BREAKING STEREOTYPES
Eating disorder myths debunked

BRAIN FREEZE
Extending tissue viability

HARNESSING COMMUNITY
Programme to combat diabetes

FUTURE-MAKERS

HEALTH & WELLBEING

A GUIDING HAND

Smart gloves
coach young surgeons

WESTERN SYDNEY
UNIVERSITY

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RESEARCH PATHWAYS

Have you considered a career in research? Have you ever thought about studying a PhD? Do you have skills and experience that you could apply to an impactful research project?

Western Sydney University provides pathways for those interested in a career in research and looking to further their qualifications.

MASTER OF RESEARCH (MRES)
The Master of Research is a two-stage program designed to provide you with the skills you need to confidently undertake a PhD. Previous research experience is not required.

Stage 1: Research training coursework.
Stage 2: Supervised research project.

The degree involves two years full-time (or equivalent part-time) study.

Scholarships are available for domestic students undertaking full-time study.

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If you have completed a substantial research project as part of a previous qualification (such as a Bachelor Honours or Research Masters), you may be eligible for direct entry into the PhD program.

If you can demonstrate significant research experience in your role at work or in the community, this may be recognised for direct entry into the PhD program.

DOCTOR OF PHILOSOPHY (PHD)
The Doctor of Philosophy provides you with the opportunity to develop capacity to conduct research independently at a high level of originality and quality. You will uncover new knowledge through discovery, the formulation of theories and the innovative interpretation of previously established ideas.

A PhD qualification opens up a range of new career opportunities. It is also a great way for you to contribute the knowledge and experience you have gained in your existing career and make a positive impact to the research happening in your field of interest.

The PhD degree involves three years full-time (or equivalent part-time) study. Scholarships are available for domestic and international candidates. You will also be supported by the Graduate Certificate in Researcher Engagement, Development and Impact (GCREDI).

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Aboriginal and Torres Strait Islander peoples should be aware that this publication may contain the images and names of people who have died.

ABOUT

Western Sydney University is a large, student-centred, research-led university, embracing Australia's global city, Sydney. 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, 45,000 students and 3,300 staff.

The University is now ranked in all major global university ranking systems, and is in the top 2% of universities worldwide. 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. Western Sydney University graduates go on to take up rewarding careers that make real contributions to societal change, lifting the pride of students, staff and the community.

A guiding principle for the University is that there is no limit to potential success for those with drive, talent, confidence and ambition.
westernsydney.edu.au

ON THE COVER

↗ A safer handover
page 12

Cover image:
© Ken Leanfore

HEALTHY AMBITION

Welcome to this special issue of *Future-Makers* where we share a snapshot of Western Sydney University's health and wellbeing research.

In this issue we present research that addresses some of the most significant health issues facing the Australian population, and in particular, communities in Western Sydney. Our research in diabetes, obesity, and eating disorders is led by internationally renowned experts. Our researchers are engaging with culturally diverse communities to change dietary and lifestyle behaviours to reduce the burden of diabetes; and with adolescents and mothers across the world to document barriers and solutions to healthy eating.

We would also like to highlight the critical work undertaken by the School of Nursing and Midwifery. 2020 is the World Health Organisation's (WHO) Year of the Nurse and the Midwife. This group of health professionals devote themselves to the care of their community, looking after us from the time before we are born, until the end of our lives.

However, acknowledgment alone is insufficient. The world needs 9 million more nurses and midwives to achieve universal health coverage by 2030. Western Sydney faces similar shortfalls as the population grows from 1.9 million to an expected 3 million by 2038. Western Health, the University's 10-year commitment to health in our region, identified that we will need to double our number of nursing and midwifery students from 4,677 to 9,400 by 2038. Priority areas include ageing, mental health, childhood obesity, diabetes, maternal and child health, as well as community health. Clearly a challenge lies ahead.

Research into the health care workforce will be a critical component of achieving these targets effectively and integrating these students on the ground. Working with our partners in the region, Western has tasked itself with these challenges. The Health & Wellbeing Research Theme has set Health Workforce as a key element in its 2020 plan and will assist in coordinating efforts across the University and region.

We hope you enjoy the selection of health and wellbeing stories in this issue.

Associate Professor Paul Breen
Research Theme Champion

Professor Virginia Schmied
Research Theme Champion

Dr Jennifer MacRitchie
Research Theme Fellow

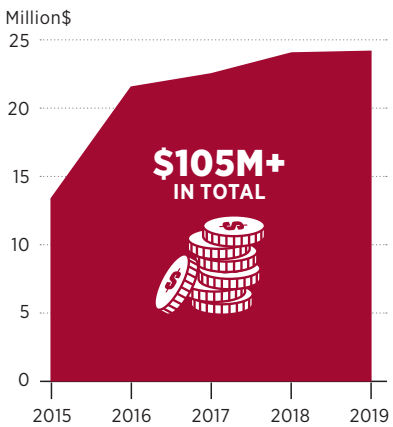
WESTERN SYDNEY UNIVERSITY IN NUMBERS

Located in Greater Western Sydney, one of the fastest growing regions in Australia, Western Sydney University is home to a vibrant and diverse community of staff and students.

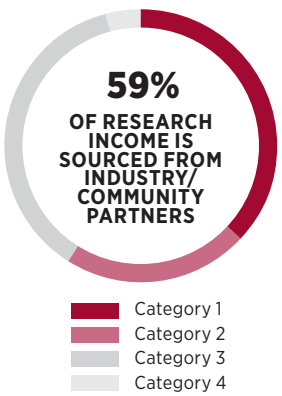
HEALTH & WELLBEING

RESEARCH

RESEARCH INCOME



SOURCE OF RESEARCH INCOME



HEALTH & WELLBEING

2018 EXCELLENCE IN RESEARCH FOR AUSTRALIA DISCIPLINES ABOVE WORLD STANDARD

★★★★★

- Complementary and Alternative Medicine
- Cultural Studies
- Evolutionary Biology
- Microbiology
- Nursing
- Oncology and Carcinogenesis
- Pharmacology and Pharmaceutical Sciences

★★★★

- Macromolecular and Materials Chemistry
- Biochemistry and Cell Biology
- Human Geography
- Human Movement and Sports Science
- Linguistics
- Performing Arts and Creative Writing
- Psychology
- Sociology

RANKINGS

2020 Times Higher Education World University Rankings **TOP 2%**

THE WORLD UNIVERSITY RANKINGS 2020 YOUNG

36th in the THE Young University Rankings

THE IMPACT RANKINGS 2020 TOP 10

2nd in Australia

3rd in the world

NATIONAL RANKINGS FOR INDIVIDUAL SUSTAINABLE DEVELOPMENT GOALS

1st

- 6 Clean Water and Sanitation
- 14 Life Below Water
- 15 Life on Land

TOP 5 worldwide

2nd

- 5 Gender Equality
- 10 Reduced Inequalities
- 12 Responsible Consumption and Production
- 16 Peace, Justice and Strong Institutions
- 17 Partnerships

QS WORLD UNIVERSITY RANKINGS TOP 100 2020

Communication & Media Studies, Nursing, and Sociology

ACADEMIC RANKING OF WORLD UNIVERSITIES (ARWU) 2020

23rd Ecology

TOP 75 Agricultural Sciences, Automation and Control, Civil Engineering, and Nursing

2019 LEIDEN RANKINGS FOR RESEARCH COLLABORATION

80th in the world

3rd in Australia

3 GOOD HEALTH AND WELL-BEING

ACTING ON MENTAL HEALTH PROBLEMS

A play that challenges perceptions of perinatal mental health.

A dramatisation of the anguish and doubts

experienced by many women during pregnancy and in the early months of parenting aims to help mothers realise that they are not alone.

Discussing mental health is difficult, despite its ubiquity. Around one in five women experience a mental health problem during pregnancy or in the year after childbirth. Many are hesitant to ask for help, but without the right care, perinatal mental illness can become an intergenerational trauma by affecting the mother-baby relationship, and can ultimately increase the child's risk of mental illness. With the aim of helping these women, Western Sydney University contributed to the creation of a play, which is helping reduce the feeling of isolation for women who feel shame about their ability to cope.

Lisa Brickell in a scene from *Mockingbird*.

> "IT'S A POWERFUL VEHICLE TO PROMOTE EMPATHY."

Dr Diana Jefferies, senior lecturer from the School of Nursing and Midwifery at Western Sydney University, wanted to give a voice to women who experience mental illness in the perinatal period. With more than 25 years of experience as a mental health nurse, Jefferies investigated historical representations of mental illness after childbirth. She used this research to contribute to Lisa Brickell's *Mockingbird*, a black comedy about motherhood and mental health. The play follows four generations of Brickell's family through mental illness after childbirth.

The play separates the women from the medical accounts normally used to describe their mental illness. Actors in the performance interact with a masked character that embodies their thoughts, to build a picture of their lived experience. "It acts as a powerful vehicle to promote empathy and gives patients a chance to share their experience," says Jefferies.

Mockingbird has been performed at conferences for healthcare professionals to encourage them to view perinatal mental health in a different light. It has also been performed to sold-out audiences in Melbourne, Sydney, and around New Zealand, seen by around 2,000 people.

Jefferies hopes to see *Mockingbird* performed to wider audiences in regional NSW and at the Edinburgh Fringe Festival. She believes that bringing issues out into the open is the first step towards understanding and improving mental health care for women and their babies.

NEED TO KNOW

- Mental illness during the perinatal period can harm both mother and child.
- Western researcher, Dr Diana Jefferies, contributed to a play about mental illness after childbirth.
- The play has been seen by 2,000 people.

This research was supported by the Australian Government through the Australian Research Council (ARC) Centre of Excellence for the History of Emotions.

3 GOOD HEALTH AND WELL-BEING

BOOSTING DIABETES PREVENTION

A community intervention program has improved the health of Australian Samoans with diabetes in south-western Sydney.

A doctor approached

a Western Sydney University diabetes expert, Distinguished Professor David Simmons from the School of Medicine, at a conference, and explained how she was struggling to treat patients of Samoan heritage. She described how many of her patients in south-western Sydney were being treated in hospital, or dying from avoidable complications from diabetes.

Professor Simmons relayed the conversation to his colleague at Western, Dr Freya MacMillan, a senior lecturer in the School of Health Sciences, and the chance meeting became the impetus for Simmons and MacMillan to establish a pilot study. They liaised with three Samoan churches in south-western Sydney and set up a reference group of community leaders to advise them in the project. Churches are the central meeting point for the Samoan community both in their home country, and in Australia.

Australia has a significant number of immigrants from the Pacific Islands. According to the 2016 census, 75,755 people are of Samoan heritage and more than 40% of them live in New South Wales. Samoans have an inherited predisposition to diabetes, but prior to the Western study, there was little research on the effectiveness of public health interventions to reduce the health risks of diabetes.

MacMillan and Simmons' team developed a program called *Le Taeao Afua* (the new dawn) derived from evidence-based research on community interventions and tailored by participants themselves to fit the Australian-Samoan lifestyle. The University trained a Samoan community activator, who in turn trained 20 church volunteers to become peer support facilitators.

Of 187 participants enrolled at the start of the program, 96% were overweight or obese and 32% had Type 2 diabetes. "The really worrying thing was that 13% didn't even know they had diabetes until we tested their blood," says MacMillan.

Volunteers developed workshops and more than 100 activities covering 12 public health messages dealing with diet and exercise. These included cooking classes that introduced people to new vegetables, and also revived others used in Samoan culture that may have been forgotten, or promoted steaming and grilling instead of deep frying.

"We looked at affordable and seasonal options to take away the stigma that healthy eating is expensive," says Ronda Thompson, the community activator. Zumba classes, resistance band exercises and family power walking were some of the physical activity favourites.

After 3-8 months, the participants had statistically significant reductions in average blood glucose levels (HbA1c), showing that the project had improved people's health.

Following the pilot's success, the University secured $4.5 million in funding to roll their program out to 48 churches encompassing other Pacific communities across greater western and south eastern Sydney. The team will train more community activators to reach more than 3,600 adults, and their children.

"We're thinking about affordable translation," MacMillan says. "By empowering communities, our goal is to embed this program into the health care system and sustain it. We hope it can then be translated across New South Wales and Australia."

NEED TO KNOW

- Many people of Samoan heritage in south-western Sydney are at risk of diabetes.
- Western's Simmons and MacMillan developed a community intervention program called *Le Taeao Afua*.
- Program participants had significant reductions in average blood glucose levels.

IN THE 2016 CENSUS

75,755
PEOPLE
were of Samoan heritage

lived in New South Wales

$4.5
MILLION
Funding was secured from the Australian Government to roll out *Le Taeao Afua* to
48 CHURCHES

3 GOOD HEALTH AND WELL-BEING

A CHANGING VIEW OF OBESITY MEDICAL CARE

People who are overweight are more prone to diseases and less likely to seek help.

People who are overweight are at increased risk of a range of chronic diseases, but are less likely to seek medical help. Western Sydney University researchers are working with healthcare professionals to break stereotypes surrounding people with obesity, and ensure they receive the care they need.

Western's Kate McBride at first became aware of this problem when she was doing her PhD research on the feasibility of cancer screening for Li-Fraumeni Syndrome, a hereditary predisposition to multiple types of cancers. "I became interested in this obesity space through breast screening," she says. "We've shown that obesity is a barrier to breast screening. Often women with obesity will go once, but won't return, because they didn't have a particularly good experience. It's really concerning because obesity is the number one risk factor for postmenopausal breast cancer."

A large part of this reluctance to see medical professionals is the stigma associated with obesity. "Healthcare professionals might not see that a person hasn't deliberately chosen to be obese," explains McBride, who is a senior lecturer at Western's School of Medicine and the Translational Health Research Institute. "There are many contextual factors like where they live, their economic status, their education level and their cultural background. All these factors contribute to whether a person is going to become obese or not." McBride notes that healthcare professionals can sometimes exhibit a victim-blaming mentality. "They just tell that person: 'You need to do something about your weight. Go and exercise. Go and eat healthily.' But they don't consider those contextual factors."

> "THERE NEEDS TO BE A SOCIETAL CHANGE IN THE WAY PEOPLE WHO ARE OVERWEIGHT ARE PERCEIVED."

This stigma can lead to dire outcomes. "Some people can't leave their homes because they don't have the support or motivation to get out there and even start to think about trying to lose weight," says McBride. "They know that they're dying because they've got high blood pressure; they've got high cholesterol; many of them have got diabetes. They can't even go to the kitchen without feeling breathless and unwell, and they're trapped in their homes."

This problem is especially acute in parts of western Sydney, for example the Nepean-Blue Mountains region where the obesity rate of 29.3% exceeds the national average of 27.5%. This is due to factors such as low health literacy, an obesogenic environment, including a plethora of fast-food outlets, and a low socioeconomic demographic. This is creating a crisis in the public health system in western Sydney where hospital admission rates for chronic disease complications are soaring," says McBride. "People tend to sidestep their GPs and then present at emergency departments when things get to a really acute phase."

McBride and her group are attacking the problem on various fronts. They are constructing a comprehensive picture of how obesity affects healthcare access by measuring rates of presentation and analysing the issues faced by people with obesity and their healthcare providers. This information will inform the development of better healthcare management. The team is also working with the primary-health network in western Sydney to consider how to improve GPs skills to help them be more supportive.

But McBride realises that more is needed in the long term. "It requires a societal change in the way people who are overweight or obese are perceived because they suffer greatly by people being judgmental about them."

Healthcare professionals need to consider the contextual factors of obesity.

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NEED TO KNOW

- The obesity rate in parts of western Sydney exceeds the national average.
- People who are overweight are less likely to seek medical help.

This research was funded by Nepean Blue Mountains Population Health.

3 GOOD HEALTH AND WELL-BEING

PUTTING CHILDREN AT THE TABLE IN THE NUTRITION DISCUSSION

The views of young people and mothers to shape global nutrition policies.

Researchers asked adolescents about their views on healthy eating.

This research was funded by UNICEF New York.

In the first study of its kind to span six continents, Western Sydney University researchers have found adolescents had a limited understanding of the nutritional value of the foods they commonly encounter.

Many adolescents who took part in the study believed that nutritious foods were either not sold near their home, or were too expensive. Similarly, mothers of infants and young children under two years, overwhelmingly reported that cost was the main barrier to feeding their children more healthily during the first two years of life.

"When unhealthy foods are the only choices around, there is no choice," says Dr Catharine Fleming, from the School of Health Sciences.

Led by Professor Amanda Third from Western's Institute for Culture and Society, a team of social and cultural research, nutrition, and midwifery experts, developed workshops delivered by trained facilitators who consulted with 464 adolescents (age range 13-18) and 396 mothers across 18 low and middle income countries, as well as Australia and the US, about their eating patterns. Participants in the five-hour session completed surveys and short-answer questions both individually and in groups. However, knowing that it can be hard for children as well as adults to speak out in such activities, the team also invited them to take part in creative interactive exercises, such as brainstorming and drawing.

Asking adolescents directly for their input on healthy eating was considered to be a novel research approach. Fleming, along with Professor Virginia Schmied, from the School of Nursing and Midwifery, worked with global leaders in public health nutrition to deliver the workshop content to ensure the views of all participants were captured across a variety of socioeconomic and geographical areas.

The team found that adolescents do want to improve their diets and to work with community leaders to implement change. "Solutions need to involve adolescents — many nutrition policies are made without young people having a seat at the table," says Fleming.

The team's findings were published in UNICEF's *State of the World's Children* 2019 report and will inform global policy and programming. Two in-depth companion reports, focusing on the insights of adolescents and mothers respectively, will be released later in 2020.

NEED TO KNOW

- Western Sydney University researchers helped design the methodology for the *State of the World's Children* 2019 report.
- They talked to adolescents and mothers across 18 countries
- They found that healthy eating solutions need to include input from adolescents.

3 GOOD HEALTH AND WELL-BEING

REVEALING THE HIDDEN SHAPES OF EATING DISORDERS

Western Sydney University researchers are helping deliver suitable treatment strategies for eating disorders, to those who need them – and dismantling a few stereotypes along the way.

One in 10 people in Australia aged 15 and older have an eating disorder, but fewer than 20% seek appropriate treatment. This is among several grave insights revealed by an extensive and long-running work by Western Sydney University's Eating Disorders and Body Image (EDBI) group.

"Reducing delays in seeking treatment, and barriers to care, are my biggest challenges," says Professor Phillipa Hay, EDBI leader.

To better pinpoint who needs treatment and help them access it, Hay and her team of clinicians and researchers are unmasking the many and varied types of eating disorders in Australia, and evaluating what therapeutic techniques work.

The field first piqued Hay's interest when, as a trainee psychiatrist in New Zealand, a mentor encouraged her to explore research into eating disorders

At the time, the mental health field recognised one eating disorder: anorexia nervosa, which was defined by restrictive eating and an intense fear of gaining weight, despite being severely underweight. Its formal description can be traced back to the 1870s, but Hay realised that, more than a century later, anorexia treatment techniques were still not based on evidence.

Anorexia nervosa has one of the highest fatality rates of any non-substance-abuse psychiatric disorder, even greater than major depressive disorder, but early treatment regimes were crudely designed. "Looking back on it now, they were quite punitive, restrictive behavioural programmes," Hay says.

"People were admitted to hospital and only given privileges if they gained weight, with very little psychological understanding of what they were experiencing."

Hay later completed a PhD on the features of emerging eating disorders, bulimia nervosa and binge eating disorder, and in 1995, set in motion one of the world's few large-scale longitudinal projects in the field.

NEED TO KNOW

- Not everyone with an eating disorder fits the stereotype.
- Personalised out-patient treatment plans offer a higher chance of success.
- Early intervention is crucial.

This research was supported by the Australian Government through the National Health and Medical Research Council.

(Top) © SolStock/E+/Getty Images

CHANGING CLASSIFICATIONS

↗ The two main classification systems for eating disorders are the Diagnostic and Statistical Manual of Mental Disorders (DSM), compiled by the American Psychiatric Association, and the World Health Organization's International Classification of Diseases (ICD).

"Even though the DSM, now in its fifth revision, is the most widely used of the two, the ICD – being an international classification system – reflects more people", Hay says.

They're revised every few years and, apart from anorexia nervosa, all eating disorders were added in the past three decades.

In the 1990s, Hay and others recognised binge eating disorder was prevalent enough to be considered a third major eating disorder after anorexia nervosa and bulimia nervosa.

At that time, a person with what we now know as binge eating disorder would be diagnosed with an 'Eating Disorder Not Otherwise Specified' by the DSM, and classed as having an 'Other Eating Disorder' by the ICD.

The DSM, in 1994, added binge eating disorder to its fourth edition as a disorder meriting further study and in the 2013 fifth edition it was added as a major disorder. For the ICD's 11th revision, Hay's research led to her role on the eating disorder working group and, in 2019, binge eating disorder was also included as a separate feeding or eating disorder in the ICD-11.

In the study, which is part of the annual South Australia Health Omnibus Survey and continues today, thousands of people aged 15 years and older are questioned about, among other health aspects, eating behaviours and treatment for disorders. Their responses often contradict the eating disorder stereotype of the thin, white, affluent teenage girl.

DISMANTLING THE STEREOTYPE

The latest survey snapshots, published in 2017, showed that a binge eating disorder, characterised by uncontrolled rapid consuming of large quantities of food, was the most common major eating disorder, affecting one in 70 respondents.

In comparison, bulimia nervosa, anorexia nervosa (broadly defined) and avoidant/restrictive food intake disorder were each reported by one in 100, 200 and 300 people, respectively.

People with an eating disorder who did not meet full threshold criteria to be classified under the major types of eating disorders were much more prevalent. These 'unspecified' and 'other specified' eating disorders made up around 10% and 3% of the surveyed population, respectively.

Hay's survey also showed that eating disorder rates have, over time, become more evenly distributed across sociodemographic sectors. For instance, even though eating disorders develop most often in young women, they're rising on a faster trajectory in women over 45 years old and men.

But the group with both high body mass index (BMI), and disordered eating, is increasing faster than either factor alone, Hay says.

Hay says that incidences of eating disorders in Aboriginal and Torres Strait Islander people are as high, or higher than in the general population, but they don't fit the generally accepted profile.

Behaviours behind this high eating disorder prevalence in Indigenous Australians are not clear cut, according to Dr Deb Mitchison, an EDBI research fellow, who found a similar incidence in a survey of adolescents.

"First Australians in general usually have a higher BMI, so you might think the behaviours are all about binge eating. But it's other types of disordered eating too, like extreme dieting and purging."

RESTRICTIVE TO RESPECTFUL

In addition to revealing the true extent of eating disorders, Hay's group develops and evaluates

Group therapy as an out-patient is an important part of recovery.

treatment techniques and strategies. Their work informs clinical practice guidelines locally and abroad.

"Her clinical leadership has been enormous in Australia and internationally," says Professor Susan Paxton, a psychologist from La Trobe University.

Hay and Paxton have collaborated on evaluations of eating disorder treatments and interventions and have shown that not all people with an eating disorder necessarily need specialist intervention.

For instance, findings from a randomised clinical trial showed guided self-help, provided by a GP to people with bulimia nervosa, an eating disorder defined by cycles of binge eating followed by compensatory behaviours such as vomiting, had similar outcomes to psychological therapies delivered by specialists.

Other treatment trials show cognitive behavioural therapy, delivered by a psychologist or psychiatrist, is most effective for recovery from long-term anorexia nervosa.

"THEY MIGHT THINK 'I CAN'T HAVE BULIMIA NERVOSA BECAUSE I HAVE A HIGH BMI'."

"Vital to knowing what works in treatment interventions for eating disorders, is speaking with people with an eating disorder about their lived experiences," EDBI researcher and clinical psychologist Dr Janet Conti says.

"Aspects of Phillipa's research are dedicated to understanding eating disorders from the perspective of the person with a lived experience, and using these insights to inform treatment."

Clinicians now know that treating the person with respect, and keeping their normal life as intact as possible rather than a "doctor knows best" paternalism, is crucial to long-term recovery. Current treatment approaches for people with an eating disorder focus on providing a personalised out-patient treatment plan, so patients don't lose connections with people, school or work – an approach used at Wesley Hospital Ashfield, where Hay is director of the Wesley Eating Disorders Centre and involved in a day programme. "People come in, get peer therapy, and group therapy, and dietetic support while continuing with their lives," Hay says.

"Change might be slower than an intensive inpatient programme, but it's far more likely to be sustained in a person, who can also maintain other important parts of their life."

BRIDGING THE GAP

Identifying those with an eating disorder, and facilitating recovery is of critical importance, but with so few people accessing treatments, how can interventions reach those who need them?

This is the question that plagues Hay. Behaviours such as binge eating and strict dieting in the general population have increased over time, and one in five people with an eating disorder are, according to the BMI metric, considered overweight or obese.

A significant barrier to overweight people receiving eating disorder treatment is the skinny stereotype, which endures not only in patients' minds but also, frequently, in the perception of doctors. "Often when a person presents to a GP, the GP doesn't see someone who's not very thin as having an eating disorder," Hay says.

"The person might also think 'I can't have bulimia nervosa because I have a high BMI'."

GPs asking the right questions, too, seem to influence the likelihood of people accessing treatment. In 2019, Hay, Conti and colleagues found people with an eating disorder were likely to seek specialist mental health intervention when a GP asked about their mental health, but not if the GP enquired about their diet or eating habits.

Like all mental health conditions, early intervention in eating disorders is important. Left too long, treatment becomes more difficult, but it's never too late to seek help. Hay says: "I've seen people recover from eating disorders who have had the illness for 20 or 30 years. There is always hope."

3 GOOD HEALTH AND WELL-BEING

WHY PAYING A VISIT PAYS OFF

Volunteer visits are helping vulnerable parents feel more confident and optimistic

A volunteer home visiting program is helping vulnerable parents in need of extra support. Volunteer Family Connect (VFC), matches families of young children with trained volunteers who visit once a week for three months to a year.

"My visits could involve reading to the kids while the parents cook dinner, going to the doctor together, or simply listening to their concerns," explains Kathleen McKinnon, a volunteer who has worked with several families. "It's only two hours a week, but it makes a huge difference to the families."

In addition to anecdotal evidence, social scientists are working to demonstrate empirically that programs like VFC make a difference.

In 2012, the government cut funding from volunteer home visiting programs citing a lack of evidence for their effectiveness, explains Associate Professor Rebekah Grace, chief investigator and Director of TeEACH (Centre for Transforming early Education and Child Health) at Western Sydney University. "If the only reason for the funding reduction was the lack of evidence, what we had to do was clear," says Dr Jayne Meyer Tucker, a former CEO of one of the three national not-for-profits that partnered on the research. She initiated crisis meetings with the research team. "We chose to run a randomised control trial, the gold standard methodology in assessing program effectiveness, which randomly allocates families to either receive the service or to continue on without the support of a volunteer."

NEED TO KNOW

- 15% of Australian parents report feeling isolated.
- The Western team's study was the largest trial of volunteer home visiting worldwide.
- The program demonstrated financial, social and health benefits.

Getting the program implementation staff, the volunteers, and volunteer coordinators on board with the trial, however, was a challenge. "The volunteers and coordinators are very motivated by the drive to help families make positive change. They worried that families in the control group were essentially being denied help, and the idea was heartbreaking for them," says Grace. "We went to each of the seven trial sites many times to talk to program volunteers and staff about why we needed to employ this methodology, to help them understand that the trial would give us the strongest evidence possible to argue for the survival of this program. This helped reframe their thinking."

The trial commenced in 2015, and the first analysis has been completed, showing that families who received the service felt more competent with parenting, were better connected to the community, experienced improved wellbeing, and were more optimistic about the future than those in the control group. Moreover, they showed volunteer improvements such as wellbeing, community connection, and sense of purpose. "It's lovely building bonds with young children," says McKinnon.

VFC currently operates with funding from an anonymous philanthropist, and the team continues to advocate for government reinvestment. The team's analysis shows that government investment in programs like these ultimately produce savings by preventing small problems from worsening and requiring more intensive intervention.

A social impact evaluation, underwritten by Ernst and Young, was performed in tandem with the study to value the improvements and social benefits generated from Volunteer Family Connect. They found that every dollar invested achieved a $1.78 to $5.42 return in social benefits.

"Even if you're economically well off, it's quite alarming how isolated and distressed you can feel as a new parent without a support network," explains Dr Kelly Baird, project manager and Research Fellow at Western. "Services are already available for parents who need professional care, like treatment for clinical depression, or who require more intensive tertiary parenting interventions. But we need to remember that the families who aren't at that level now, without intervention, could be at the edge."

"The issue with belonging is significant," adds Grace. "People are more isolated now than any other time. We need to be addressing social inclusion with the same seriousness and sense of urgency as we do with issues like smoking, alcoholism and obesity."

A Volunteer Family Connect participant.

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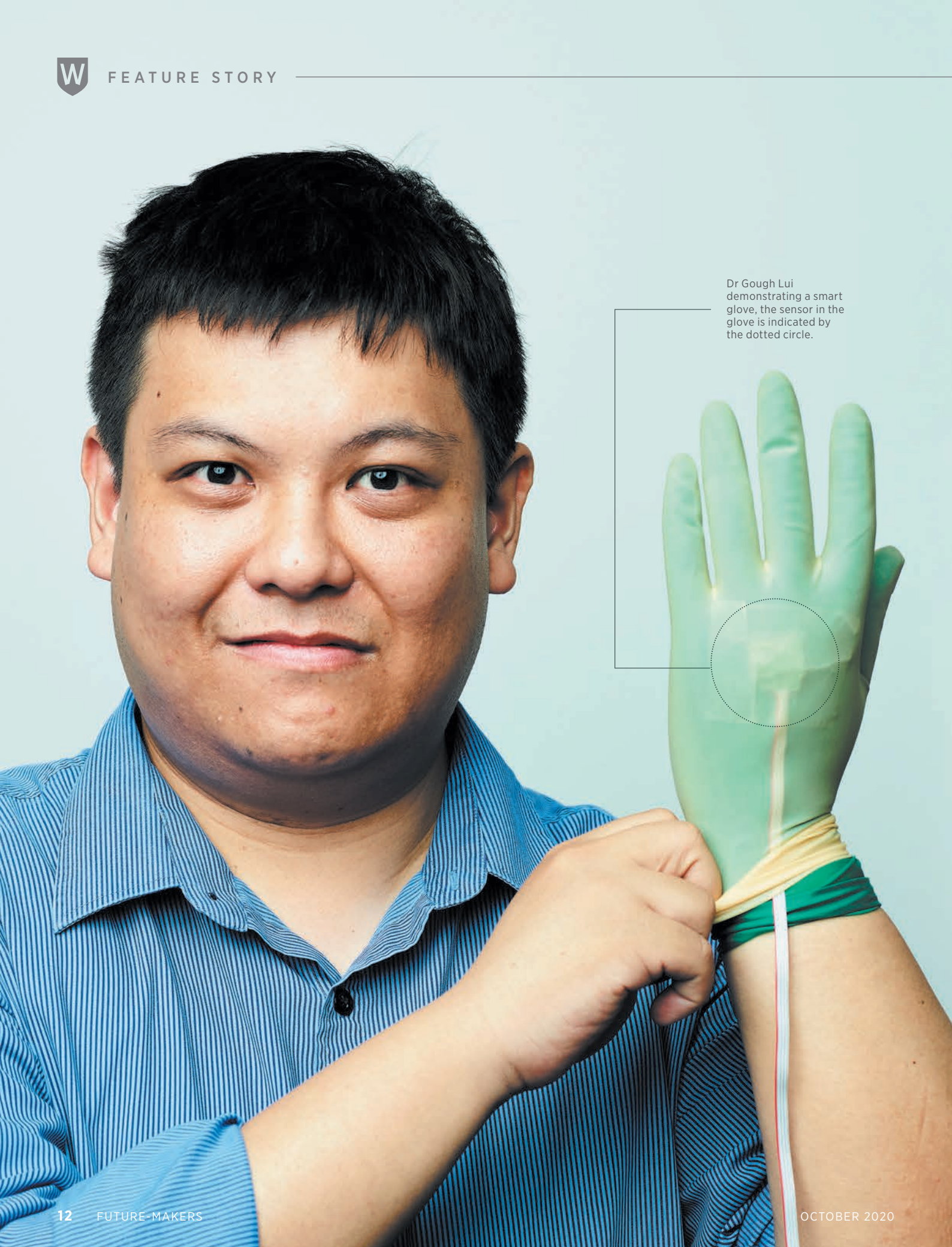


Dr Gough Lui demonstrating a smart glove, the sensor in the glove is indicated by the dotted circle.

3 GOOD HEALTH AND WELL-BEING

A SAFER HANDOVER

Electronic gloves help transfer knowledge from master surgeons to students.

Researchers from Western Sydney University, in consultation with Liverpool Hospital, have developed tools to help trainee surgeons master intricate surgical procedures.

Gough Lui, a biomedical engineer at Western's MARCS Institute for Brain, Behaviour and Development, has worked closely with Liverpool Hospital for a number of years. "We get engineers to sit in with clinicians to identify problems and inspire solutions that can really make a difference," he says. In one of these sessions, Clinical Dean and Foundation Professor of Surgery and Colorectal Surgery, Professor Les Bokey, discussed with Lui the possibility of training surgeons in a more objective and evidence-based manner to ensure evidence-based competency.

A big hurdle is that the surgical skills needed now are more complex than in previous decades. Surgeons must master open surgery, keyhole surgery with cameras, and robotic surgery, for instance. But while techniques have advanced, teaching methods have not greatly changed.

In training, an experienced surgeon watches over the student's shoulder, giving feedback. "Often they say, 'that wasn't very good,' but can't concretely articulate what is wrong," says Lui. "That's very frustrating when you're trying to master a skill, but not seeing a way forward."

One positive advance in training has been that students can now practise on simulators. But these are hugely expensive, and trainees in typical hospitals rarely have easy access.

To solve the problem, Lui has developed surgical gloves containing electronics to record the subtle, fast and controlled hand movements of skilled surgeons. When worn by students, the gloves can monitor how their hand motions differ from the experts'. Lui hopes that the gloves will eventually be coupled with a smartphone app, so trainees can practice tasks at home, for as little as $100 — a fraction of the cost of a simulator.

Creating the perfect gloves is a work in progress. At first, Lui placed electronics on the back of the glove, to detect acceleration and hand orientation, and added force-sensors in the fingertips. But experienced surgeons reported that they reduced their touch sensitivity and were too bulky, hindering movement. Lui has looked at alternatives including the use of force sensors further up the forearm and motion sensors on the back of the hand for an upgraded version.

"Now we have a tool that can assist in objectively measuring the intricate hand manoeuvres," says Bokey. Trainees who have participated in the development of the prototype can readily appreciate their potential contribution to training. Lui laughs that students even loved the clunky early version. "They are excited because they can see the promise," he says.

Lui is working out how best to deliver useful instructions to trainees. The gloves collect motion data and relay them to a screen, where even the tiniest jitters are visualized. This can be distracting to students concentrating on difficult tasks. Alternatives include 'haptic' feedback — the fingertips buzz — or audio feedback to guide trainees along the right path. But Lui is cautious in case students become overly reliant on the technology. "In reality, human debriefing is always better than computer feedback alone," he says. "This is not a replacement for trainers, but it will augment their ability to give advice."

The plan is to do a pilot trial in mid-2020, says Lui. If successful, the gloves could have unexpected uses. "We've already had requests from musicians asking if these gloves could help people become more skilled performers," says Lui. "They could have a wider impact than we ever hoped."

NEED TO KNOW

- The surgical skills needed today are more complex than in previous decades.
- Gough Lui and the team at MARCS have developed electronic gloves to help trainees learn from the movements of skilled surgeons.
- The gloves have proven popular with students.

This research was supported by the South West Institute for Robotics and Automation in Health, the South Western Sydney Local Health District, and the James N. Kirby Foundation.

3 GOOD HEALTH AND WELL-BEING

BRAIN

Accidents can sometimes spark innovation. About six years ago on a normal day in the lab, Western Sydney University neuroscientist, Yossi Buskila, was looking for signs of how brain diseases progress in sample slices taken from mice. Brain slices typically only remain viable for around six hours before the cells die, so Buskila usually disposed of them at the end of his day. This time, he forgot. When he returned next morning, he was surprised to see that a small number of cells had survived.

"I asked myself, why did some survive, and can we enhance that process?" That led him and colleague, Paul Breen, from The MARCS Institute, to develop the 'Braincubator' — an incubation system that prolongs the slices' longevity by up to six times, to around 36 hours. The apparatus opens new avenues of research into memory and learning, and into neurodegenerative disorders.

Buskila studies slices from mice that have been genetically modified to replicate how diseases such as Alzheimer's, epilepsy and amyotrophic lateral sclerosis (ALS) affect electrical and chemical signals between the brain's neuron and glial cells. He is also driven by a fundamental desire to reveal the brain's workings. "How do brain-waves code information? How do thoughts come about?" Buskila says. "These questions are my passion."

The short lifespan of a brain slice was a huge obstacle for research. Taking the brain out of the body and cutting into it immediately destroys 20-30% of cells. The rest become exposed to bacteria, which release toxins that kill cells within a few hours. And preparing new samples every morning took up to two hours.

Busilka's braincubator preserves the slices in a tank filled with a liquid that mimics spinal fluid. Simply adding antibiotics to try to stop the bacteria growing will not work because the drugs would damage the brain cells. So Buskila's team tried some other tricks. They found that cooling the slices to 15 or 16°C slowed the spread of bacteria.

Another way to destroy bacteria is to shine UV light on to the tank, but that also kills neurons. In the Braincubator, brain slices are kept in one cooled chamber, while in a second chamber, UV light shines on to the artificial spinal fluid which circulates between the two. This successfully slows bacterial growth in the liquid, dramatically increasing the slices' life.

NEED TO KNOW

- Brain slices typically last 6 hours.
- The Braincubator, developed by Western researchers, has extended slice longevity by a factor of 6.
- It is now commercially available.

> "NOW WE CAN LOOK AT WHAT HAPPENS NOT JUST IN 4 HOURS, BUT IN 20 HOURS."

The Braincubator is already on sale and has proved useful for researchers. Dario Protti, a physiologist at the University of Sydney, uses the Braincubator in his lab, and says "it has had a very positive impact on my research". He says the equipment helps reduce the number of animals used in experiments and could potentially be used to monitor changes in how proteins and genes are expressed in brain tissue over much longer periods.

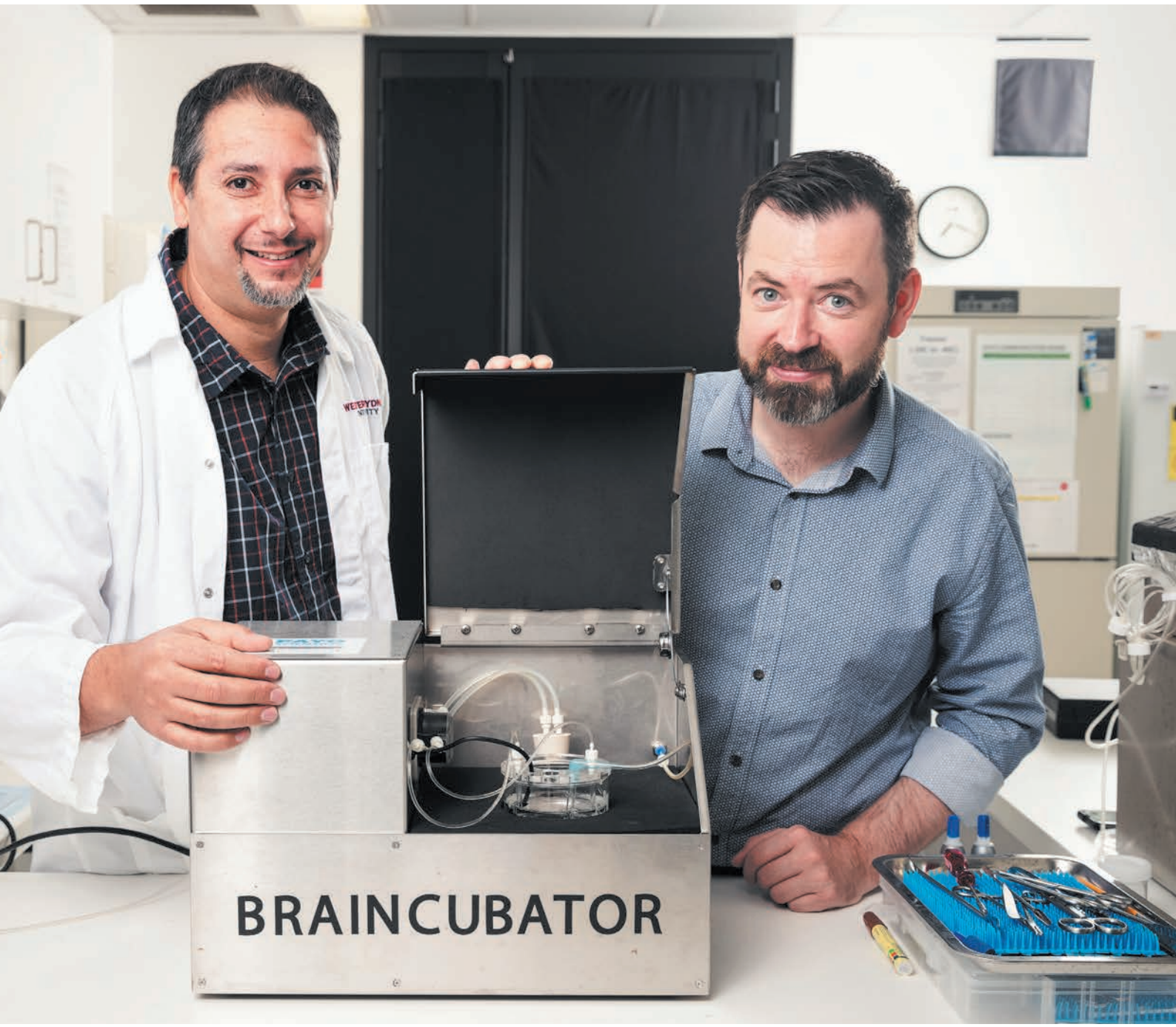
"Now we can look at what happens not just in four hours, but in 20 hours, and study the difference between short-term and long-term synaptic processes," says Buskila. "If the Braincubator can have a real impact on our understanding of how the brain works, that will make me happy."

Dr Yossi Buskila (left) and A/Prof. Paul Breen (right) with the Braincubator.

This research was funded by MND Australia.

WAVES

Technology developed by Western researchers can extend the viability of brain slices up to 36 hours.



RESEARCH FOR A BETTER FUTURE

KYLIE BUDGE
Research Theme Fellow - Urban Living Futures and Society

SEBASTIAN PFAUTSCH
Research Theme Fellow - Environment and Sustainability

LYN TIEU
Research Theme Fellow - Education and Work

JENNIFER MACRITCHIE
Research Theme Fellow - Health and Wellbeing

Western Sydney University Research Theme Fellows discuss their work's impact.

Dr Kylie Budge, a creative arts researcher, Dr Lyn Tieu, a linguist, Dr Jennifer MacRitchie, a cognitive scientist, and Dr Sebastian Pfautsch, a tree physiologist, are among Western Sydney University's best and brightest academics. Their work is helping to shape a greener, smarter, healthier, inclusive, and creative future. These researchers recently came together to share their thoughts on their work's potential for creating impact in the world.

FUTURE COMMUNICATORS

Linguistics wasn't at the front of Lyn Tieu's mind when she began her university studies, but she quickly became fascinated by what the scientific study of language could reveal about society. Her work focuses on how children acquire meaning, and how they interpret a particular feature of language called linguistic inferences — the messages we sometimes don't even realise we're conveying through our choice of words and phrasing.

For example, the sentence 'girls are as good as boys at maths' seems to be an equitable statement. But Tieu, Research Theme Fellow in Education and Work, says some studies have shown that the implicit inference that comes from the way that statement is ordered is that girls are not as naturally gifted as boys are at maths. "So if teachers are saying things that convey additional messages beyond what they're attempting to convey, that could have an impact on how children are interpreting the content that we're delivering," she says.

In seeking to understand how children interpret these linguistic inferences, Tieu is hoping her research can help "bridge that gap between our scientific understanding and children's actual educational experiences."

> "POLICY-MAKERS AND GOVERNMENTS SOMETIMES PRESUME THAT SOMEHOW INNOVATION OCCURS IN AN ABSTRACT VACUUM."

She also believes that linguistics has much to offer in terms of moving society towards greater equality, because it recognises that all languages are equal. "Prescriptive authorities will have you believe that there is some standard version of a language that you must attain, but the danger with that is that people then use that to create prejudices, to marginalise," she says. "In linguistics we learn that that's not true — different languages and dialects are equally important and valid, and can offer rich insights into the mind. If linguistics could actually be taught earlier in the curriculum, not only would you get the scientific benefit of learning about scientific inquiry and hypothesis testing through linguistic studies, it could actually change attitudes."

FUTURE SPACES

Changing attitudes is something that Kylie Budge is working hard to do in the creative arts field; in particular, antagonism towards selfies and Instagram culture in museums.

"People like myself are arguing there is some kind of benefit to this Instagram culture because it's a platform where people can creatively express their experience, their engagement with the space, and with the artefacts that are on display," says Budge, Research Theme Fellow in Urban Living Futures and Society. "It's a way to upend the power balance that has perhaps existed for too long, where museums have told people what they should think, what they should look at and how they should think about certain exhibits or space."

"There are still a lot of people who won't go to a museum or gallery, and feel like that's not a place for them," says Budge. But she argues that allowing digital expression in these traditionally non-digital spaces can open these spaces up to new audiences who might otherwise not experience them.

Another area where attitudes are changing, but not always for the better, is around the concept of maker spaces. These communal spaces with shared equipment are popping up in cities around the world – and particularly in China, where they are viewed as hothouses of creativity and innovation.

There is growing awareness of the importance that these spaces have in encouraging innovation. "These are about participating, making, and contributing to society, rather than just consuming."

"I think policy-makers and governments sometimes presume that somehow innovation occurs in an abstract vacuum," Budge says. "Different support mechanisms and spaces need to be provided and created to allow innovation to flourish. It doesn't just happen."

Creativity and divergent thinking are nourished in maker spaces, but the spaces themselves need protection and support. Australia has a few maker spaces — one of the most well-known in Sydney is in light industrial estate land in Marrickville — but, many are under threat from development pressure. Budge hopes that her work will contribute towards greater understanding and appreciation of and access to these spaces in Australian cities, particularly outside metropolitan regions.

FUTURE CREATIVITY

Music is a familiar expression of creativity, but Dr Jennifer MacRitchie, Research Theme Fellow in Health and Wellbeing, believes it also could have significant health and wellbeing benefits, particularly in the elderly. Having studied electrical engineering and music, she was working on motion capture technology to study the movement of pianists' fingers when she became interested in the processes by which we acquire musical skills.

"PLAYING A MUSICAL INSTRUMENT IS SUCH A BENEFICIAL TASK FOR YOUR BRAIN, SO WE STARTED WONDERING, WHY IS IT NOT SOMETHING MORE PEOPLE CAN HAVE ACCESS TO AND BENEFIT FROM?"

"Your brain has to process symbols on a page if you're reading music notation, decide on an action, a set of fine-motor commands that you use to manipulate the musical instrument, listen to the sound being produced, and then refine the next set of actions accordingly and you're doing that at such minute time scales," she says. "Playing a musical instrument is such a beneficial task for your brain, so we started wondering, why is it not something more people can have access to and benefit from."

It has long been established that these skills have to be acquired early in life, but MacRitchie and her colleagues have recently published research results that show that the elderly are just as capable of taking up music for the first time, and there are significant benefits in doing that.

But some older people can face additional challenges in learning music; for example, having restricted movement due to stroke or arthritis, or cognitive decline experienced as part of dementia. Practical and economic concerns to accessing a musical instrument may be enough to put off potential learners. This is another area where technology is breaking down barriers; MacRitchie gives the example of new musical interfaces that can be used on an iPad.

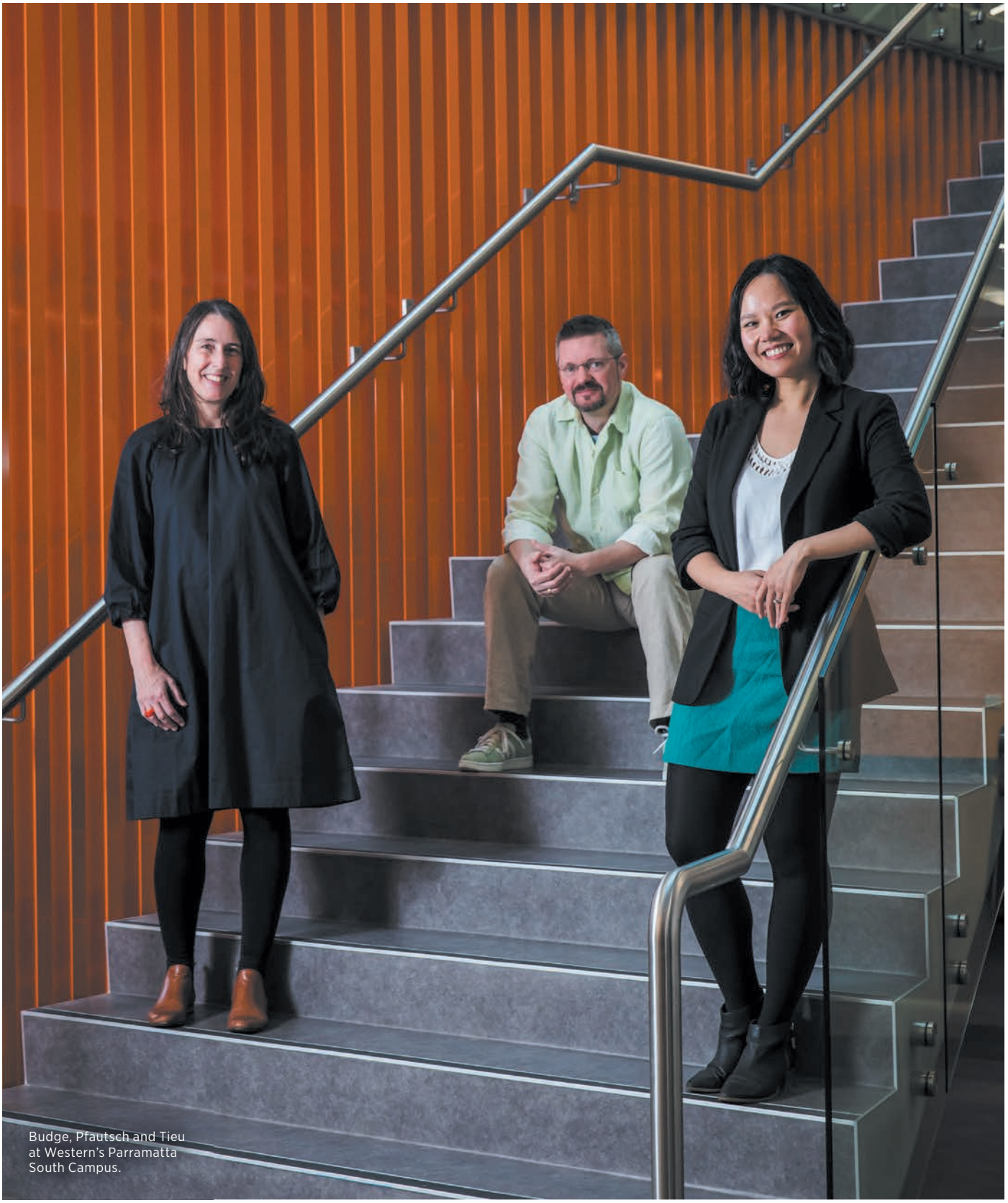
"A lot of my research is trying to devise ways to reduce some of those cognitive and physical barriers in learning to play a musical instrument so that we've got more people having access to musical activities and getting the optimal benefits for their wellbeing."

Researchers are still getting to grips with the extent of these benefits, because until now much of the work has focused on people with a lifetime of musical experience, not on those who are taking it up later in life. While there are likely to be physical and cognitive benefits, MacRitchie is also interested in the emotional and social benefits. "By doing a lot of group musical activities, you're giving people avenues to share something together and identify as part of a group," she says. "That helps reduce loneliness, for which older adults tend to be at risk."

FUTURE CITIES

The elderly, immobile and very young are more vulnerable than most to the effects of heat, and that's where Dr Sebastian Pfautsch's research comes in. As Research Theme Fellow in Environment and Sustainability, he's looking at how urban green

Music could have positive cognitive benefits in the elderly.



Budge, Pfautsch and Tieu at Western's Parramatta South Campus.

(left to right) Kylie Budge, Sebastian Pfautsch, Lyn Tieu, and panel moderator Bianca Nogrady at the Research Theme Fellow Panel.

infrastructure could help address the growing issue of urban heat.

Urban green infrastructure describes anything green in an urban space; from the grass, shrubs and trees along roads and in parks, to living walls and rooftop gardens. It's increasingly recognised that urban green infrastructure plays a vital role in cooling the urban environment.

Pfautsch and colleagues deployed temperature data loggers across several western Sydney councils, and found that a street with just 10% canopy cover experienced 12 days above 40°C in summer, while a street with 30% canopy cover had fewer than half that — experiencing just five days of summer above 40 degrees. "It's a huge difference that not only impacts the wellbeing of people living in tree-lined streets but also impacts power consumption for air conditioning in their houses," he says. "You have add-on effects once you start increasing urban canopy, where you reduce heat and energy bills in households."

But there are other benefits to increasing urban green infrastructure, Pfautsch says. "While green infrastructure helps make cities liveable, it also has benefits in biodiversity, liveability, public health, and even helps with reducing crime, and increasing property values," he says.

The challenge is how, where and what to plant to best combat the urban heat island effect combined with the climate crisis that is already seeing temperatures in Australia's major cities approach dangerous levels during summer months. But there's only so much that urban green infrastructure can do.

"If western Sydney gets hit by a heatwave, trees won't help cooling these very hot air masses, especially if they have no access to water that supports transpiration," he says. "We have to look at other ways to cope with these new conditions of repeated heat waves and low rainfalls. We're exploring how thermal benefits can be generated by different surface materials and colours used in urban design."

Pfautsch hopes his work can help guide local and state governments towards creating more liveable cities in the face of a heating climate. "We urgently need to expand green infrastructure, but we have to be smart about it if we want maximum cooling benefits in times of rapid urbanisation and a heating climate."

CENTRES OF DISCOVERY

Western Sydney University campuses are situated in locations throughout Greater Western Sydney.

Further information can be found here: **westernsydney.edu.au/future/our-campuses.html**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