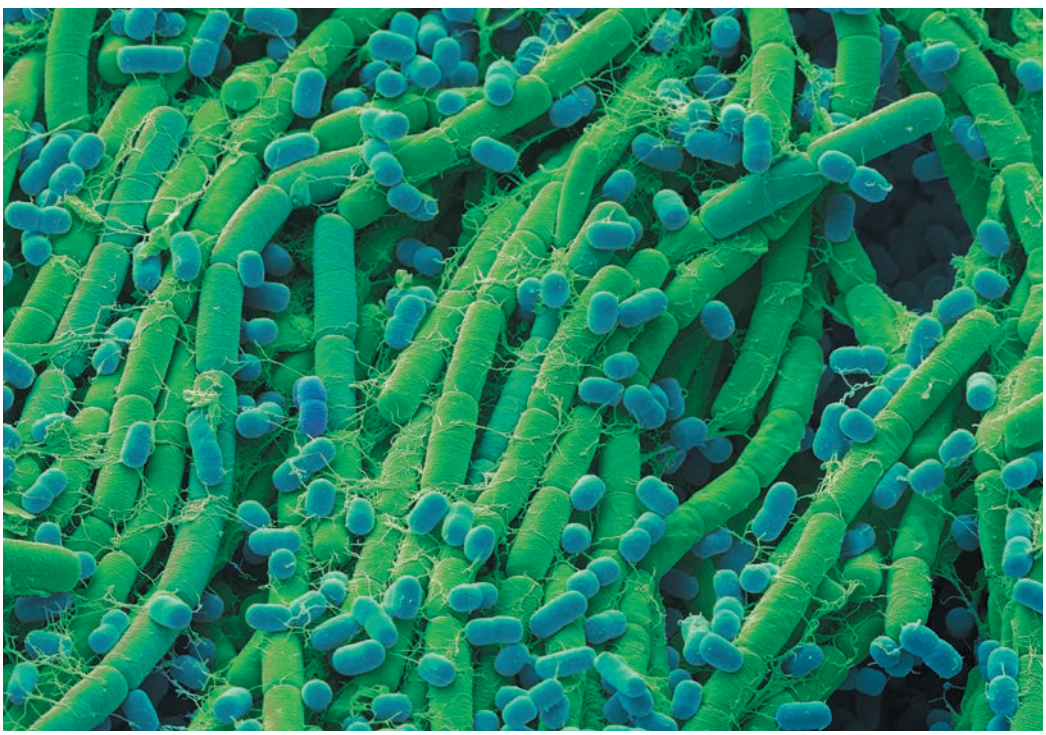
Asking and answering these fundamental questions is crucial. A clearer understanding of how plants and microbes work together to build resilience against a specific kind of stress, such as drought or heat, could enable scientists to harness these natural associations to boost drought resistance in grasses and in other types of plants or biological systems, adds Egidi.

"In Australia, just as in many countries in the world, the native grasses are critical to pastoral communities and agriculture," she says. "Through our research, we hope to design management strategies to preserve and restore the wealth of biodiversity in our drylands."

In addition, Egidi is keen to find ways to reduce, and eventually eliminate, reliance on fertilisers and pesticides. The overuse of chemicals in farming has meant that soils are depleted of their natural microbial components, lowering the soil's productivity with a knock-on effect on crop yields. Egidi hopes her work could help to replenish naturally helpful microbes that should be found in Australia's soils.

She is also heavily involved in research for sustainable agriculture on a global scale; she is one of the leaders of the Global Initiative of Sustainable Agriculture and Environment and she and her team are currently undertaking a global survey of the microbial communities from crops around the world.

ASCOMYCOTA
are the most common fungi in soils



A false-coloured scanning electron microscopy image of soil bacteria.

BRINGING PEOPLE TOGETHER

Another of Egidi's passions lies in bringing together scientists working in microbial ecology. Together with terrestrial ecologist, Dr Christina Birnbaum, at the University of Southern Queensland, Egidi set up the Plant-Soil Ecology Research Chapter (PSERC) of the Ecological Society of Australia in 2016. They have held a symposium every year since, with strong representation from early career researchers.

"Eleonora and I decided to start PSERC because there wasn't a group or society in Australia that represented plant-soil-microbial ecologists," says Birnbaum. "Similar groups already existed in Europe and USA, but not Australia. It has been a pleasure to co-convene the PSERC with Eleonora and see it growing into the strong community we have today. Eleonora is an inspiring researcher and a great colleague, and I can't wait to see what the future holds for her."

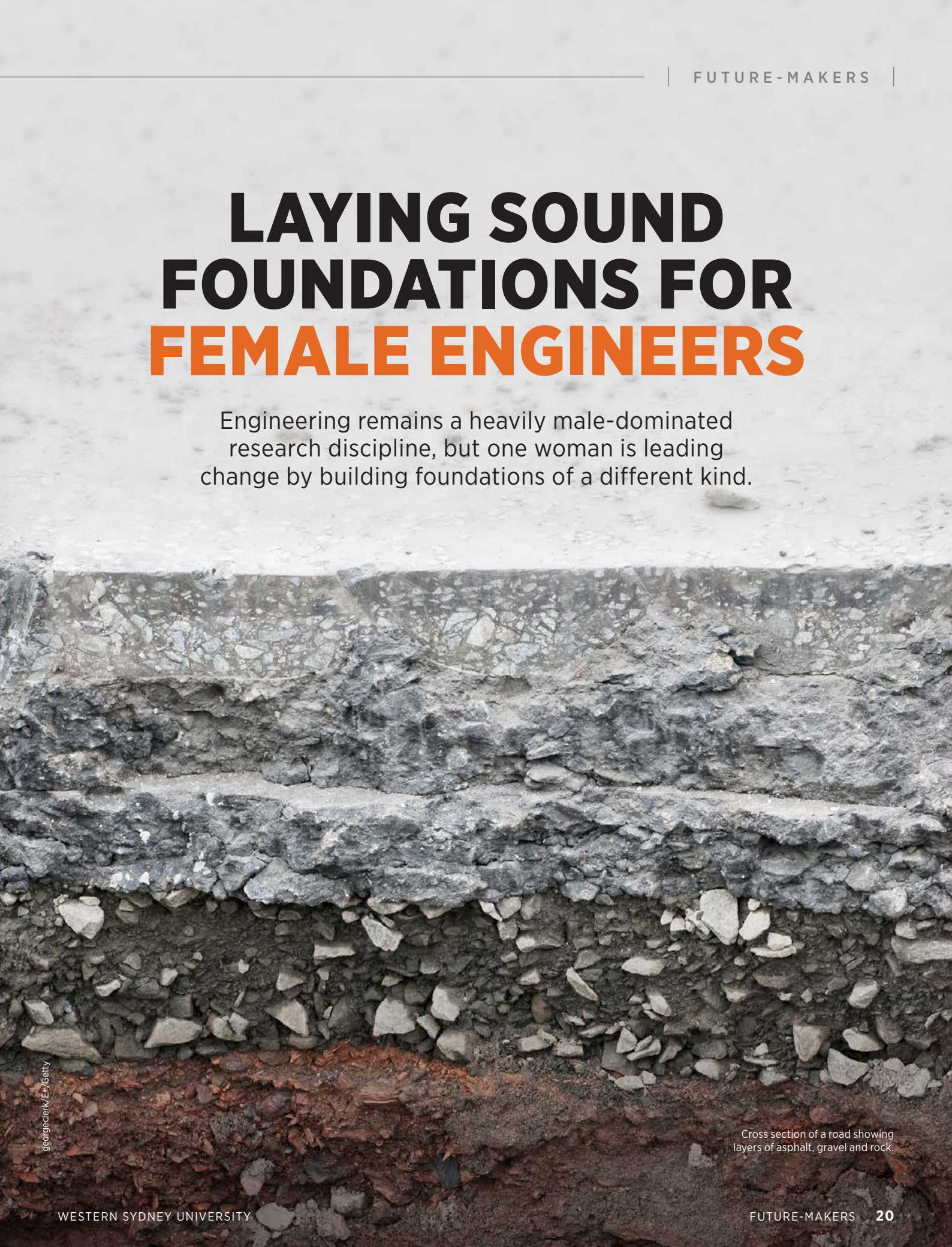
Egidi ensures she plays active roles in discussion panels and conferences, giving talks regularly and encouraging young researchers to participate. "Visibility is crucial, particularly for young women and other underrepresented groups in science," she says.

She ensures that the discussion forums she organises have equal representation on every panel, as far as possible. Since 2018, she has been involved in developing and promoting Western's gender equity in STEMM action plan, which resulted in an Athena SWAN Institutional Bronze Award for the University in 2020. She continues to work with Western's parent and carer support network.

(Top) Blueringmedia/iStock/Getty; (Bottom) Steve Gschmeissner/Science Photo Library/Getty

LAYING SOUND FOUNDATIONS FOR FEMALE ENGINEERS

Engineering remains a heavily male-dominated research discipline, but one woman is leading change by building foundations of a different kind.



georgeclerk/E+/Getty

Cross section of a road showing layers of asphalt, gravel and rock.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

The American Society of Civil Engineers is a distinguished professional society with a global membership dating back to 1852, and currently represents more than 150,000 members of the civil engineering profession in 177 countries. But in all that time, only one Australian woman has been elected as an ASCE fellow. Professor **Deepa Samanthika Liyanapathirana** of Western Sydney University received this distinction in 2021 for her contribution to computational geomechanics.

Computational geomechanics uses numerical methods to analyse and predict the behaviour of geotechnical structures embedded in or in contact with the ground. In geotechnical engineering, small-scale tests of soil-structure interaction issues are futile because they can't replicate in situ stress levels. Field-scale testing is prohibitively expensive. Hence computational geomechanics is a powerful tool. It is used to design geotechnical scenarios such as tunnels, retaining structures, slopes, excavations, and pile foundations and test how they withstand different groundwater flow conditions and types of loads during the design life, including earthquakes. In short, computational geomechanics assists in the economical design of safer infrastructure.

Liyanapathirana has established herself as a leader through her work on pile foundations — long columns used to support a building by transferring its weight to deeper, more stable layers of the ground — and is developing new analysis methods for complex geotechnical problems. She has studied the dynamics of driving piles into the ground, their behaviour under earthquakes, and how pile foundations are affected by deformations in the ground that occur during nearby construction activities such as deep excavations and construction-induced ground vibrations. Her work on the effect of soil behaviour on pile foundations, particularly in seismically active regions where soil liquefaction happens, won her the American Society of Civil Engineers' Thomas A. Middlebrooks Award in 2007.

Liyanapathirana first became involved in computational geomechanics while doing her undergraduate degree in civil engineering at the University of Moratuwa in her native Sri Lanka. "I was introduced to computer programming for my final year thesis, and I was instantly attracted to it," Liyanapathirana reflects. She later moved to the University of Western Australia where, she notes, "my PhD supervisor was looking for someone who loved programming, and that's how it started".

> "I ONLY NEEDED A LAPTOP AND AN INTERNET CONNECTION TO UNIVERSITY SERVERS."

One of the attractions for Liyanapathirana was the computer-based nature of the work, since it gave her the work–life balance that is so difficult to achieve for many women in academia who have children. "As I progressed through my career, particularly in the early stages, this flexibility to work in my own time was a huge advantage to me," she explains. "I was doing my PhD when my first daughter was born, and my second was born when I was in a postdoctoral position at the University of Sydney. I received a lot of encouragement from my supervisors to resume my research projects after maternity leave both times. They highly valued my contributions to the projects and created a flexible working environment for me. I am truly grateful to them. The nature of the research meant I could work from home at night because I only needed a laptop and an internet connection to access university servers."

Deepa Samanthika Liyanapathirana, Professor of Civil Engineering at Western.

PAYING IT BACK

Liyanapathirana's move from Sri Lanka was also made easier by the support she was given. "The research team at the University of Western Australia at that time was predominantly a multicultural group of PhD students," says Liyanapathirana. "There was also a very focused and productive female postdoctoral fellow who did great work, and it was helpful to have someone to look up to."

Because of this experience, Liyanapathirana realises the importance of role models and is eager to pay back for the opportunities she has had. She is a keen supporter and mentor for women in engineering — an academic field where they remain a small minority. She estimates that only 12 to 13% of Western Sydney University's civil engineering students are women.

In 2006, she and other female academics at the University set up the 'Women of Wisdom' group with the aim of increasing the retention of female engineering students. "We're still going very strong," she says. "Every year we hold icebreaker events, speed networking events, poster presentations and competitions, and invite people from industry."

While her academic work is most directly related to the ninth United Nations Sustainable Development Goal (SDG) on industry, innovation and

Computational geomechanics is essential in ensuring safe infrastructure design.

Zero Creatives/Image Source/Getty

infrastructure, she sees the fifth SDG on gender equality as a more personal mission.

STABILISING SYDNEY

Sydney is a particularly interesting place to be a civil engineer. The western part of the city sits on a layer of sedimentary rock, which in turn sits on top of sandstone. Known as Bringelly Shale, this sedimentary rock is highly reactive to moisture and has a soft, fine-grained texture, which gives it a low strength and stiffness. This makes it prone to expand and contract in wet and dry seasons and thus challenging to build on.

Foundations built on Bringelly Shale often settle unevenly, which leads to cracks and other damage to buildings and roads.

Computational geomechanics has helped engineers and builders develop techniques to mitigate the risks posed by difficult ground conditions and design and build safe and durable structures on them. These techniques include development of new ground improvement methods to mitigate risks using reinforcement methods, like the piles studied by Liyanapathirana, and installation of drainage systems to control groundwater levels.

While Liyanapathirana's work has had primarily an academic focus, she also works on projects with industry partners. "Right now, we have a project trying to find a solution to the Bringelly Shale problem by developing a new binding agent to treat and improve the ground."

NEED TO KNOW

- Deepa Samanthika Liyanapathirana is a civil engineer with a focus on computational geomechanics.
- She established herself as a leader in the field through her work on pile foundations.
- She is a keen supporter and mentor for women in engineering.

PREPARING FOR THE FUTURE

New areas of research for Liyanapathirana are the study of soil-structure interaction issues for foundations in unsaturated soils, and the long- and short-term effects of construction-induced ground movements and vibrations on foundations. There are many soil models to simulate unsaturated soil behaviour but their use for understanding the behaviour of geotechnical structures is limited. Considering construction-induced ground movements is important for massive infrastructure projects in populated areas. In some cases, these movements are beneficial to the foundations; for example, when installing columns for ground improvement, densification around columns can improve the loads that can be taken by them. In other cases, they can destroy structures on adjuvant foundations.

Increasing global temperatures and rising sea levels will make extreme weather more common, increasing the risk of flooding and landslides, and in turn making foundation design increasingly challenging. Liyanapathirana's research, along with that of other computational civil engineers, is helping to design and construct more sustainable and resilient infrastructure through a better understanding of rock and soil mechanics.

ECOLOGY BY NUMBERS: MODELLING CHANGES TO AUSTRALIA'S VEGETATION

An ecological mathematician has built a sophisticated computer model to help researchers navigate the perils of climate change.

15 LIFE ON LAND

Thirty years ago, as a PhD student, **Belinda Medlyn** began to examine what will happen to Australia's vegetation when atmospheric CO_2 hits critical levels.

The ecologist now leads the Ecosystem Function and Integration Theme, and the Climate and Forest Ecosystem Modelling Group, at Western Sydney University, and her focus is on understanding the impacts on environments as CO_2 levels and climate change spiral out of control.

During her PhD at the University of New South Wales (UNSW), her experiments focused on a theoretical future of a much warmer world. "But now, we're seeing it play out," she says. "We're in a big global experiment."

In her position as a Distinguished Professor at Western's Hawkesbury Institute for the Environment, her focus is on constructing a continent-scale computer model of Australia's vegetation, from the hummock grasses in the red centre, to the towering eucalypts of Western Australia.

NEED TO KNOW

- Belinda Medlyn is constructing a model of Australia's vegetation.
- It will assess how vegetation will change with higher temperatures and changing rainfall.
- A focus will be placed on extreme events.

CREATING PLANT AVATARS

The hope is that this model will enable more accurate assessments of how landscapes could transition as they experience higher temperatures and changing rainfall. "We're looking at Australian vegetation as a whole, and we're trying to think about how different components might shift or change," Medlyn explains.

Although vegetation is really complex, it follows a set of rules which can be mapped mathematically, she says. "The

Belinda Medlyn at the Hawkesbury Institute for the Environment.

(center) Cybele Malinowski; (right) Keven Osborne/Fox Fotos/Photodisc/Getty

maths attempts to come up with equations that describe the patterns that you see."

Based on that simple concept, Medlyn and colleagues are constructing a complex simulation of Australia's landscapes and vegetation, down to a resolution of around five square kilometres.

They want to know where plants are likely to die, where they are likely to thrive, and where vegetation types will be replaced. The work could also help predict changes in bushfire patterns.

"PEOPLE DON'T TAKE YOU SERIOUSLY BECAUSE THEY'RE NOT EXPECTING A WOMAN TO PRESENT A MATHEMATICAL MODEL."

AN EXTREME FUTURE

Medlyn's research addresses the UN Sustainable Development Goal —Life on Land — which aims for sustainable use of terrestrial ecosystems, including forests. "Ultimately, the aim is to use this research in management as well, so that you can say if we were to plant this kind of forest here, whether it would do well," Medlyn says.

Aside from the development of the model, her research has also highlighted how little was known at the time she was doing her PhD about what the future would hold. The prevailing thinking was that the Earth would get a little hotter and drier, but the extreme rises were wildly underestimated.

"A lot of the focus of the research now is on the really extreme events" she says. "We overestimated the capacity of plants to cope with what was coming."

UNSW climate scientist and colleague, Professor Andy Pitman, director of the ARC Centre of Excellence for Climate Extremes, says Medlyn's research is significant because it addresses one of the three crucial questions for understanding what the future of the planet will be — the future of food, the future of water, and the future of carbon.

"In order to understand the future of carbon, we have to understand how above- and below-ground vegetation responds to climate, and Belinda is doing work fundamental to answering that," Pitman says.

BUILDING CONFIDENCE

Medlyn isn't the only ecological mathematician in Australia, but she's one of very few women in the field, and that's had an impact on her experience as a scientist. "There certainly have been times where people don't take you seriously because they're not expecting a woman to present a mathematical model," she says. This has taught her the importance of being confident in her abilities and presentation, a skill she is working to impart to the next generation.

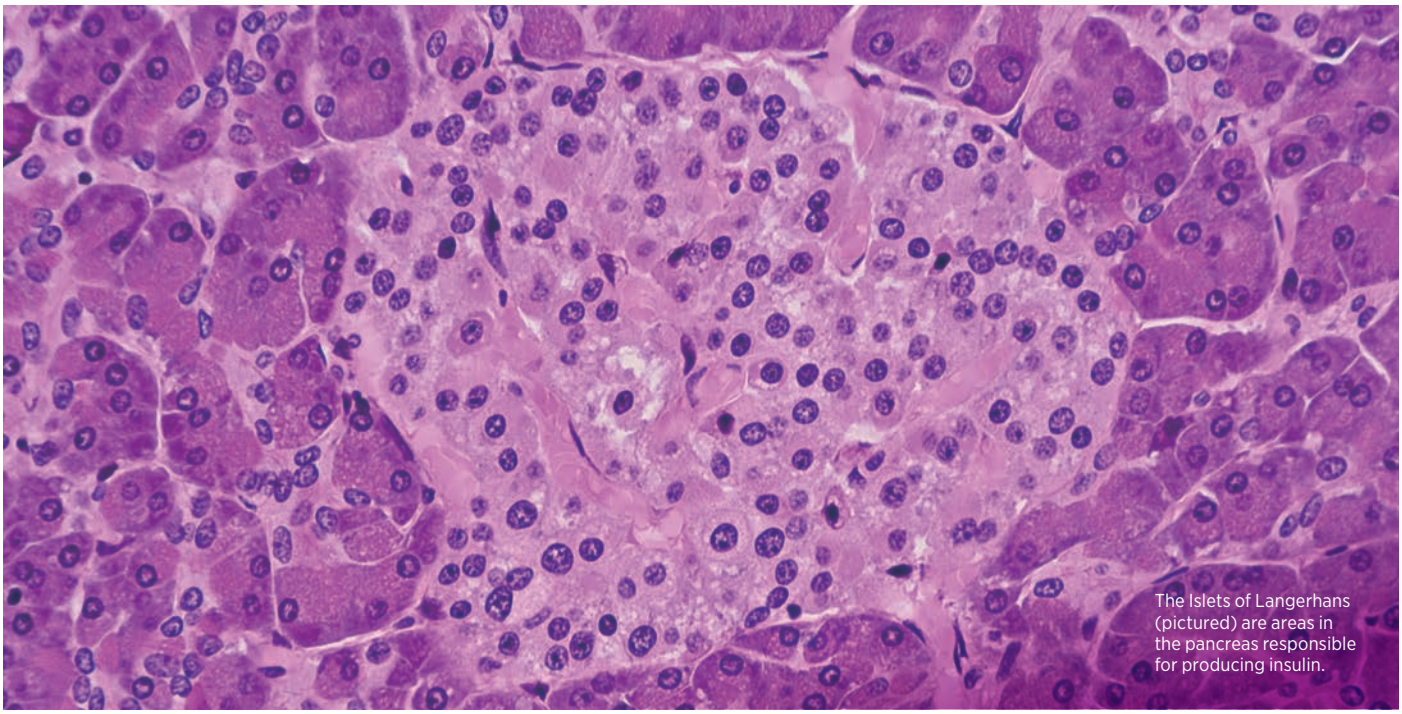
"I work with a lot of younger women, and building their confidence is a really important thing. Giving them permission to be authoritative and to see themselves as the authority in the subject," Medlyn says. "That takes quite a while to learn."

Towering eucalypts in the Boranup Forest in Western Australia.

Being awarded an ARC Georgina Sweet Australian Laureate Fellowship in 2019 was in part due to Medlyn's efforts in this regard. These fellowships are awarded to female researchers in recognition of their significant contributions both to their fields of research and to advancing women.

Medlyn herself has had an unconventional scientific career path, working part time for ten years to spend more time with her children when they were younger. She's an advocate for what she calls 'off-ramps' and 'on-ramps' in a scientific career; the idea that scientists should be able to take some detours from a full-time research career to spend time doing other things, whether that is raising a family or simply pursuing different interests.

"Just because you step off the pipeline for a beat, that shouldn't be the end," she says. But people need support to do that. "I was lucky that I had some really good mentors who created opportunities for me that allowed me to come back from part time to full time and build my career from there."



The Islets of Langerhans (pictured) are areas in the pancreas responsible for producing insulin.

BIOMARKERS DISCOVERY MAY HELP PREVENT DIABETES IN LATER LIFE

Women with gestational diabetes are at high risk of type 2 diabetes in the future. A new test for predictive blood markers might reduce the number that go on to develop the disease.

3 GOOD HEALTH AND WELL-BEING

Mugdha Joglekar, who researches diabetes, never expected to be at the receiving end of the disease she studies. However, similar to about 10-20% of pregnant women, Joglekar developed gestational diabetes.

Gestational diabetes usually goes into remission at the end of pregnancy, with high blood glucose levels associated with the condition returning to normal levels. For many women, however, the recovery is only temporary.

"A meta-analysis from *The BMJ* indicated that women with gestational diabetes have a nearly 10-fold higher risk of developing type 2 diabetes in later life than women without gestational diabetes," Joglekar says. Type 2 diabetes is a condition where the pancreas eventually fails to produce the desired levels of insulin due to increasing resistance to insulin.

"Really concerning is the high risk of type 2 diabetes onset just 8 to 10 years after pregnancy, or even before," she adds. This is much younger than the average age for developing the condition, which is around 55.

But Joglekar's recent research suggests this transition may be preventable. She and her collaborators have identified a specific biomarker, present in the blood of women shortly after they give birth, that could be used to identify which women were more likely to go on to develop type 2 diabetes.

The discovery could lead to the development of a test for new mothers. "These women could then start lifestyle interventions, such as diet and exercise, to potentially avoid type 2 diabetes later in life," Joglekar explains.

DIVERGENT PATHWAYS

For Joglekar, working in medicine is ingrained. "My grandfather was a doctor and established a hospital at Shirwal in rural western India," she says. Both Joglekar's parents took this further and she states "now, my brother and his wife work there as the third generation of doctors and surgeons continuing the legacy."

Her childhood spent in and around the hospital had a lasting effect. "I still clearly remember when I was six and a patient was brought in after an accident in which he lost a hand," Joglekar recalls. "I remember thinking, if lizards can regenerate their tails, why can't we regenerate our body parts?"

She was always intrigued by the what and the why of health. "I wanted to know what goes wrong with people when they get a disease," Joglekar says. Rather than follow family into the clinic, she pursued a path of biomedical research.

Ed Reschke/Stone/Getty

Joglekar was initially drawn to study the regenerative potential of stem cells. These versatile cells can replace or rescue damaged cells in many tissues around the body. "During my PhD I worked on converting pancreatic stem cells into insulin-producing cells, which are the cells whose function is lost in diabetes," she says.

The more Joglekar learned about diabetes, however, the more intrigued she became. "The causes of diabetes can be so varied; it's a really complex disease," she says. Today, her broad-ranging diabetes research spans the causes of the disease, potential prevention, and biomarker-based methods for early detection.

BIOMARKER BREAKTHROUGH

Despite the high prevalence of women developing type 2 diabetes after gestational diabetes, little research has focused on this pathway.

Type 2 (as well as type 1) diabetes is a serious condition in which elevated blood glucose levels gradually damage tissues including nerves and blood vessels, with significant health ramifications. Across the general population globally, the average age of type 2 diabetes onset peaks at around 55 years, but among women who suffered from gestational diabetes it's not uncommon to develop the condition as young as 45 or even earlier.

Not every woman with gestational diabetes is affected. "So, we asked the question: shortly after they deliver their baby, can we identify women that are at higher risk of developing type 2 diabetes in the future?" Joglekar says.

Joglekar and her colleagues collaborated with University of Melbourne clinicians to analyse a set of circulating microRNA biomolecules. Released by almost every cell type around the body, microRNAs can offer a detailed readout of health.

The team used machine learning/AI-based tools to analyse the levels of more than 700 microRNAs in blood samples collected from 103 women 12 weeks after a gestational-diabetes pregnancy. The women had been given a diabetes test every 1-2 years for up to a decade after giving birth. The analyses compared the microRNAs of women who went on to develop type 2 diabetes within this period with those who did not, searching for differences.

"We found one particular microRNA that is very important," Joglekar says. When combined with other known risk factors such as age and body mass index, women with this biomarker had a 90% higher risk of developing type 2 diabetes, the team showed.

Joglekar is now in discussion with researchers in Australia, U.S. and Canada to confirm the result in a larger patient population.

"We are also collaborating with nanotechnology researchers to develop a simple colour-changing test for the target microRNA," she says. If forewarned, these women could be further stratified to a higher risk group, who could then make lifestyle changes to avoid or delay disease onset. "As a person with experience of gestational diabetes, I would have liked to have had such a test," Joglekar notes.

The same test technology could be applied to other microRNA biomarkers — such as biomarkers for type 1 diabetes. Type 1 diabetes, unlike type 2, is linked to an autoimmune reaction in which the body's immune system attacks its own insulin-producing cells in the pancreas. Joglekar and her team are collaborating with Anandwardhan Hardikar, professor of physiology at Western, and his colleagues to validate biomarkers for type 1 diabetes.

"There are now therapies which can delay the onset of type 1 diabetes by a few years," Joglekar says. "If we could identify the children at risk, and then delay the disease, we'd not only give them a better quality of life for those years, but potentially give them a longer life as well."

"This cross-disciplinary research that Dr Joglekar leads in developing and validating microRNA biomarkers of future health puts Western Sydney at the forefront of developing cutting-edge technologies to stratify risk of future health across multi-ethnic communities," says Hardikar.

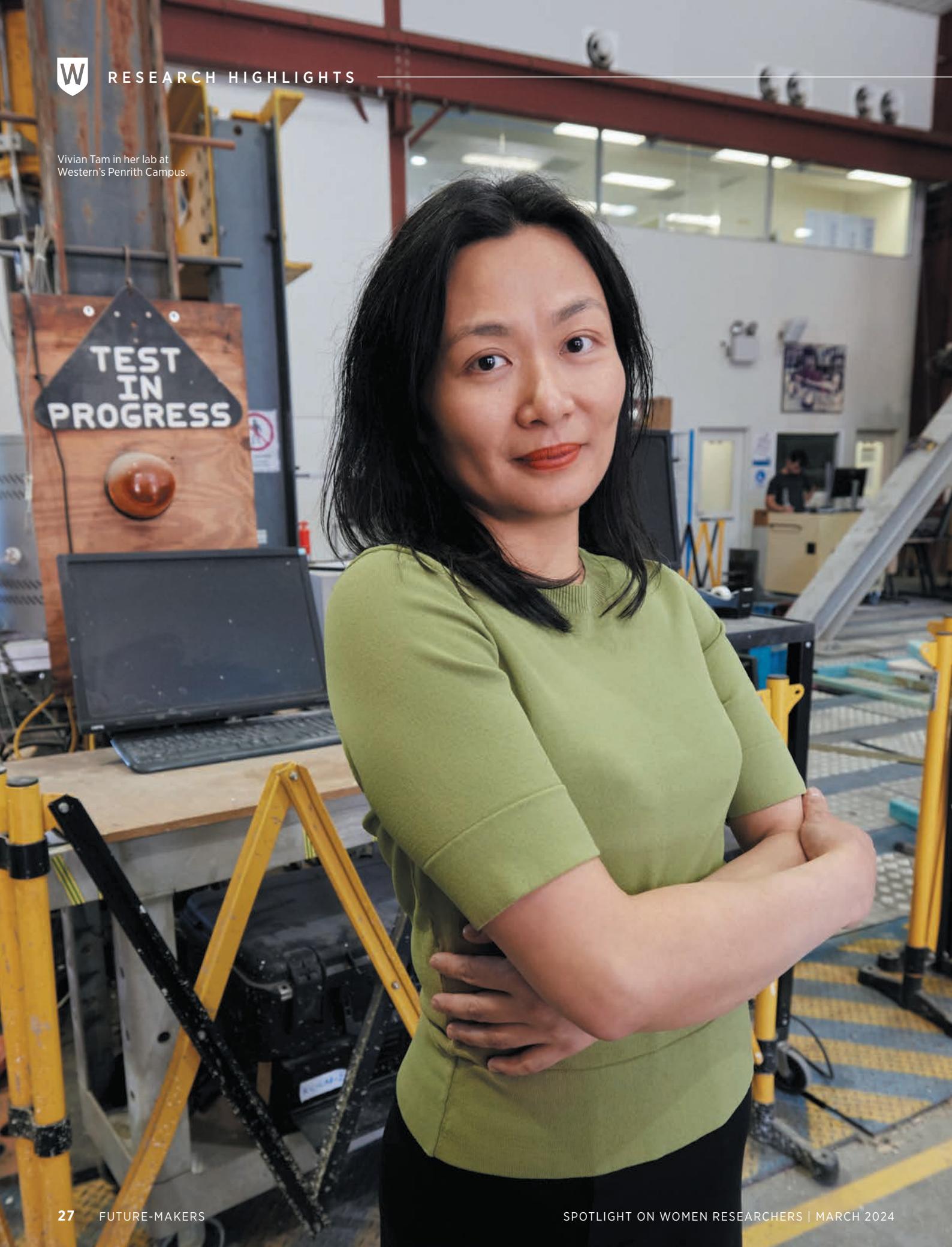
A pregnant woman testing blood sugar at home.

NEED TO KNOW

- 10-20% of pregnant women develop gestational diabetes.
- They are at higher risk of developing type 2 diabetes earlier than the average age of disease onset.
- Mugdha Joglekar and her team have found a biomarker found in blood shortly after pregnancy that can help identify women at risk.

Mugdha Joglekar, a senior research fellow at Western's School of Medicine.

(top) Guido Mieth/DigitalVision/Getty



Vivian Tam in her lab at Western's Penrith Campus.

(left) Cybele Malinowski; (right) Andrew Merry/Moment/Getty

BUILDING A NEW SUSTAINABLE PATH

A move to Western Sydney University set Vivian Tam on a new path of discovery that brings together the dynamic working elements of Australia's construction industry.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Vivian Tam is the epitome of a pioneering researcher. After joining Western Sydney University in 2009 as a senior lecturer in quantity surveying, she secured the first Australian Research Council (ARC) Discovery Projects grant in construction management in 2015, studying the lifecycle cost and emissions of green buildings. This was followed soon after with a second ARC Discovery Projects grant on developing a multiple-constraint automation model for optimal green building implementation with construction industry partners, putting sustainable construction on the national research agenda in 2019.

"Construction management is not a field traditionally associated with research funding," Tam says. "When I joined the School of Engineering in 2009, we had no PhD students in construction, and no research projects. These two ARC projects kicked off a new culture of research here, and we now have more than 25 PhD candidates covering a range of topics, as well as the largest number of undergraduate students in construction management in Australia."

Tam earned her own PhD in construction engineering and management at City University of Hong Kong, studying the environmental impact of the local construction industry. This led to her interest in green buildings and sustainable construction, which has focused on turning construction waste into a valuable building resource.

"I have been studying ways to recycle concrete since 2001, which led to the recent development of our CO2 Concrete process, for which I have just received the first ever ARC Future Fellowship in construction management," says Tam.

A spin-off venture, CO2 Concrete which produces durable and high-strength recycled concrete by injecting carbon dioxide into recycled aggregates to improve its bonding, has now been established with Tam as Lead Inventor to further develop the process with local industry partners.

"Western Sydney is a really dynamic region with lots of infrastructure development over the past decade, including the new airport," says Tam. "This makes it a great place for sustainable construction research, with many willing partners for collaboration."

At the same time, Tam has taken on the roles of Associate Dean (Research and HDR) of the School of Engineering, Design and Built Environment and Director of the Centre for Infrastructure Engineering. She has just been made Western Sydney University's first ever Fellow of the Australian Academy of Technological Sciences and Engineering for her contribution to a low-carbon circular economy, making her mark as a leader in the field she has pioneered.

"I have received lots of support in my career at Western Sydney by following my passion," Tam says. "My encouragement for any researcher is to find your interest and follow it."

NEED TO KNOW

- Vivian Tam is passionate about recycling waste in construction.
- She was awarded the first ARC Discovery Projects Grant in construction management.
- She is the lead inventor of CO2 Concrete.

The Sea Cliff Bridge, a concrete elevated overpass in New South Wales.

UNDERSTANDING ANTI-ASIAN RACISM IN AUSTRALIA

Racism towards Asian Australians is overwhelmingly unreported, finds a Western-led study.

10 REDUCED INEQUALITIES

A study conducted during the COVID-19 pandemic has found that Asian Australians are overwhelmingly not reporting incidents of racism, and Associate Professor **Nida Denson** from Western Sydney University's School of Social Sciences is trying to find out why.

Denson, who was born to Thai immigrant parents in the United States and grew up in the Midwest, aims to improve the health and wellbeing of marginalised groups by understanding how racism occurs at the individual and organisational level.

While completing her PhD at UCLA in the United States, her work was focused on diversity in higher education contexts and has appeared as evidence in U.S. Supreme Court cases supporting race-conscious university admissions practices. Since joining Western in 2007, her research interests have expanded to include racism in broader contexts. Denson is also a member of the Centre for Resilient and Inclusive Societies, an independent think tank comprised of universities and civil organisations undertaking research to inform policies for social inclusion and resilience.

IN NOVEMBER 2020

63%

OF ASIAN-AUSTRALIAN

survey respondents believed that reports about racism would not be taken seriously.

There is a reluctance to report racist incidents to authorities, for a number of reasons.

(top) treety/iStock/Getty; (bottom) Wachiwit/iStock/Getty

As part of a project stream that aims to challenge racism and enhance social belonging, Denson co-led a study with Western colleague, Dr Alanna Kamp, a senior lecturer in the School of Social Sciences, to conduct a nationwide survey of more than 2,000 Asian Australians about their experience during COVID-19. In November 2020, the researchers asked participants about their experiences of racism before March 2020 — when the first lockdown began in Victoria — and how their experiences had changed since then.

NEED TO KNOW

- Asian Australians experienced many racist incidents during the pandemic.
- They were unlikely to report this due to a lack of trust in authorities.
- Nida Denson and colleagues are launching a campaign called *Let's Talk about Racism*.

LACK OF TRUST

A startling revelation was that many racist incidents during this period went unreported to authorities, employers, friends or family. While overt acts of racism decreased by 10% in Victoria — which had undergone the longest lockdown at the time of the study — and 8% across the nation due to lockdowns and physical distancing, 40% of Asian Australians still faced racism during the pandemic.

Furthermore, on asking victims about their likelihood to report racist incidents, 30–50% chose not to report racism they faced or witnessed, even to friends and family. Only 3% of victims and witnesses reported racism to the Australian Human Rights Commission, implying that the number of complaints received by the Commission underrepresents reality.

"Not reporting was the most common response. This was for many reasons — some didn't have knowledge of authorities they could report to. Others thought authorities just would not care, and that they would be re-traumatised through reporting," says Denson. "The results show that 63% of respondents believed that their report would not be taken seriously, 60% felt the incident would not be handled in an appropriate manner, and 40% lacked trust in authorities. That was surprising and sad."

One respondent shared that the offender was a client of their employer. "I'm sure that if I reported the incident, it would have been ignored. Even worse, I feared that I would have to face ramifications for reporting the incident," they said.

The anticipation of racism left a significant impact on Asian Australians' mental health, even for those who hadn't been direct victims of racism. "Over three quarters of respondents said that they avoided going outside for things like shopping, even after lockdowns were eased," says Denson. "The anxiety from anticipating racism eroded their mental wellbeing, and also affected their sense of feeling Australian and their sense of social cohesion."

NEW WAYS OF COHESION

Drawing on these learnings, Denson and colleagues are launching a social media campaign (*Let's Talk About Racism*) to educate the wider community on what racism could look like, both overt and subtle. The campaign will use social media tiles and a short video to depict these scenarios and provide specific suggestions for actions that victims and bystanders can take.

"There have been instances on public transport where an individual openly berates an Asian person, but the rest of the passengers sit in silence, unsure of what to do. From the perspective of the victim, this can feel like the other passengers agree with the aggressor," she says. "In instances like this, bystanders can ask whether the victim is OK. They don't have to confront the perpetrator, but it's important to recognise that bystanders can be a more active participant; it shouldn't be left just to the victim to stand up, because they're not always able to."

While Denson believes racism will always be an issue, she sees hope from marginalised groups learning from each other and coming together. "The target of racism changes based on world events. Islamophobia was huge after 9/11, and now with COVID-19, Asian hate," says Denson. "For example, Islamophobia Register, a group that began creating a platform for people to report incidents of Islamophobia, is seeking cross-group collaboration; groups combatting Asian Hate are thinking of creating a similar register. Change is gradual but underway," she says.

Nida Denson is an associate professor at Western's School of Social Sciences.

IMPROVING RESEARCH PATHS FOR THOSE WHO COME NEXT

Professor Michelle Trudgett uses her own experience to improve outcomes for Indigenous scholars and students.

While running several major projects as Western Sydney University's Deputy Vice-Chancellor Indigenous Leadership, Professor **Michelle Trudgett** also maintains a significant research load, with a focus on Indigenous participation in higher education and leadership.

A Wiradjuri woman from Dubbo in New South Wales, Trudgett loved being a student and after completing an undergraduate degree at the University of New England, she enrolled in a Master of Professional Studies with a major in Indigenous studies, followed by a Doctor of Education degree.

"I realised when I was studying that there wasn't much support for Indigenous postgraduate students," she says. So she made this the subject of her doctoral thesis.

NEED TO KNOW

- Michelle Trudgett is Western's first Deputy Vice-Chancellor Indigenous Leadership.
- She launched Western's 2023-2032 Indigenous Futures Decadal Strategy.
- Western is building an Indigenous Centre of Excellence at the Parramatta South Campus.

Michelle Trudgett, Deputy Vice-Chancellor Indigenous Leadership at Western.

In 2009, Trudgett was recruited by Macquarie University, becoming its first Indigenous postdoctoral research fellow. Working in the Indigenous Studies department, she moved quickly up the academic ranks and within two years was promoted to senior lecturer and deputy director of the department.

She left Macquarie University in 2014 for the opportunity to be the inaugural Director of the Centre for the Advancement of Indigenous Knowledges at the University of Technology Sydney. Trudgett was then attracted to a leadership position at Western Sydney University in 2019, to fulfill the position of Pro Vice-Chancellor Aboriginal and Torres Strait Islander Education, Strategy and Consultation. In 2021 she was promoted to her current role.

BUILDING FUTURE LEADERS

When she joined Western, one of Trudgett's first tasks was to develop the University's Indigenous Strategy for 2020-2025, which was launched in March 2020. It focuses on Indigenous engagement across seven key areas: students; employment; research; learning and teaching; community engagement; leadership; and cultural viability and knowledge.

"The Indigenous Strategy had a lot of ambition, a lot of big commitments, but the biggest of them all was the goal to establish a landmark building that celebrates Indigenous people, history, culture and knowledge," she says. That dream is soon to come to life via the Indigenous Centre of Excellence (see 'The Indigenous Centre of Excellence', page 33).

Trudgett recently launched the 2023-2032 Indigenous Futures Decadal Strategy, which complements the first plan.

While leading these major strategic endeavours, she also recently completed two ARC projects with her long-standing research partner, Professor Susan Page, Pro Vice-Chancellor, Indigenous Education. One looks at Indigenous leadership and governance in higher education

"I THINK WESTERN IS A PLACE WHERE INDIGENOUS PEOPLE CAN THRIVE."

and the other investigates how the sector can best support and develop early career researchers (see page 57).

The first project on Indigenous leadership, included interviews with the Vice-Chancellors of 27 universities around Australia about their perceptions of Indigenous leadership in the sector.

"We found that Indigenous leaders in higher education are expected to have more skills than non-Indigenous leaders," says Trudgett.

"We are expected to have all the attributes, such as diplomacy and resilience, that you would expect any leader to have. But, on top of that we are expected to have additional personal and cultural competencies.

While finding that senior Indigenous positions in Australian universities are a growing priority for the higher education sector, the research showed that the scope of the senior leader positions is very broad, often covering

both strategic and operational responsibilities. The team also found a key challenge linked to senior Indigenous appointments is career progression beyond their Indigenous portfolio.

Trudgett believes the university sector has a long way to go in terms of recognising and respecting the skills of Indigenous leaders. "The university sector still has not seen one Indigenous Vice-Chancellor," she says.

In a paper from the research, Trudgett and her co-authors note "these roles should never be viewed as supplementary to other portfolios, but rather core to all components of university business. Emerging and current senior Indigenous leaders are one of the sector's richest assets, who have tremendous power to challenge how the higher education system in Australia operates."

The next stage of the research is to establish a model of best practice for Indigenous leadership and what it brings to organisations.

On the question of what makes a good leader, Trudgett shared a story about her grandfather, an Indigenous man from Warren in NSW.

"My dad's father lived in a small country town outside Dubbo and was the coach of a predominantly non-Indigenous football team. He had to get a bunch of country men together, to the point of them having a shared vision and being on the same page. For an Aboriginal man in the 1950s, that would not have been an easy task, but he did it while getting great respect," she recalls.

Trudgett is not one to dwell on difficulties. When asked about challenges she's faced in her career, she hesitates before replying. "What some people see as a barrier or a challenge, I prefer to flip on its head and see as an asset," she says.

"When people say Indigenous people are disadvantaged in education, for example, that is completely true, but I would say I'm actually advantaged because I am Indigenous and I come with a whole range of Indigenous knowledge and lived experience, which are huge assets," Trudgett adds.

"It's the things that make me unique and different from most of Australian society which are part of the reason I have the opportunities I have in life. Challenges quickly become opportunities."

LOOKING AHEAD

For now, Trudgett's main challenge is trying to maintain a significant research profile while holding a senior executive position, which is "often an intense pressure situation".

She is proud of all the positive initiatives taking place at the University. "I think it's a place where Indigenous people can thrive and be supported, which is not the case in some other universities," she says.

"The way the Indigenous staff support each other regardless of what portfolio they are in, how they support our students, how they come together, how we are on a shared journey to do good things that are going to make changes for our community is something I am very proud of".

"If I stepped away, the Indigenous staff here at Western are so dedicated and brilliant that they can keep things going. I don't think that all universities can say that."

THE INDIGENOUS CENTRE OF EXCELLENCE

In February 2023, Western Sydney University received a grant of $78.5M from the NSW Government's WestInvest program for an Indigenous Centre of Excellence, which will be located on Darug land at the University's Parramatta South Campus.

For Professor Michelle Trudgett, the announcement of their successful bid — which will ensure the future of the proposed centre — is a major step towards realisation of her vision for a landmark building and the culmination of months of work in planning, community consultation, and meetings with architects and designers.

Kayden Edwards, an Indigenous student, also welcomed the initiative, saying that many high-school students want to learn more about their culture but the resources aren't available. "It will be especially important for onboarding students in coming years by adding that layer of community and culture into their lives," he says.

"It will attract staff, students and members of the community to the same place and get them all interacting."

The Centre will include an Indigenous Research Institute, a First Nations library and archive space, auditorium, theatre, elders' rooms, children's play areas, meeting spaces and a yarning circle.

Trudgett is one of five Indigenous members of the panel of eight to judge a national design competition for the building, with the winning design announced in late 2023 and the new building planned to open in February 2026.

"That is my main focus at the moment. It's huge and it's something that will keep giving to the community for many generations to come," she says.

THE ROBOTS THAT CAN TEND TO INDOOR CROPS

Cultivating food indoors could be made more efficient by incorporating imaging, robotics and data analysis.

A vertical hydroponic system growing lettuce.

2 ZERO HUNGER

In the open air, the success of growing crops is reliant on many factors.

In contrast, growing protected crops in sheltered environments such as greenhouses offers agriculturists much more control over factors such as light, water and nutrients.

"But you don't want to go into these facilities a lot," says Professor **Oula Ghannoum**, a plant physiologist at Western Sydney University's Hawkesbury Institute for the Environment. "You want to reduce human contact, because people can be vectors of crop infections." The other main challenge is that we have a shortage in skilled labour but some of these tasks can be done by machines and artificial intelligence.

Ghannoum leads a project called Automated Crop Monitoring for Protected Cropping Systems, which was launched in April 2023 by Australia's Future Food Systems Cooperative Research Centre.

"We're developing a non-invasive technique to monitor crop growth and health, as well as fruit quality and ripening," Ghannoum explains. In terms of the United Nations Sustainable Development Goals, this project ticks most of the boxes for efficiency, she says.

This technique relies on obtaining and analysing images. "We have to figure out how to take the images, but also how to analyse these images and turn them into biological information that can assist growers," Ghannoum explains.

The project comprises three parts: selecting the camera for imaging; developing robotics for enabling the camera to capture information throughout the growing facility; and data analysis.

"In the end, the product will be just a single unit," she says. That machine will consist of a series of cameras for visible-light and hyperspectral imaging, possibly a sensor to collect depth and thermal data, and the robotics that move the cameras to capture the information required.

According to Ghannoum, the tricky part will be analysing the data. This will require creating 3D reconstructions of the crop plants from images and combining them with environmental data from the facility. From this, the scientists will determine a plant's health, growth and production level, and also decide whether the plants need attention, such as more nutrients.

So far, the team's manual prototype collects images, and the scientists can measure growth rate. "The next steps are to determine the fruit volume, leaf size and crop yield," Ghannoum says.

From the start, this project has been attracting attention from researchers and agriculturists. "We're excited to develop our vertical farming systems, including cost-effective imaging and sensing solutions for real-time monitoring of crop growth, nutrition, health, yield and quality of our leafy green produce," says Wayne Ford, co-founder and chief executive officer at Vertical Patch, an urban agricultural company in Smithfield, which is an industry partner in the project and has several controlled/protected-crop farms in Sydney. "Under Oula's guidance and direction, this project will bring further research and innovation to our vertical farming systems."

NEED TO KNOW

- Protected cropping can improve food yield and reliability.
- But humans may introduce infections while monitoring the crop.
- Robotic monitoring could help minimise human contact and thus crop infections.

onurdongel/iStock/Getty

NURTURING CULTURAL IDENTITY IN FOSTER CARE

Respecting distinctions for children from diverse backgrounds raised in out-of-home settings.

10 REDUCED INEQUALITIES

Cultural identity is critical to a child's wellbeing.

Researchers say it cultivates a sense of belonging, self-esteem and a connection to their roots; it helps kids thrive within their own family traditions, while navigating the complexities of their world with greater understanding and compassion.

Yet, for many children and adolescents placed into foster care or other out-of-home settings, cultural mismatches with caregivers — in terms of ethnicity, language, religion or other backgrounds — can impede the nurturing of these identities, potentially causing feelings of isolation and making it more challenging for young people to thrive emotionally and socially.

A research project led by Professor **Rebekah Grace** at Western Sydney University aims to address these obstacles within Australia's child protection system.

With funding from the Australian Research Council, Grace and her colleagues have been studying the factors that facilitate the preservation of heritage and cultural traditions among children who cannot live with their birth parents.

This research aims to inform best-practice guidelines for establishing culturally secure and nurturing settings for youth from migrant and refugee family backgrounds.

Legal provisions already exist to guide the placement of Aboriginal and Torres Strait Islander peoples, but no comparable placement principles have yet been established in Australia for other cultural groups.

"Every child has a right to be raised within their own culture," says Grace, a developmental psychologist who directs Western's Centre for Transforming early Education And Child Health (TeEACH). "But there are very few practical guidelines and little evidence in this space in terms of what's effective."

NEED TO KNOW

- Many children in foster care have a cultural mismatch with their carers.
- This can cause feelings of isolation and make it harder for the child to thrive.
- Western's Rebekah Grace and colleagues are trying to find out how to help carers to support the cultural connections and identities of children.

Practitioners and service organisations desperately need information on how to successfully support this cohort of children and young people, Grace says.

Her project — which Western researchers are conducting in collaboration with academics at Macquarie University and the University of Sydney — aims to fill that research gap.

She and her colleague Associate Professor Stacy Blythe, Deputy Director of the Translational Research and Social Innovation group, started by conducting a national review of policies and procedures around cultural sensitivity issues within out-of-home care environments in relation to non-Indigenous children from diverse geographic, religious and linguistic backgrounds.

They found very few policies and procedures, and those they did find were mostly aspirational, lacking the kinds of practical guidance needed to effectively navigate the complex task of raising children in a culturally sensitive manner.

To understand the experiences and support needs of all parties involved in welfare services for culturally diverse children in care, Grace and her team are talking to service workers, children, caregivers, and birth-family members. Their focus extends to finding ways to help carers support the cultural connections and identities of children, and identifying useful steps to improve practices.

They plan to design an evidence-based practice model that emphasises the importance of cultural identity and balances the need to support cultural maintenance with other considerations in placement decisions.

"The system is really far behind society's standards today, in terms of respecting diversity and caring for people," says Blythe, who is also a long-time foster carer, and a board member of the International Foster Care Organisation. "It's a messy space to work in — which is why we do research to try and fix it."

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There were **ABOUT 46,200 CHILDREN** in out-of-home care in Australia as of June 2021.

Source: www.aihw.gov.au

Georgijevic/E+/Getty

Cultural mismatches between children and foster carers can make it difficult for children to thrive.

BRINGING AN INDIGENOUS PERSPECTIVE TO HEALTHCARE

Nurse and academic, Professor Kerry Doyle is linking researchers with Indigenous communities to create better healthcare outcomes.

3 GOOD HEALTH AND WELL-BEING

Growing people and establishing a good research team

is what Professor **Aunty Kerrie Doyle** regards as her biggest achievement, but she is also widely known and respected as an advocate for Aboriginal healthcare.

Doyle is the Associate Dean, Indigenous Health, in the School of Medicine at Western Sydney University and she also co-chairs the Aboriginal Health and Wellbeing Academic group of Maridulu Budyari Gumal (the Sydney Partnership for Health, Education, Research and Enterprise).

After training as a nurse in the 1970s, she worked as a community nurse in Aboriginal communities around Australia and was a founding member of the Congress of Aboriginal and Torres Strait Islander Nurses and Midwives (CATSINaM). In the 1990s, when nursing had become a university degree, she returned to study and after completing a number of degrees, in 2017 she finished her PhD on the topic of 'Community and social inclusion in Indigenous communities' at the Australian National University in Canberra.

In 2019 the Dean of the School of Medicine, Professor Annemarie Hennessy, recruited Doyle to Western. "I'd been following her work for some time and thought she would be a great person to work with, so I accepted the job," says Doyle.

She came with a five-year plan to build a research team that could lead to improved healthcare for Indigenous communities across New South Wales. Although the plan was disrupted by COVID-19, over the past four years she has built a multidisciplinary team that works across a diverse portfolio of projects.

Her research team provides an Indigenous perspective on a range of social science and health-related projects led by other departments and universities, as well as leading its own projects, in response to community needs.

The research revolves around Indigenous mental health, covering issues such as social and emotional wellbeing; gambling and cultural connection; and diabetes and eating disorders.

LaylaBird/E+/Getty

Doyle says the team needs to be very diverse to cover such a wide range of issues and community needs.

As well as her work on local Australian Indigenous issues, she is part of an international project on the global burden of disease with the University of Washington in Seattle in the United States. "That's a huge project and I'm only a small cog with a very small voice, but since last year they have started to include Indigenous Australians, which is really important," she says. "We are such a small cohort globally, and we miss out on a lot of health information."

In collaboration with her Western Sydney University colleague, Dr Paul Saunders, she has also studied the incidence of gambling in Indigenous communities during the isolation of COVID-19. The pair have developed a public health awareness strategy to educate doctors on how to talk to Indigenous people about gambling.

"People look at gambling and think it's an addiction, a medical issue — but it's also an issue of poverty and helplessness," she says.

A member of the Indigenous community receiving a COVID-19 vaccination in New South Wales.

Australian Associated Press/Alamy Stock Photo

NEED TO KNOW

- Western's Aunty Kerry Doyle aims to improve healthcare for Indigenous communities across NSW.
- Her team focuses on Indigenous mental health, gambling and cultural connection, and diabetes and eating disorders.

"We found that people with a gambling problem will usually talk to a family member first, then to their GP, so we put a lot of resources into educating GPs using the concept of the 'gambling bug'. We would tell people, 'Go and tell your doctor you've been bitten by the gambling bug'. It was a way to have people be able to talk about their problem without feeling shame."

As well as these major projects, Doyle and her team have a number of smaller grants. For example, one of her researchers visits a local 'men's shed', where they teach men how to use computers.

"We show them how to send emails, how to write a CV, even how to get on to social media, because some of them are disconnected from their families," she says.

With another small grant, she is holding a workshop to teach traditional knowledge, such as weaving and games.

> "WE ARE SUCH A SMALL COHORT GLOBALLY, WE MISS OUT ON A LOT OF HEALTH INFOMATION."

As experienced by some other fair-skinned Indigenous people, Doyle has sometimes been a target for criticism. She finds another challenge, also faced by many Indigenous people working in their own communities, is being on call 24 hours a day.

"You have to deal with issues that are part of your community, and you are trying to make a difference in your community. That can be hard when you know there is such a big need," she says. She is surprised when people ask her how often she visits Aboriginal communities, and she responds, "Every day, when I go home."

Doyle would like to give non-Indigenous people the skills to work effectively in Indigenous communities — not just in Australia but around the world.

"Educating and training clinicians about working in different communities will ensure everyone feels confident in multicultural care settings," she says.

And for the future she'd like to expand her team and apply for more grants in the hope of winning additional funding and support more research by higher-degree students.

"That's always my biggest feeling of accomplishment — when your student graduates with their PhD, there's nothing better."

Concrete is a major component of buildings and presents a major sustainability challenge.

ENGINEERING A RESEARCH CAREER WITH IMPACT

A focus on high-performance advanced composite materials and resilient structures has seen one engineer become a disciplinary leader and sustainability champion.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

In the field of mechanical and aeronautical engineering, one route to sustainability is to increase the durability, maintainability and resilience of materials, which extends the working life of structures and enhances structural safety, thereby reducing energy consumption and waste.

For Professor **Sarah Zhang**, this path of research has led to a series of opportunities and in a few short years has propelled her into a leadership position in her field.

Zhang joined Western in 2019 after 15 years at the University of New South Wales (UNSW). She is a mechanical and structural engineer with expertise in numerical modelling and simulation, focusing on research and development of advanced composite materials and structures. Since joining Western she has developed a strong interest in sustainability and strong leadership especially in defence-related research.

NEED TO KNOW

- Magnesium oxychloride cement can be produced from industry by-products.
- Sarah Zhang and colleagues found a way to make it more water resistant.
- She is now developing green composites that will improve its fire resistance and sustainability.

DEFENCE APPLICATIONS

Zhang has been successful in securing a couple of major projects by the Next Generation Defence Fund, funded by the Department of Defence, to develop nanocomposite adhesives to improve the efficiency, durability and longevity of repairs to key infrastructures especially for aircraft structures, as well as to assess the vulnerability of composite structures against laser weapon attacks and enhance the structural protection capability.

"These projects are very challenging, but critical and significant to the defence industry and composite manufacturing. They are focused on improving structural performance for key infrastructure made of composites, which are widespread across civilian and defence industries," says Zhang. "I look at both through a sustainability and resilience lens: how we can extend the lifetime of structures through smarter and greener advanced materials and manufacturing technology and processes."

CONCRETE RESULTS

One of the most polluting aspects of construction is the manufacture of the cement used for concrete. The production of ordinary Portland cement (OPC) accounts for up to 8% of global CO_2 emissions. Zhang's first research project with

wx-bradwang/iStock/Getty

"I LOOK AT PROJECTS THROUGH A SUSTAINABILITY AND RESILIENCE LENS."

Western was a continuation of the research she started at UNSW on an alternative type of cement, which is environmentally friendly, but has not been widely adopted by the construction industry.

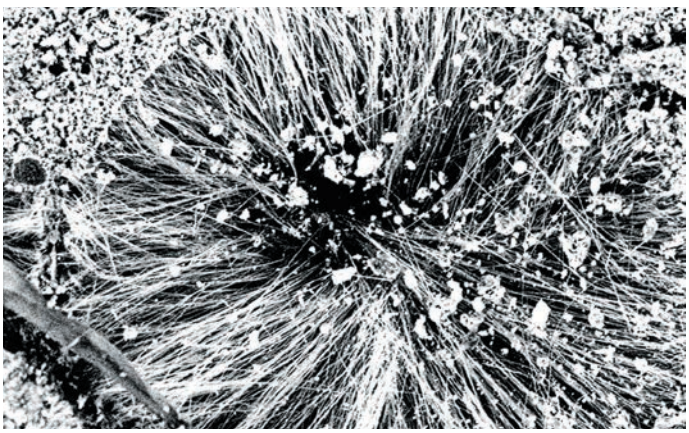
Magnesium oxychloride cement (MOC) is a 'green' cement produced from industry by-products, especially from magnesium mines, that has been known about for some time. However, "while it is strong and sets quickly, it has low water resistance, which has prevented it from being used externally," explains Zhang.

Zhang and her team made a breakthrough in recent years and developed a formula using other industry by-products such as fly ash and silica fume. The addition of some acid solved the issue of poor water resistance.

The new formula led to the microstructure of the cement being set in a way that prevents the material from being weakened by water. The result has been adopted by a local industry partner.

After that significant win, Zhang started exploring the addition of short fibres to further improve the durability and fire resistance of the green composite and improve its resilience and sustainability.

"Fire resistance under loading is a significant issue for buildings and key infrastructures," Zhang says. "We were awarded a Discovery Projects grant from the Australian Research Council to develop fire resistant composites especially for non-structural application such as claddings."



A scanning electron micrograph of the needle-like phase of magnesium oxychloride cement (MOC).

IMPACTFUL LEADERSHIP

Meanwhile, Zhang has worked tirelessly to build the research capacity of the School of Engineering, Design and Built Environment in her disciplinary areas in both mechanical and civil engineering, in particular in advanced materials and manufacturing, and construction sustainability and resilience.

She is the founding Co-Director of the Centre for Advanced Manufacturing Technology and was the Deputy-Director of the Urban Transformations Research Centre at Western. She has also been Western's discipline lead for Civil and Environmental Engineering and a Research Theme Champion for Environment and Sustainability. In addition to her research agenda, Zhang has been contributing to the University governance and education. She has been working as the Deputy Chair of the Academic Senate since 2021 and as the Acting Chair of the Senate for the second half of 2022.

"I was fortunate to be given these leadership roles and I received a lot of great support from the University to turn these opportunities into active programmes and outcomes," Zhang says. "Western is such a vibrant and dynamic university, with truly impressive engagement agendas across community and industry, and many dedicated people working so hard and making things happen."

HELPING YOUNG MIGRANT WOMEN FIND WORK

A new project could expand Australia's workforce by bridging the gap between newly arrived young women migrants and local employers in two local government areas in southwestern Sydney.

eyesfoto/E+/Getty

8 DECENT WORK AND ECONOMIC GROWTH

According to Dr **Teddy Nagaddya** there is a common negative stereotype that migrants to Australia take more than they give to their new communities. She argues that it's long past time to "unpack migrants' talents and see what their skills and experiences can bring to their new communities and to Australia as a whole."

Nagaddya, a lecturer in social work & communities at Western Sydney University, is completing a three-year research project that aims to bridge the cultural and employment gap between young women migrants to Australia and local small businesses who need workers.

A 2021 Labour Force Australia survey found that the unemployment rate for recent migrants was 7.2% compared to 4.8% for people born in Australia, with even starker unemployment figures for migrants who didn't speak English as their first language. Women migrants had a 6.7% overall unemployment rate, compared with 6.0% for men.

A MEETING OF MINDS

"We see several intersecting modes of disadvantage impacting these women," Nagaddya says. "This is a social justice issue because meaningful employment is a key indicator of successful migrant integration into Australian society."

A project by Nagaddya on 'Place-based employment and enterprise of newly arrived young migrant women', has received funding from the Australian Research Council's highly competitive Linkage Program. Nagaddya, along with her Western co-investigators Dr Ee Ling Quah and Associate Professor Nida Denson, has chosen to focus on the Liverpool and Fairfield local government areas (LGAs) in Sydney's southwest.

What these two culturally vibrant but economically challenged LGAs have in common is that only about one-third of their residents were born in Australia. In Liverpool, migrants from Lebanon, India and Fiji are the most prevalent. In Fairfield, migrants have most commonly come from Iraq, Vietnam and Syria.

Nagaddya's project begins with an assessment of local employers' needs. "We want to understand whether employers have structures or cultural pathways to help migrants to access meaningful employment," she says. "Or do they erect barriers that keep migrants out of the workplace?"

The next phase will be to interview young migrant women who have settled in Liverpool and Fairfield. "We must explore migrant women's intersecting vulnerabilities, instead of just asking why they aren't accessing employment," Nagaddya says. "Regardless of language barriers and other obstacles, migrants have a lot to offer their local communities. We'll develop interventions to build employment opportunities appropriate to each place."

BRINGING EMPATHY

As a migrant from Uganda herself, Nagaddya is sensitive to the complicated social dynamics each newcomer experiences. "I came to Australia as a PhD student, with a smooth and defined pathway, unlike typical migrants who may literally have no idea where they're going to live or what they'll do for employment," she says.

Professor Brian Stout, Dean of the School of Social Sciences, says Nagaddya's empathy contributes to the high impact nature of her work. "Teddy's research supports policy solutions to improve the lives of migrants and those around them," he says. "Teddy and her research partners are building important links between grassroots community groups, funders and policy makers."

Looking ahead, Nagaddya sees opportunities to apply her research team's findings elsewhere by adapting them as needed. "As we gain an understanding of what works in Liverpool and Fairfield, we hope to replicate what we've done here," she says. "Our place-based approach to employment is another way of encouraging targeted investments that can create opportunities for entire communities while acknowledging migrants' contribution to their local economies."

NEED TO KNOW

- Western's Teddy Nagaddya is assessing the needs of local employers and newly arrived young migrant women in two economically depressed LGAs in Sydney.
- She hopes to address commonalities between employers and migrant women to boost local economies.

MIGRANTS HAVE A LOT TO OFFER THEIR LOCAL COMMUNITIES

Snapix Studio

Teddy Nagaddya is a lecturer in Social Work and Communities.

AN ADVOCATE FOR WOMEN FROM BIRTH

One of Australia's leading midwifery academics discusses the inspirations behind her career, her groundbreaking research and her lifelong commitment to women's rights.

3 GOOD HEALTH AND WELL-BEING

"The meaning of the word 'midwife' is 'with woman'" — the word is perfect because women are the centre of everything we do," says Dr **Hannah Dahlen AM**, Professor of Midwifery at the School of Nursing and Midwifery at Western Sydney University. "I respect every single person I care for, regardless of their background. I can never step into anyone else's skin, that's not my job. My job is to listen to each individual's needs and optimise their birth experience accordingly."

Dahlen was born in Yemen during the 1960s, where her mother worked as a midwife. Dahlen's mother was originally from the UK, and had worked as a midwife in St Frideswide's Mission House in London's Docklands, which was the inspiration for the popular BBC series, *Call the Midwife*.

"My very earliest memories are of being in a playpen at the Yemeni clinic where my mother worked, and watching her care for all these women," says Dahlen. "I grew up surrounded by women and birth, and listening to my mother's stories of cycling around the London docklands to support pregnant women. When I was ten years old, I begged my way into one of the births. I was astonished that women can produce these tiny, perfect human beings from their bodies. It was spellbinding."

A true moment of revelation came for 12-year-old Dahlen two years later, as she attended another birth in a tiny room in the home of a local family. Just before dawn, Dahlen helped deliver a baby girl and presented the child to the mother who simply said, 'take it away'.

"I realised that her whole identity and future was hinged around the birth of a son, and this was her third daughter" Dahlen recounts. "I remember feeling some very powerful emotions then, which have really defined my entire career since. One was pure awe of all that women can do. The other was fury and disbelief — that

NEED TO KNOW

- Western's Hannah Dahlen is an expert in perineal care.
- She is passoniate about preventing birth trauma and has led longitudinal cohort studies examining this.
- These studies have resulted in a Senate enquiry in New South Wales into birth trauma.

Cavan Images/Alamy Stock Photo

"I WAS ASTONISHED THAT WOMEN CAN PRODUCE THESE TINY, PERFECT BEINGS."

because of the sex you are at birth, you are somehow a lesser human being."

Dahlen has held fast to these fierce emotions, and they have shaped her career. She is a strong feminist, and advocate for women's rights, particularly women's rights to be seen and heard. Secondly, she has devoted her research to support women to have the best births possible, physically, psychologically, culturally and spiritually.

BETTER BIRTH EXPERIENCES

Dahlen's career as a midwife and researcher spans more than 30 years. She is renowned as an expert in perineal care, including promoting methods to prevent pain and tearing of perineum tissues during vaginal birth.

She also pioneered research into the importance of babies coming into contact with the microbiome in their mother's vaginal canal during birth. Her team showed that this has a significant influence on the development of a healthy immune system in infants.

She is also passionate about preventing birth trauma. The 'Birth in the time of COVID-19' (BITTOC) study has been running since 2020, under Dahlen's supervision. It is a longitudinal cohort study of child-bearing women from across Australia, who were recruited during the pandemic. The aims of the study include tracking women's mental health throughout pregnancy, birth and beyond in light of the stress of the pandemic, and the impact on child development up to two years following the birth.

"Our findings hinted at high numbers of women experiencing trauma during birth and that trauma having long-term impacts, even in modern Australia," says Dahlen. "As a direct result of our work in this area, we were asked to conduct a wider survey of women's experiences of birth in Australia, which we co-designed with consumers and through mentoring a wonderful early career researcher (ECR) who was my Masters and then PhD student: Hazel Keedle. The Birth Experience Study (BESt) received responses from over 8,800 women, and the results were shocking."

The BESt team found that 28% of women experience birth trauma in Australia today. One in ten women are experiencing what is termed 'obstetric violence': mistreatment and disrespect of women, including physical and emotional abuse from health care providers during births. This data and many other studies over the past 20 years, led by Dahlen and her PhD students and ECRs, have resulted in a Senate enquiry in New South Wales into birth trauma, which is ongoing.

"Birth has long been seen as 'women's business' and yet I still see a patriarchal dominance over approaches in obstetrics," says Dahlen. "Sadly, many working within obstetrics still behave as though the baby is the only focus and ignore the importance of respecting women's bodies and autonomy."

"Having shouted about these problems for more than 20 years in the media and through our research, it's a relief to finally see it being listened to and taken seriously," Dahlen continues. "There's a great sense of satisfaction that these women's voices are truly being heard."

THE NEXT GENERATION

Another of Dahlen's passions is mentoring and training the next generation of leaders in midwifery. She hopes to inspire people to take up where she leaves off when she retires, and there is still much work to do to ensure every woman has access to high-quality midwifery care. "I am committed to replacing myself with 20 more great leaders before I retire."

Dahlen regularly engages in public speaking and outreach, working closely with the Australian College of Midwives. She was awarded a Member (AM) of the Order of Australia in the Queen's Birthday Honours list in 2019 for her services to midwifery, nursing and medical education and research.

"Hannah has always been, and continues to be, a fantastic researcher, advocate and practitioner, and her work is widely used and cited around the world," says Professor Caroline Homer, a leading midwifery expert at the Burnet Institute, Melbourne. "She is fearless at calling out injustices and especially where services and systems do not meet the needs of women and families. She is a brilliant communicator and has done so much to make the work of midwives visible, meaningful and valued."

Hannah Dahlen speaking at the Australian College of Midwives conference in Adelaide in 2022.

Australian College of Midwives

ELEVATING THE VOICES OF ABORIGINAL AND TORRES STRAIT ISLANDER WOMEN

Re-envisaging support for Aboriginal and Torres Strait Islander women with traumatic brain injury from family violence.

Brain light/Alamy Stock Photo

3 GOOD HEALTH AND WELL-BEING

A Western Sydney University team is working on research that aims to understand the needs and priorities of Aboriginal and Torres Strait Islander women living with traumatic brain injury caused by family violence. The project lead, Dr **Michelle Fitts**, was involved in earlier work on understanding the experiences of Aboriginal and Torres Strait Islander people transitioning from hospital to community and Country after a traumatic brain injury. After review of hospital records, the earlier project found a significant subset of women arriving at hospital with head injuries as a result of assault, including Aboriginal and Torres Strait Islander women.

Fitts — who is a Senior Research Fellow at the Institute for Culture and Society at Western Sydney University — turned to the literature to understand the phenomenon, but found that little had been published about Aboriginal and Torres Strait Islander women who experience traumatic brain injury in Australia.

NEED TO KNOW

- There is a lack of knowledge about the lasting impacts family violence has on the brain.
- Indigenous women experience a range of barriers to healthcare and social supports.
- Resourcing communities to design and implement education, prevention and early intervention solutions is essential.

LONG-TERM IMPACTS

Traumatic brain injury can have significant long-term consequences, and yet Fitts and her colleagues realised during this current research project that for many Aboriginal and Torres Strait Islander women, it was an invisible injury — not well understood by Aboriginal and Torres Strait Islander women that experienced it or by many frontline community-based services.

Michelle Fitts (left) and Elaine Wills (right).

For Elaine Wills — who is a Warumungu woman and Research Associate at the Institute for Culture and Society, the timing for help is critical. "Providing immediate support at the time of the injury is critical for long-term recovery," says Wills.

From listening to the stories and information shared by Aboriginal and Torres Strait Islander women with experience of traumatic brain injury from family violence, as well as community-based services, the research team learned that the barriers to safe and supportive assistance were complex and considerable. The research team found that Aboriginal and Torres Strait Islander women were fearful of accessing hospital care or social supports or otherwise reporting their injuries because of the threat that their children would be removed by child protection systems. Aboriginal and Torres Strait Islander womens' fears were also linked to the effects of historical assimilation policies. People of all cultural backgrounds, including non-Indigenous men, were responsible for the violence Aboriginal and Torres Strait Islander women experience.

They reported competing priorities, too. Aboriginal and Torres Strait Islander women were often primary carers for children and other family members, Fitts says. So, they prioritised the needs and wellbeing of other family members over their own. "Aboriginal and Torres Strait Islander women will manage symptoms on their own," she explains. "It's often only when those symptoms become unmanageable and when they felt it was safe to do so, that they will attend the hospital or their local clinic."

KNOWLEDGE GAPS

There was also a significant knowledge gap about traumatic brain injury in regional and remote towns and communities. In meetings, community members told the research team that they hadn't known that brain injury could result from family violence or that it could cause long lasting impacts. There was education around other forms of acquired brain injury but there were few education resources that raised awareness about the connection between repeated concussions, family violence and long-term changes that can occur in the brain, Fitts says.

Other factors made it harder for Aboriginal and Torres Strait Islander women to receive the help they needed. For instance, in some remote locations, the local clinic may not have enough health staff to open the clinic. A number of Aboriginal and Torres Strait Islander women were also in contact with the court and prison systems. But because their traumatic brain injury had not previously been reported, it was not in their medical record, so when they appeared in court, "they didn't have medical records or a diagnosis that could be considered at sentencing," Wills says.

Another barrier that can prevent referrals to support is the lack of training for frontline community-based services to

Strong Women, Strong Culture, Strong Families. Created by Michelle Tyhuis, 2022.

identify traumatic brain injury. Sometimes frontline services associated symptoms with mental health conditions, trauma or long-term drug and alcohol use, with traumatic brain injury not considered. They can look similar and they can coexist, says Fitts, but not considering traumatic brain injury in that context meant that critical information and referrals were not provided for traumatic brain injury. Lack of training on traumatic brain injury is not unique to regional and remote services involved in the project, with the same being reported by services in other countries such as Canada and the United States, Fitts says.

"Help isn't just a matter of diagnosis," says Wills. In fact, diagnosis is a western concept and cognitive assessments are largely developed for non-Indigenous people, she explained. Further, there is not an equivalent word for 'disability' within Aboriginal and Torres Strait Islander languages. For many women, disability is connected with stigma and further vulnerability.

Cultural responsiveness is key. The conversation must begin with the roles women play in their community and families as aunties, mothers, and grandmothers. "That is a source of identity and pride," says Wills. "It's something that's valued by all the women that we speak to."

RESEARCH CONVERSATIONS

For the research team, responsiveness includes the way the research itself is done. They view the traditional research pathway as rigid and linear. Fitts and her colleagues have sought to dismantle it in this research program, for example, by holding traumatic brain injury education workshops with Synapse Australia prior to data collection, rather than afterward. As Fitts says, this was so "communities and services had the understanding, awareness and language to feel confident to participate in the project as well as support the development of deeper understandings of traumatic brain injury." The research team also commissioned artwork from local Aboriginal and Torres Strait Islander artists to reflect and celebrate the powerful presence and influence of women in families and communities.

The research team recognises the women that walk alongside them to complete this study and raise the voices of Aboriginal and Torres Strait Islander women with traumatic brain injury from family violence. "It has been a two-way learning journey", says Wills.

Sports clubs, such as those offering rugby league, could be a good venue for public health messaging.

(left) Roz Bannan/Moment/Getty; (right) South_agency/E+/Getty

HOW SPORT BENEFITS EVEN THOSE ON THE SIDELINES

Programmes run by cricket and rugby league clubs are popular, but can they also improve public health?

3 GOOD HEALTH AND WELL-BEING

Sport is important for the health of those who play. But it's also a valuable route to reach families who might not otherwise have exposure to public health messaging, for example about good diet or cancer screening.

Western Sydney University researchers are now set to explore this connection between sport and community health in a pioneering partnership with the Sydney rugby league club, the Wests Tigers.

"Sport is this incredible tool that's probably underutilised for the promotion of health," says Associate Professor **Emma George**, a health and physical education researcher who leads the project. "We want to engage fans within the community with health promotion initiatives that really focus on improving lifestyle behaviours like physical activity and nutrition."

Working with the club, the researchers will invite families to a 10-week educational programme, where they will meet players from the women's team, practise skills, and hopefully develop healthy habits that could last a lifetime.

"People have strong social connections to their team and their club. So, we draw on that to get people engaged in programmes they wouldn't necessarily put their hand up for," George says.

One important aspect of the course, she adds, is more open discussion of mental health. "Ideally we would really like to catch some of those families who maybe slip through the cracks of more traditional health promotion programmes."

KEEPING SCORE

George's team is trying to find out whether such programmes linked to sport are effective. In a separate research project, they are evaluating community programmes delivered through cricket and rugby league clubs and other professional sports organisations.

"A lot of these programmes are focused on children, but we are also seeing organisations are trying to get more girls involved in their sport," she says. "Or they're trying to reach more people from disadvantaged, rural or remote communities."

Despite good intentions, there has traditionally been a lack of evidence about the impact that these programmes have had, which makes it harder to know whether to repeat such initiatives or tweak them to get greater public health benefits.

"We work very closely with these organisations to understand what they're trying to achieve, and we design tools with them to assess programme outcomes," says George. "We consistently find that people like the feeling that they are part of something bigger, and they have a sense of belonging when they participate."

Now she is striving to determine if this also translates to improved public health outcomes.

NEED TO KNOW

- Sport can be used as a route for public health messaging.
- Western's Emma George is exploring this connection by working with a Sydney rugby league team.
- Her research team is evaluating whether programmes linked to sport are effective.

BRIDGING CULTURAL GAPS IN EDUCATION AROUND BRAIN HEALTH

A multilingual approach to combat dementia in culturally diverse communities.

3 GOOD HEALTH AND WELL-BEING

Dr Joyce Siette is on a mission to promote healthier brain ageing. Two years ago, through the 'Brain Bootcamp' programme that she initiated, Siette helped to deliver free care packages to hundreds of seniors across the Sydney area.

Each box contained personalised health information, educational booklets, brainteaser exercises, and step-counters — all aimed at modifying behaviour in small ways to keep minds active and reduce the risk of developing dementia.

"We saw incredible improvements," says Siette, who is a research theme fellow in health and wellbeing at Western Sydney University, and head of the Brain Health Hub at the University's MARCS Institute for Brain, Behaviour and Development.

Most of the people aged over 65 who received the packages showed a heightened awareness of their risk factors, and a lower susceptibility to age-associated cognitive problems. But the benefits were not universally realised. Among people from immigrant or refugee backgrounds, many encountered linguistic and cultural challenges in implementing the programme's recommendations. People from these communities also tended to have poorer dementia knowledge, on average, than their Australian-born counterparts. "We were not effectively reaching all the people that we needed to," says Siette.

It was an eye-opener for her. "That made me wonder how we can help these culturally diverse communities improve their health literacy and provide them with strategies for dementia prevention that address their needs."

Siette and her colleagues published a policy paper in the *Australasian Journal on Ageing* in 2022, which highlighted gaps in dementia research about seniors belonging to culturally and linguistically diverse populations. The researchers outlined a series of strategic approaches to combat language disparities and other cultural barriers in dementia risk-reduction initiatives.

Following this — with funding from both the Australian Association of Gerontology (AAG) Research Trust and Dementia Australia — her team developed a smartphone app to support healthy ageing among Chinese-speaking older adults. Siette presented a prototype of the digital tool at the Australian Association of Gerontology's annual conference in November 2023.

She also secured a substantial three-year grant from the National Health and Medical Research Council of Australia, specifically aimed at designing a brain health awareness campaign tailored to the multicultural needs of western Sydney, an epicentre of Australia's migrant communities, where a language other than English is spoken in the majority of homes.

The project focuses particularly on the Arabic, Chinese and Vietnamese communities. It will entail pop-up outreach events in shopping centres and other public spaces, where individuals will be encouraged to acquire skills aimed at preventing dementia.

These events will feature interactive activities, art installations, hands-on educational materials and more; it will provide people with an opportunity to actively participate using their own languages, and with guidance geared toward culturally appropriate lifestyle changes. Healthy food advice, for example, will be based on ethnic cuisines. Social networking suggestions will take into account cultural norms and preferences.

The goal, explains Siette, is to empower people in these communities with the knowledge and tools needed to pursue healthy brain ageing, while celebrating their diverse cultural backgrounds.

The project should go a long way toward addressing stigma around dementia in these communities and the dearth of adequate messaging around brain health for most non-English speakers, says Professor Lee-Fay Low, an epidemiologist at the University of Sydney who is collaborating with Siette.

Siette's pioneering work is bridging these gaps, adds Low, who says that working closely with diverse communities will ensure "that the dementia-risk-reduction message gets through."

NEED TO KNOW

- Seniors belonging to culturally and linguistically diverse groups often do not receive appropriate support in dementia risk-reduction initiatives.
- Western's Joyce Siette is seeking to change this by running a brain health awareness campaign in western Sydney.

It was estimated that

MORE THAN 400,000 AUSTRALIANS

were living with dementia in 2023

Source: Australian Institute of Health and Welfare (2022) Dementia in Australia, AIHW, Australian Government. www.dementia.org.au/statistics

sorbetto/DigitalVision Vectors/Getty

An exhibition in Parramatta about brain health run by Western's Brain Health Hub.

MAKING THE MOST OF FADING MEMORY

Efforts to enhance recollection are helping improve the quality of life of people experiencing cognitive decline.

3 GOOD HEALTH AND WELL-BEING

Remembering past events is crucial for maintaining a sense of self and the relationships with the people around us. But what happens when memories begin to fade?

In collaboration with aged care providers, Associate Professor **Celia Harris** from the MARCS Institute for Brain, Behaviour and Development at Western Sydney University is using her expertise about the mechanisms behind autobiographical memory — the memory for life events — to develop actionable recommendations and training modules for aged care professionals.

"With memory, it's easy to dwell on what's lost, but we can also focus meaningfully on what remains of an individual's identity," says Harris. She points out that memories from one's youth and early adulthood, both significant periods that shape identity, tend to persist. "Many can still tap into these memories to derive meaning and self-understanding. Even if their sense of self shifts to an earlier chapter in life, we can still validate and support that."

MEMORY RECALL

Throughout her career, Harris has researched how we bring memories to mind, in particular how clues in the external environment can help improve access to memory. In previous work with aged couples, she found that they remember better when they are together, as they carry on conversations in ways that offer each other strong memory cues.

For example, in an experiment in which couples were asked to list names of mutual friends, one spouse remembered the given name, while the other spouse remembered the family name. "We wanted to see if we could bring the idea of creating a memory-boosting environment through conversation into aged care, in particular the specific ways in which couples were giving cues, prompting, and acknowledging each other's expertise," she says.

Harris partnered with aged care providers to conduct workshops for care staff, training them on conversation techniques that led to memory sharing. For care workers who do not share memories of past life events in the way that couples do, a crucial technique was to ask open-ended questions starting with 'who, what, when, where, why, and how'.

"It's surprisingly challenging to do, since staff had to transition from asking how their day was, to ask something that would make them think deeper into the past," Harris says. "It can feel awkward at first, but then you build a repertoire of shared information, and it gets easier as you ask more questions."

Care staff were encouraged to think of when they could be having meaningful conversations. "Care workers have a busy and challenging job. I wanted them to think of it not as an extra task, but something they could embed in all their interactions however brief — for instance, while waiting for the shower to heat up, or as they applied moisturiser for a resident," says Harris.

In practice, staff found the new memory-focused interactions not only enjoyable, but also beneficial. They reported that routine care tasks such as taking someone to the bathroom or shower became easier, since engaging residents in reflective conversations made them more relaxed.

They were also able to establish a better relationship with those they were caring for. One caregiver recounted her experience with a resident

Memory-focused interactions can help aged care staff develop better relationships with those they care for.

FG Trade Latin/E+/Getty

Memories from youth and early adulthood tend to persist when other autobiographical memories have faded.

EllenaZ/iStock/Getty

who she always perceived to be in a bad mood; a simple question about a photograph of his wife prompted him to happily recount stories that he had never offered before. "These prompts helped care workers see residents in a new light through hearing their stories, and asking meaningful questions that helped them go from a stranger to creating a relationship," says Harris.

She is now working to make the intervention applicable in more contexts. "We plan to look into people who are the most likely to be excluded from programmes in aged care — like those with significant cognitive impairment who struggle to communicate verbally."

NEED TO KNOW

- Western's Celia Harris is developing recommendations based on autobiographical memory recall for aged care providers.
- She is also developing MemoryAId, a device to assist memory recall.
- It is hoped that this will help people stay in their own homes for longer.

MEMORY DEVICES

Harris is prototyping a memory device called MemoryAId, designed to assist memory recall by sending reminders and prompts for tasks. This, she hopes, will provide support for daily activities as well as enhance meaningful engagement.

She envisions that the new device will help people stay living in their own homes for longer. "In a home setting, some of the crucial things are remembering to eat and drink during the day," she explains. "Knowing that these reminders are there could also ease concerns for caregivers, if they worry whether they can go to work and leave the person."

While the device's primary design focuses on home use, Harris believes it will be equally valuable in residential aged care settings. "Prompts necessary at home — like meal reminders — aren't necessary in an aged-care environment where meals are routine, but what the residents might really care about would be other things that enrich your life, like making a phone or video call to family," she says.

The device will require little to no daily management once set up and will adapt to changing needs of the individual as their dementia progresses. "Declining memory from ageing or dementia is undeniably distressing both for individuals and the people around them," says Harris. "But we can also focus meaningfully on what's still there, in order for these people to understand who they are, and to continue connecting to others."

PINPOINTING PATIENTS WHO WILL BENEFIT FROM CANCER IMMUNOTHERAPY

Novel techniques to characterise both cancer and immune cells are helping to predict patient response to immunotherapy and develop more effective treatments.

3 GOOD HEALTH AND WELL-BEING

Tara Roberts is a born scientist. "According to my mother, the first word to come out of my mouth was 'why'," she says. "I've always been interested in the world around me and in how things work."

She started to focus her curious nature on biomedical research while still in high school, when her grandmother was diagnosed with ovarian cancer. "The treatments she was offered weren't effective and caused side effects," she recalls, "I quickly realised how little was known about the disease and the need for more research into better treatments."

Roberts is now an associate professor at Western Sydney University, where she leads a research group that focuses on examining the role of inflammation in cancer development and progression.

"We are currently pursuing two lines of research," she explains. "One aims to predict how cancer patients will respond to immunotherapy, and the other is looking at DNA-damaging therapeutics and how they can be used to stimulate anti-tumour responses." The ultimate goal of the group is to personalise cancer therapy and improve patient outcomes.

IMMUNOTHERAPY HOPE

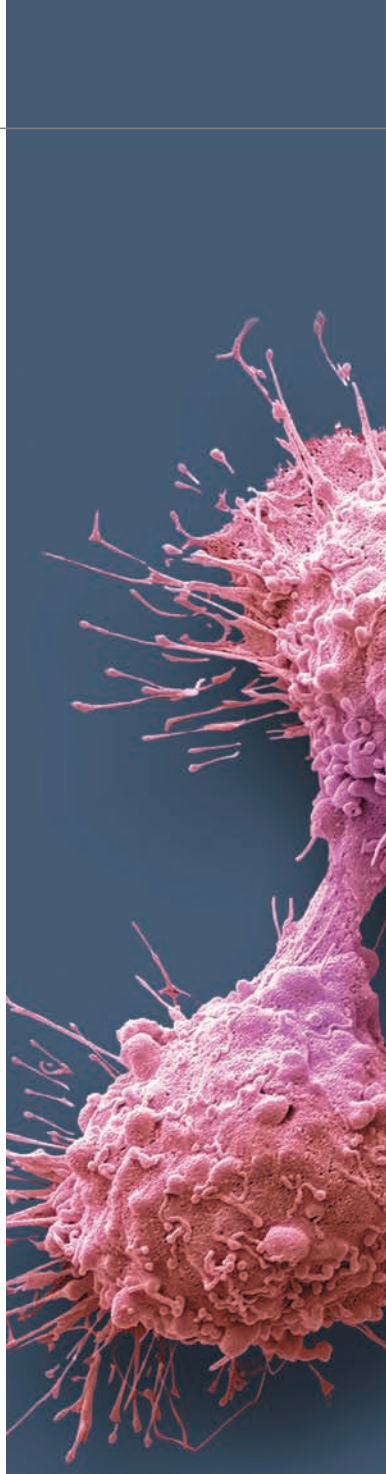
Treatments that boost the immune response against cancer cells, referred to as immunotherapies, are offering new hope to some patients. "A subset of patients respond brilliantly and are practically cured from metastatic disease, which is something we didn't think we'd be able to say a decade ago," Roberts says.

However, many patients do not respond. Roberts' group is trying to work out what makes a patient 'the right one' to receive immunotherapy and ways to extend the benefits of immunotherapy to more patients.

She has recently embarked upon a large collaborative project that combines several novel techniques to characterise the molecular signalling pathways that are activated in circulating tumour and immune cells collected from patients' blood.

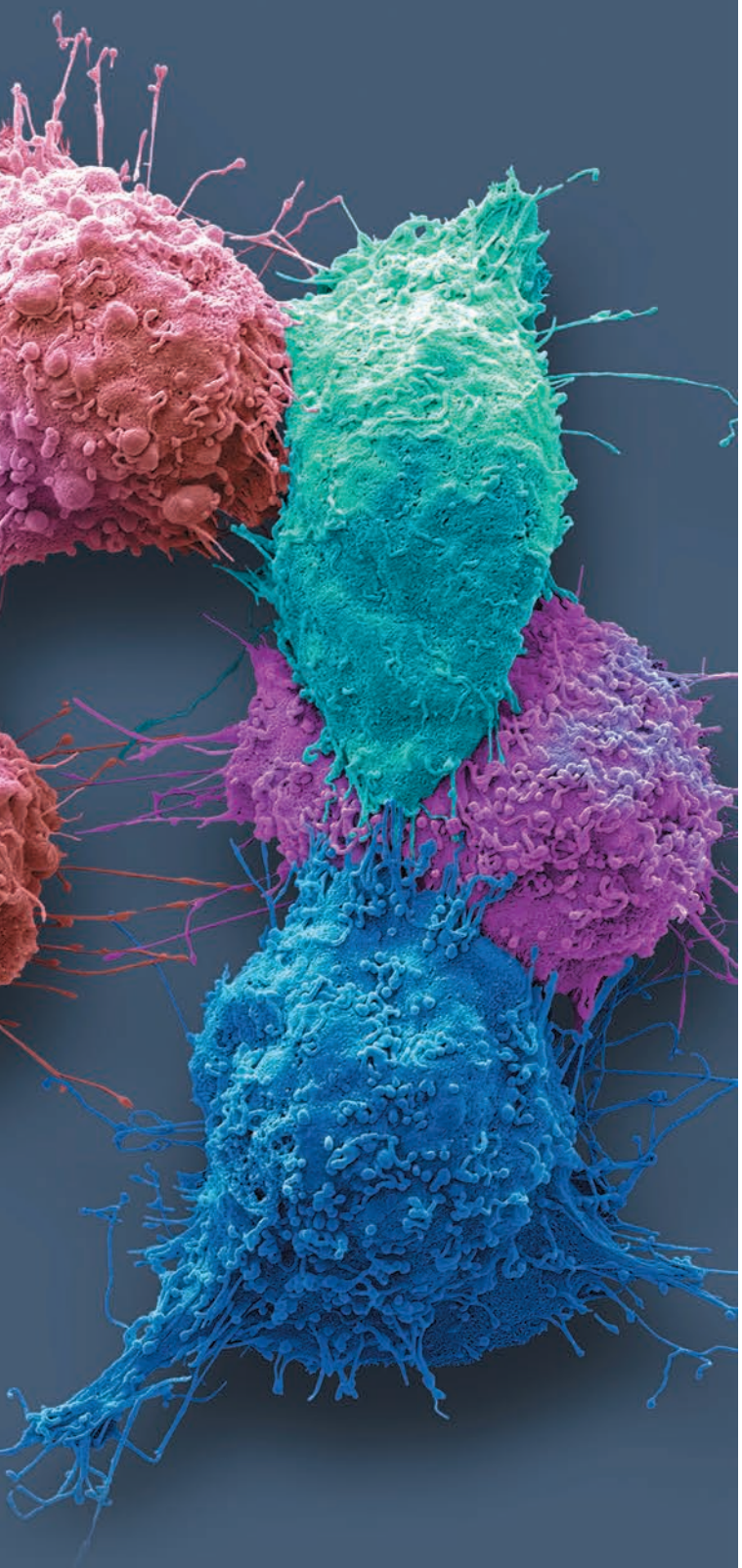
"A SUBSET OF PATIENTS RESPOND BRILLIANTLY AND ARE PRACTICALLY CURED FROM METASTATIC DISEASE."

Tara Robers, an assoociate professor of oncology at Western.



(left) Ingham Institute; (right) Steve Gschmeissner/Science Photo Library/Getty

A false-coloured scanning electron microscopy image of ovarian cancer cells.



NEED TO KNOW

- Not everyone responds to cancer immunotherapy.
- Western's Tara Roberts is trying to find out what makes specific patients respond to it.
- This could help personalise cancer therapy.

"Liquid biopsies allow us to gather more timely information about a cancer and are easier to perform than tissue biopsies," she explains.

Working with the Cancer Systems Microscopy lab at UNSW, led by Dr John Lock, Roberts is using a platform that enables the detection of multiple protein markers simultaneously, right down to the resolution of single cells.

"By gathering a comprehensive picture of what cancer cells and immune cells are doing over time, we will be able to select patients who are best suited for immunotherapy, determine when they are becoming resistant to treatment, and make better therapy choices," she says.

In some cases, treatments that prepare or support the immune system before or during immunotherapy, can make immunotherapy more effective. During her postdoctoral research, Roberts found that DNA damage can trigger the release of DNA from the nucleus into the cytoplasm, where it can trigger pro-inflammatory signalling.

"This response has been well characterised in the context of infection," she explains. "But what we've found out since then is that it may be possible to manipulate radiotherapy, which breaks up the DNA inside cells, to boost responsiveness to immunotherapy."

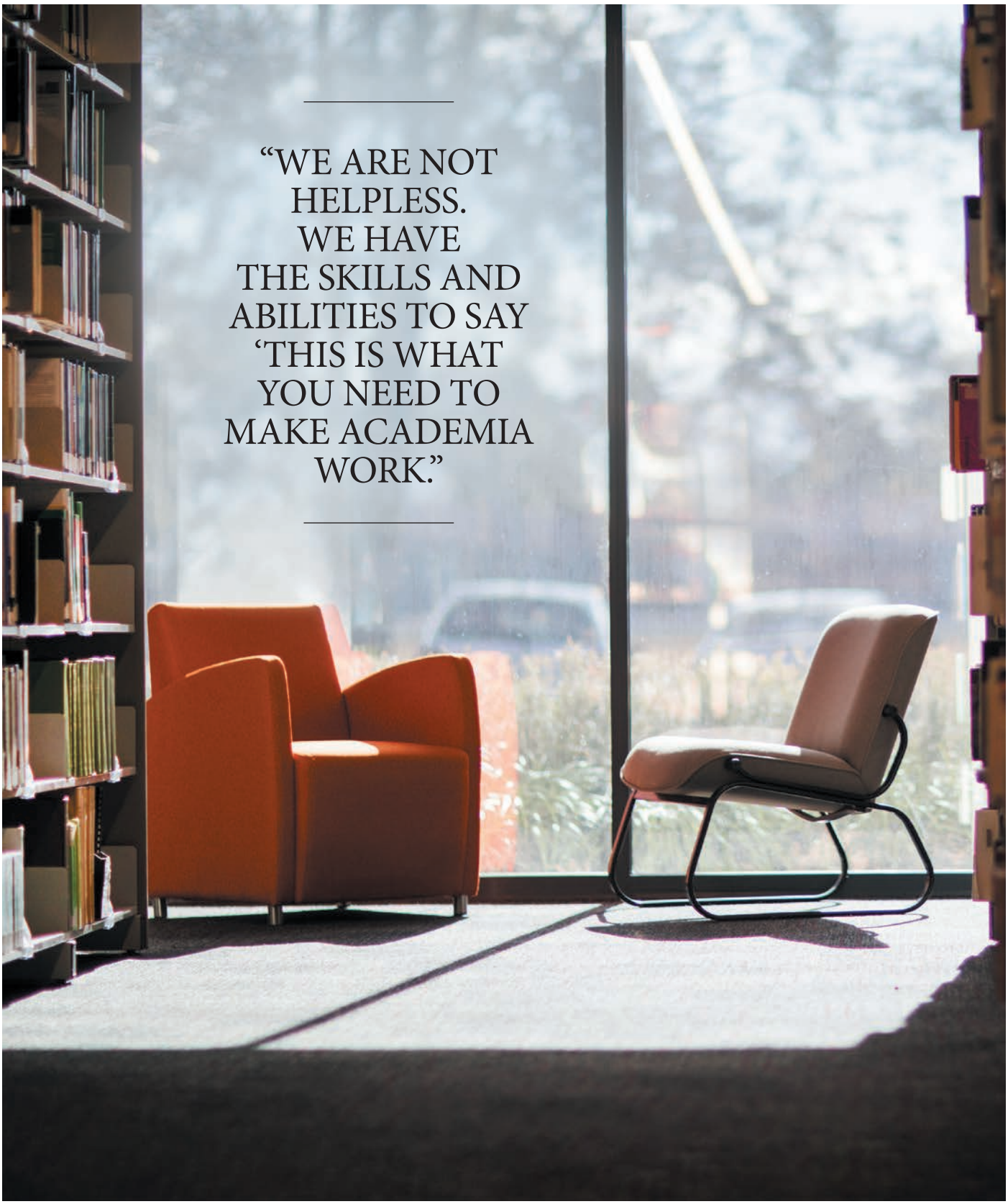
GROUNDBREAKING WORK

Weng Ng, a medical oncologist at Liverpool Hospital, has been working closely with Roberts to identify biomarkers that predict prognosis and treatment response in patients with gastrointestinal cancers. Their collaboration has resulted in successful funding proposals and numerous publications.

"Roberts' research into cytosolic double-stranded DNA sensing is groundbreaking and will have a major impact on improving the care of cancer patients," Ng says.

Roberts envisions being able to carry out more comprehensive analyses of patient data with the assistance of AI and machine learning. "Combining emerging knowledge of the molecular signatures of cancer with other types of data, such as imaging and patient notes, will help us move away from a 'one-size-fits-all' approach and towards treatments tailored to individual patients," she says.

In addition to leading a research group, Roberts teaches oncology to undergraduates at Western's School of Medicine and is the Associate Dean of Higher Degree Research for the School of Medicine, providing academic leadership and strategic direction to the higher degree research programmes at the University. "Balancing all these roles can be challenging, but it is very fulfilling to work towards transforming patient care," she concludes.


“WE ARE NOT HELPLESS. WE HAVE THE SKILLS AND ABILITIES TO SAY ‘THIS IS WHAT YOU NEED TO MAKE ACADEMIA WORK.”

EMPOWERING INDIGENOUS EARLY CAREER RESEARCHERS

In-depth interviews shed light on the unique challenges faced by Indigenous early career researchers and offer pointers on how universities can support them in their post-doctoral career development.

10 REDUCED INEQUALITIES

The transition from PhD student to independent scholar is a challenging time for any academic. Limited funding, a relatively small professional network, and institutional requirements can make the first five years after completing a PhD a uniquely stressful period for early career researchers (ECRs).

For Indigenous ECRs, the pressures are compounded by additional demands on their time, such as developing Indigenous curriculum, mentoring students and serving on committees. To better understand the lived experiences of Indigenous ECRs, Western Sydney University's Professor **Michelle Trudgett**, who is Deputy Vice-Chancellor, Indigenous Leadership led an exploratory Australian Research Council funded project with Professor **Susan Page**, and post-doctoral fellow Dr **Michelle Locke**. Together, this all-Indigenous-Australian team conducted in-depth interviews with 30 Indigenous ECRs from across Australia, following up with them over a period of three years.

"Indigenous scholars are absolutely crucial to the university workforce in Australia, and there aren't enough of them, so we really wanted to know what we can do to make the career journeys of Indigenous ECRs more successful, particularly in those first critical years of transition from student to scholar," says Page, who is Pro Vice-Chancellor Indigenous Education.

For Locke — who is herself an Indigenous ECR and senior lecturer at Western — the recently concluded project was about raising the voices of Aboriginals and Torres Straits Islanders, and paying it forward. "I was fortunate to have two experienced Indigenous scholars as mentors who were able to guide me on which things to say yes to: things that were important not only to my own career, but also in making a difference for other Indigenous people," Locke says.

One of the ways the team's research is having a direct positive impact on the participants is that 14 of the Indigenous ECRs have contributed to a book, titled *Indigenous Early Career Researchers in Australian Universities: Our Stories*, which is due to be published soon. Beyond counting towards their publication targets, the book, co-edited with Dr Rhonda Povey, aims to highlight what Indigenous researchers bring to academia — affecting positive change and deepening the way knowledge is acquired.

"Often, the focus has been on the trauma and tragedy of what has happened in Indigenous Australia. We need to tell those truths, but we are not helpless," says Locke. "We have the skills and abilities to say, 'this is what you need to make academia work.'"

The book also addresses university administrators, particularly those making decisions about researcher development. "We expect that the book should be useful for those thinking, 'What can I do to support the career development aspirations of Indigenous early career academics?'," says Page.

"By bringing Indigenous people on board and helping us to grow, we can continue to speak up in a way that non-Indigenous people will not only listen to but act on and apply," says Locke. The result? An ECR experience that is better for all.

NEED TO KNOW

- Indigenous early career researchers face many non-research related demands on their time.
- A Western team is examining ways to make their career journeys more successful.
- 14 Indigenous ECRs have contributed chapters to a book about this that is being published soon.

PhD supervisors Professor Michelle Trudgett and Professor Susan Page (middle and right) proudly attended Dr Stacey Kim Coates' (left) graduation ceremony in November 2023.

MEASURING MOISTURE TO PREDICT BUSHFIRE BURN

Scientists seek ways to forecast the danger of bushfires and wildfires in different kinds of environments globally.

15 LIFE ON LAND

The devastation of a bushfire can also represent a new beginning. "Most ecosystems around the world are adapted to some type of fire, perhaps every five to seven years for some forests, and maybe only once every 400 to 500 years for a rainforest," says Dr **Rachael Nolan**, a senior research fellow at the Hawkesbury Institute for the Environment at Western Sydney University.

"It's okay if the frequency of fires meets the natural regime that the system is adapted to, but you get problems when that changes," she explains.

For one thing, forests store carbon. If a forest burns too often to fully recover, it will contain less biomass and less carbon. "That's particularly important for Australia, because we rely on our forests to offset carbon emissions as part of our obligations to meet international climate-change agreements," Nolan explains. Such concerns also feature in the United Nations Climate Action Sustainable Development Goal.

A bushfire needs four ingredients: fuel to burn, dry conditions, an ignition source, and the right weather conditions. But how can experts predict when those conditions might arise?

To find out, Nolan leads a project called 'Forecasting Live Fuel Moisture Content, The On/Off Switch for Forest Fire', which includes collaborators at Western and Australian National University (ANU) in Canberra. Nolan hopes to forecast fuel moisture by focusing on how vegetation responds to drying soil. This approach will also combine weather data with satellite information that tracks moisture content in vegetation.

But it's hard to use that information to predict the risk of a bushfire. "It's a bit complicated," she explains. "Plants don't all respond the same way to the same amount of moisture in the soil." Her team now hopes to include information on plant traits in their modelling, to work out when plants are more likely to burn.

Nolan also wants to come up with a better method. "The point of the project is to come up with a way of forecasting," she says. "We want to know what's going to happen next week or next month, to predict whether it will be a bad season for bushfires."

Nolan has "coordinated a team of researchers at Western and ANU to deliver valuable predictions of fuel moisture and fire risk to our project partners at the Rural Fire Service and Department of Planning and Environment," adds Distinguished Professor Belinda Medlyn, leader of Western's ecosystem function and integration group and a collaborator on the forecasting project.

This could help people across NSW and Australia better prepare for increasingly perilous bushfire seasons as climate change intensifies.

NEED TO KNOW

- Fuel, dry conditions, an ignition source, and certain weather conditions are needed for a bushfire to occur.
- Western's Rachael Nolan is working on a method to forecast fuel moisture and fire risk.
- This could help people better prepare for bushfire season.

Rachael Nolan (centre) with colleagues Matthias Boer and Anne Griebel.

Cybele Malinowski

HELPING ADULTS ACHIEVE MEDIA LITERACY

Teaching internet users to become media savvy and better navigate pitfalls online can enhance their lives.

Tanya Notley speaking at the first Australian Media Literacy Symposium held in March 2023.

4 QUALITY EDUCATION

"Media literacy isn't just about keeping people safe online — it's also about thriving," says Dr **Tanya Notley**, Associate Professor of Communication at Western Sydney University. "Unless you're media literate, you can't take advantage of all the opportunities the internet offers to fully participate in society."

The paucity of information on the topic in Australia prompted Notley to conduct the first adult media literacy survey in the country. The results revealed a low level of confidence in respondents' abilities to use and evaluate media. Worryingly, 30% of adult Australians said they have no one to help them to access, use, create or analyse media.

Building on this survey, Notley is now leading an ARC Linkage project that is investigating how adults decide whether online information can be trusted. Partnering public cultural institutions will use the research to develop educational responses.

"Media literacy is asking people to pause and ask critical questions: Who created this content? Is it a trustworthy source? What claims are being made and what are other sources saying?" explains Notley.

Notley's research team is partnering with highly trusted public cultural institutions such as libraries, museums and the national broadcaster to implement the project. "We have to be strategic and targeted in the way training and support is delivered and think of what works for groups with different abilities and access to different resources," says Notley.

The top priority emerging from the initial survey was protection from scams and predators online. This was followed by the desire to stay connected with family and friends. "Media literacy training for adults must focus on meeting such immediate needs, by engaging adults in things they are already doing and where they are already spending their time," says Notley.

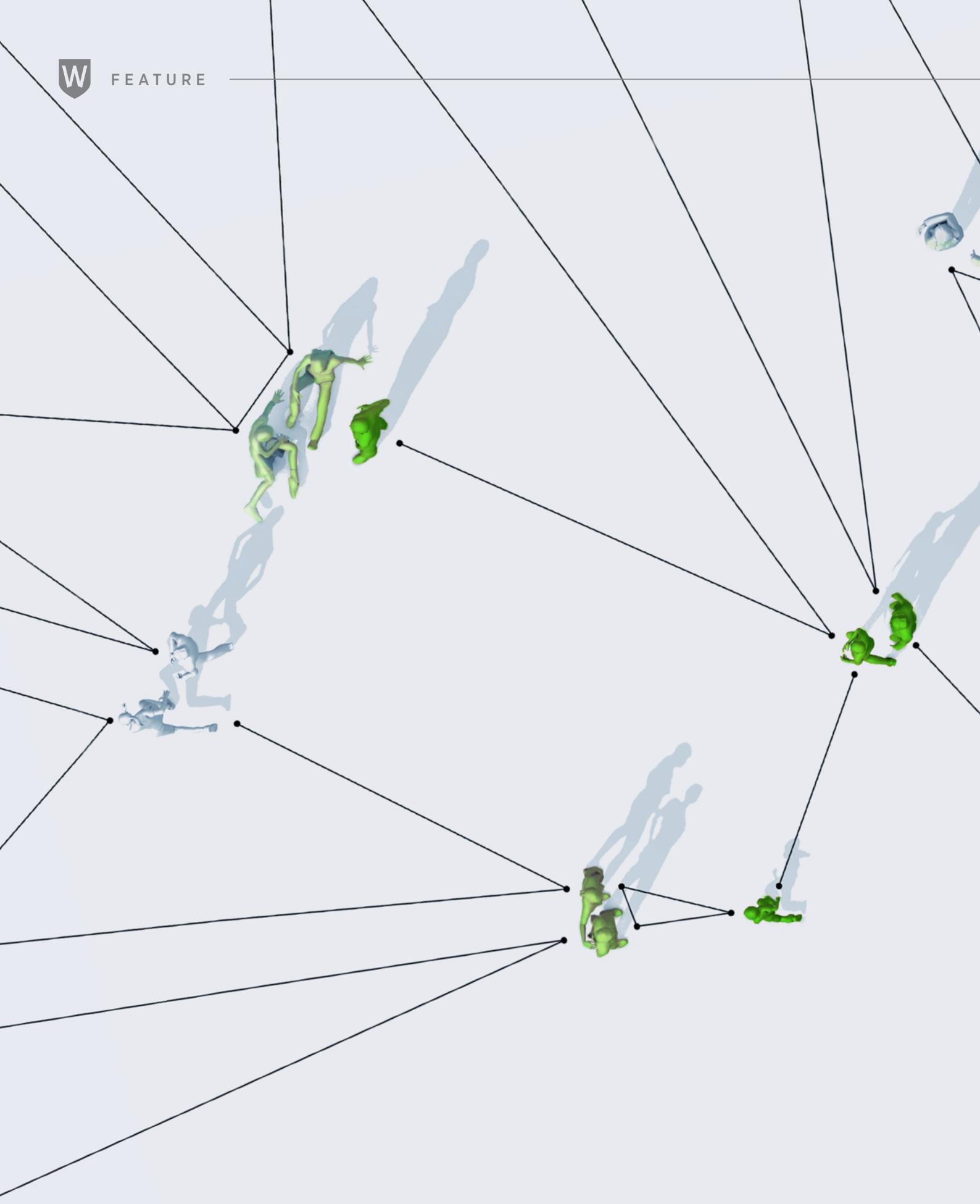
NEED TO KNOW

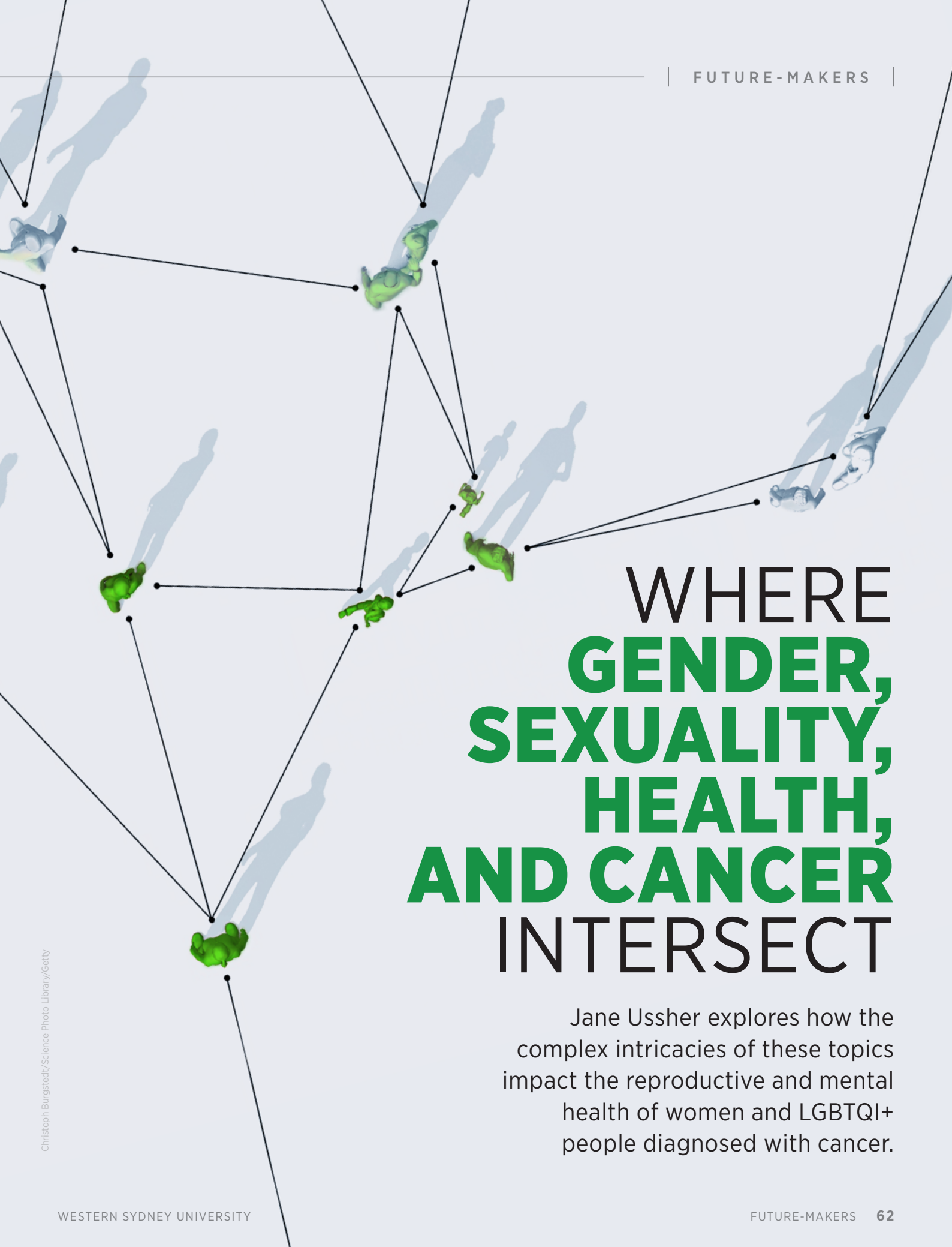
- Media literacy is essential in avoiding scams and disinformation online.
- Little support is provided for adults to become media literate.
- One of the first initiatives in Australia was 'Check the Facts' before the 2022 Federal Election.

In one of the first initiatives for adult media literacy in Australia, Notley worked with the Australian Associated Press on a nationwide media literacy campaign before the last federal election called 'Check the Facts'. It invited Australians to ask critical questions, and was engaged with around six million times on social media.

"The increasing sophistication of disinformation is a real challenge," says Notley, who stresses the importance of reaching people before they are subjected to highly targeted and manipulative disinformation.

According to Annabel Astbury, head of ABC Education and partner on the new ARC Linkage project, "Dr Notley's work across the last decade has shown the increasing need for a nationwide approach to ensuring all Australians are able to navigate, participate in, and create all forms of media."





WHERE **GENDER, SEXUALITY, HEALTH, AND CANCER** INTERSECT

Jane Ussher explores how the complex intricacies of these topics impact the reproductive and mental health of women and LGBTQI+ people diagnosed with cancer.

Christoph Burgstedt/Science Photo Library/Getty

3 GOOD HEALTH AND WELL-BEING

In the realm of gendered health and feminist psychology, Professor **Jane Ussher** at Western's Translational Health Research Institute is renowned. But her initial foray into the field was a bumpy one.

As a teenager growing up in the United Kingdom, Ussher would spend summers visiting family in Ireland. "My grandfather had the works of Sigmund Freud in his bookcase," she recalls. "I didn't read them in great depth, but I thought they were really interesting and that made me decide to do a psychology degree."

Studying the subject at university, however, proved to be a challenge. The course was much more scientific than she had expected, and Freud's work was breezed over in just two lectures. "I was completely appalled," admits Ussher, who tried to switch her major to English literature after the first semester.

She wasn't allowed to, which upon reflection, Ussher says "was incredibly fortunate because I've made psychology my life." Now, more than 40 years on, she has blazed a glittering career path in the field of critical health psychology — having published more than 300 academic articles, presented more than 150 conference papers, written 13 books, and led numerous organisations. Ussher was also awarded the Ann Voda Lifetime Achievement Award from the Society for Menstrual Cycle Research in 2023.

NEED TO KNOW

- Jane Ussher is a leading authority in the field of sexuality and reproductive health.
- Her research has resulted in a greater understanding of premenstrual distress and the development of psycho-educational interventions for it.
- She led the 2019-2023 'Out of Cancer' study that shed light on the experiences of LGBTQI+ cancer patients.

MENSTRUATION, NOT MADNESS

For Ussher, the turning point came in her third year of university, when she came across a 1973 paper on premenstrual syndrome (PMS) written by the eminent feminist psychologist, Mary Brown Parlee. "Menstruation has historically been used as an excuse for excluding women from flying planes, and for women not becoming doctors, among many other things, and Parlee really deconstructed all the scientific evidence behind these myths," says Ussher.

"Reading her paper was the most exciting moment of my whole undergraduate life, because it really spoke to me and to my own experience," she says. "In that moment, I thought: 'I want to do a PhD on this', which all my friends thought was hilarious because I wasn't particularly studious."

Ussher went on to pursue a PhD at the University of London

Mixmike/E+/Getty

in 1983. A job opportunity brought her to Australia in 1998. "I thought I'd come for a year and see whether I liked it. I fell in love with Sydney and I'm still here," she says with a smile.

Ussher's research over the years has led to a greater understanding of the menstrual cycle and, in particular, premenstrual distress. She's helped develop various therapies to treat severe cases of premenstrual distress. The key, she says, is recognising that the reproductive body is only one part of the equation; women's life stresses, relationships and the way distress is labelled also need to be considered.

"It's actually what women expect of ourselves and the pressures that are put upon us. There's a lack of support for many women," she explains. It's an issue that's close to Ussher's heart, stemming from her teenage years, when her mother was hospitalised for depression and given electro-convulsive therapy as well as "huge cocktails of drugs".

"My mother was positioned as mad, as having post-natal depression, but actually if you look at her life situation — four children, no family support or friends, and no personal income because my dad didn't want her working — it was understandable that she was distressed," says Ussher, who was 13 at the time and stepped in to care for her younger siblings. "I was very angry about it, but also I wanted to understand how women are treated within the mental health system in a way that's often very gendered and misogynistic."

Ussher believes there still isn't enough attention given to women's reproductive health experiences. She continues to work on the closely intertwined issues of reproductive and mental health and has led a series of projects to identify the sexual- and reproductive-health experiences of marginalised groups, including trans women, and migrant and refugee women.

A team led by Jane Ussher has produced a range of patient support materials for LGBTQI+ people experiencing cancer.

(top) Viroj Changyencham/Moment/Getty

DIVERSE EXPERIENCES

Some 20 years ago, Ussher transitioned into a new area, bringing her expertise in sexual reproductive research into the cancer space. She has led a series of Australian Research Council (ARC) projects on the gendered experiences of cancer carers, sexual changes experienced post-diagnosis, and fertility concerns after cancer.

Cancer research used to be largely quantitative, but Ussher's team has been conducting mixed-methods research, including surveys, interviews, and photovoice, to document people talking about their own lived experiences. This research has been used to develop educational materials for a series of Cancer Council patient information books that are now in their fourth iteration.

More recently, Ussher led the ARC-funded 'Out with Cancer' study aimed at understanding lesbian, gay, bisexual, transgender, queer and intersex (LGBTQI+) experiences of cancer and cancer care.

"People have told us that in very traditional health settings, like a cancer centre, this community doesn't necessarily feel included and welcomed," says Kim Hobbs, an oncology social worker at Sydney's Westmead Hospital, who has collaborated with Ussher on a series of projects. The team conducted more than 750 interviews and surveys with LGBTQI+ cancer patients and their caregivers, to better understand the challenges they face. They also interviewed health care practitioners, and discovered "there's actually a really big appetite from healthcare professionals to find out how they can be more inclusive of all their patients," says Julie Rae, a policy and advocacy officer at Breast Cancer Network Australia (BCNA).

Jane Ussher holds a personal chair in Women's Health Psychology at Western.

"Previously there were some small-scale studies looking at specific tumour types that were not necessarily in the Australian healthcare context, so there was a little bit of information here and a little bit there," says Rae. "But Jane's study is really comprehensive and will lead to material improvements in the experiences of LGBTIQ+ people with cancer and their carers."

The team translated their findings to produce a wide range of patient support materials — information sheets, podcasts, an app, videos for the BCNA website — as well as an 82-page book produced by the Cancer Council NSW, which Ussher describes as "the most comprehensive booklet internationally on the topic of LGBTQI+ cancer to date." They're now working on developing practice guidelines for clinicians working with LGBTQI+ cancer patients, and online training for health care practitioners.

"You can have great research, but often, it's hard to get that translated into real change," says Rae. "The great thing about Jane and her team is that they're really dedicated to using this research to create meaningful and enduring change in cancer care."

Hobbs, who has been working with Ussher for more than 20 years, adds: "There's been an acceptance of Jane as an expert in those aspects of cancer care that some clinicians find it hard to get their heads around."

A STELLAR COHORT

The title of Distinguished Professor is the highest Western Sydney University honour awarded to academics, and is based on international influence, intellectual leadership, a commitment to excellence, and research impact.

Distinguished Professor

ANNE CUTLER

1945-2022

The MARCS Institute for Brain, Behaviour and Development

↗ A world-renowned pioneer, Distinguished Professor Anne Cutler devoted her life to the pursuit of scientific excellence.

Distinguished Professor Cutler's research significantly advanced our understanding of how listeners process speech. Not only did she study and explain speech communication, she epitomised it. In preparing spoken addresses, she gave deep and careful thought to her audience which translated into spoken communication that was clear, clever, concise, and illuminating.

Distinguished Professor Cutler passed away peacefully in the Netherlands on 7 June 2022. She will be remembered by many students and colleagues around the world who she mentored throughout her career. She will continue to be celebrated for her research and teaching, as well as her unique, life-changing contributions to her field.

Distinguished Professor

IEN ANG

Institute for Culture and Society

↗ "There are so many different stories to tell about people from varied backgrounds and life trajectories," says Distinguished Professor Ien Ang, a global leader in cultural studies and a Fellow of the Australian Academy of the Humanities.

Ang developed an ethnographic approach to audience research which attracted worldwide attention as an innovative direction in the study of media and popular culture. Since then her wide-ranging scholarship has focused on cultural globalisation, migration, multiculturalism and transnationalism, with a special interest in Asia-Australia relations.

She joined Western in 1996 as a dynamic research leader and was the Founding Director of the Institute for Culture and Society, where she has worked with major cultural organisations including the Special Broadcasting Service (SBS), the City of Sydney and the Powerhouse Museum.

Distinguished Professor

KATHRYN HOLMES

School of Education

↗ Distinguished Professor Kathryn Holmes' research helps young people learn to love science and mathematics.

With a focus on student educational and career aspirations, gender equity, STEM education, and student wellbeing, Holmes' research has helped transform how STEM subjects are taught in schools across NSW.

"We would like all children to be well supported to achieve their aspirations but in some STEM fields there are significant gender disparities that are proving difficult to shift," says Holmes.

She and her team at the Centre for Educational Research, work closely with school systems and teachers to develop pedagogical approaches that engage students and improve learning outcomes, particularly for students and teachers in disadvantaged schools.

Distinguished Professor

LYNN KEMP

School of Nursing and Midwifery

↗ Western's Researcher of the Year for 2018, Distinguished Professor Lynn Kemp is an international leader in the field of early childhood interventions in primary and community health and translational research. Through the Maternal Early Childhood Sustained Home-visiting (MECSH) program she developed in south-west Sydney, Kemp's work has touched the lives of more than 15,000 families across the world.

"Seeing the difference MECSH makes for children and families, and the increased satisfaction of the nurses who work with them, brings me personal and professional enjoyment," says Kemp.

Kemp joined the University in 2015 as the Director of the School of Nursing and Midwifery's Translational Research and Social Innovation team.

Distinguished Professor

BELINDA MEDLYN

Hawkesbury Institute for the Environment

↗ After an initial stint as a merchant banker, Belinda Medlyn went back to university, obtained a PhD in theoretical biology and never looked back.

"As a keen outdoors type, I was fascinated by the idea that one could apply mathematics to the outdoors," says Distinguished Professor Medlyn.

Now a Clarivate Highly Cited Researcher for 6 years running (2018-2023) and the recipient of the 2019 ARC Georgina Sweet Laureate Fellowship, Medlyn has not only transformed our understanding of the effect of increasing atmospheric carbon dioxide and climate change on forests, but also significantly advanced the standing of women in science.

Distinguished Professor

KERRY ROBINSON

School of Social Sciences

↗ Distinguished Professor Kerry Robinson's research aims to support the health, wellbeing and rights of gender and sexuality diverse people.

"Equity, social justice and working collaboratively with communities has always been foundational to my research," says Robinson, who has been based at Western for more than 30 years.

Currently, Robinson is leading a project funded by Australia's National Research Organisation for Women's Safety (ANROWS) which focuses on the experiences of LGBTQ young people who have faced sexual harassment in the workplace; as well as a project funded by Multicultural NSW on young people, diverse communities, and social cohesion.

In 2023 Robinson was awarded an ARC Discovery Project Grant exploring Australian trans and gender diverse children's experiences of affirming their gender.

Distinguished Professor

VIVIAN TAM

School of Engineering, Design and Built Environment

↗ A world-leading researcher in construction engineering and management, Distinguished Professor Vivian Tam excels in designing green, sustainable alternatives for industry.

Her invention, CO2 Concrete, has made it possible to produce recycled concrete with durability and strength matching that of virgin material while also reducing CO_2 emissions and landfill.

Tam was awarded an ARC Future Fellowship for 2023-2026. "We hope to solve Australia's mixed construction and demolition waste disposal problem and lower its greenhouse-gas emissions at the same time," she says.

Tam also serves as the Associate Dean (Research and HDR) of the School of Engineering, Design and Built Environment and Director of the Centre for Infrastructure Engineering. She became Western Sydney University's first ever Fellow of the Australian Academy of Technological Sciences and Engineering in 2023.

(Lynn Kemp) Michael Amendolia; (Belinda Medlyn) Sally Tsoutas

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Individual TIMES HIGHER EDUCATION RANKINGS for SDGs in 2023:

- #1 for SDG5 GENDER EQUALITY
- #1 for SDG12 RESPONSIBLE CONSUMPTION AND PRODUCTION
- #1 for SDG17 PARTNERSHIPS FOR THE GOALS
- #2 for SDG6 CLEAN WATER AND SANITATION
- #2 for SDG15 LIFE ON LAND
- #3 for SDG10 REDUCED INEQUALITIES

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