

Australia's top 250 researchers > Rising young stars > The Nobel experience

RESEARCH 2025

Fast movers

How 15 university leaders are turbocharging research

Six page special starts page 8

Bond University Charles Darwin University CQUniversity Deakin University
Edith Cowan University Griffith University La Trobe University
Monash University RMIT University of Newcastle University of Queensland
University of South Australia University of Sydney UNSW Sydney UTS

We've been doing our *research*

Flinders' research is on the rise. With the fastest growth in research income of any Australian university from 2018*, our fearless commitment to groundbreaking research is helping to shape a better future.

140

growth in research
income over 5 years**



*(HERDC data 2018 - 2022)
**(HERDC data 2017-2022 (rounded up from 138.02%))

Foreword



Australia's researchers grapple with the challenges of today to build a better world tomorrow. Look around and you can see the fingerprints of Australian researchers everywhere. From environmental and industrial innovations to the medicine we take or the technology we hold in our hands.

Australia punches above its weight internationally when it comes to our research output. We are home to about 0.3 per cent of the world's population. Yet as a nation we produce more than 3 per cent of the world's research.

This hasn't happened by accident. It's the result of bright minds and decades of investment in the work of Australian researchers, our education systems and research facilities – year in, year out.

That's why the Australian government continues to invest in our National Collaborative Research Infrastructure Strategy (NCRIS). This investment currently supports about 100,000 researchers.

It's why we continue to invest in research through institutions such as the Australian Research Council, which this financial year will be provided with more than \$1 billion in National Competitive Grants across the sciences and humanities. And across the Australian government, total investment in research and development is projected to reach about \$16.5 billion over the next four years.

Research is critical to Australia's economic growth and productivity. It's a vital part of the Australian government's plan for a Future Made in Australia. That's why the Australian government is investing \$2.2 billion to support researchers to commercialise research, with programs such as Australia's Economic Accelerator supporting collaboration and driving cutting-edge research in priority areas.

Congratulations to every researcher, scientist and institution featured in this year's publication. Each is an example of Australian research excellence, across some 250 individual fields of research.

Your work is changing lives here and around the world, and I thank you for it.

Jason Clare
Federal Education Minister

Supporting Australia's innovative future



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Institution abbreviations

- ACU** Australian Catholic University
- AIMS** Australian Institute of Marine Science
- Alfred** Alfred Hospital
- ANU** Australian National University
- Baker** Baker Heart and Diabetes Institute
- Burnet** Burnet Institute
- CDU** Charles Darwin University
- CQU** Central Queensland University
- CSU** Charles Sturt University
- CSIRO** Commonwealth Scientific and Industrial Research Organisation
- George Institute** George Institute for Global Health
- HRI** Heart Research Institute
- JCU** James Cook University
- ONJCRI** Olivia Newton-John Cancer Research Centre
- Peter Mac** Peter MacCallum Cancer Centre
- QIMR Berghofer** QIMR Berghofer Medical Research Institute
- QUT** Queensland University of Technology
- RCPAQAP** Royal College of Pathologists of Australasia Quality Assurance Programs
- RMIT** RMIT University
- RCH Melbourne** Royal Children's Hospital Melbourne
- UNE** University of New England
- UNSW** University of New South Wales
- Uni of Melb** University of Melbourne
- UniSA** University of South Australia
- USQ** University of Southern Queensland
- USC** University of the Sunshine Coast
- UTS** University of Technology Sydney
- UWA** University of Western Australia
- Westmead** Westmead Hospital
- VU** Victoria University

THE AUSTRALIAN ♦

RESEARCH

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Our *research* goes hand-in-hand with industry

At Flinders University, we're not just conducting research; we're actively shaping a better future by collaborating closely with industry partners. Partner with us to unlock unparalleled access to state-of-the-art research and cutting-edge facilities, attract top-tier talent, and drive impactful innovations in technology. Together, we can fortify your reputation and establish your organisation as a leader in transformative change.

Fearlessly committed to a better future.
Work with us.

Welcome to the 2025 Research magazine

Showcasing the value of Australian research

This year's magazine again delves deep to discover the richness of Australia's research and shine a light on its unsung heroes

Welcome to The Australian's 2025 Research magazine which, every year since 2018, has presented a comprehensive picture of Australia's best research – naming the top performers in each of 250 fields across eight disciplines.

When we started doing this in 2018 it was a revolutionary approach, using big-data techniques to analyse the massive trove of publicly available data about researchers and their work, and offering fine-grained information about the top individual researcher, and the top university or research organisation, in each of the 250 fields.

Now in their seventh iteration, these lists are anticipated and expected within the research community each year. Gratifyingly, we've noticed that an appearance in the lists has become something researchers and institutions take pride in and want to share.

Because the lists are so fine-grained they are able to delve deep into research disciplines and give wider recognition to work that would otherwise be known only to a researcher's peers. In this way the Research magazine, and its listings, are a valuable showcase for Australian research. They demonstrate the intrinsic value of research, and also its importance to the wider community by improving health, wellbeing, the environment and the economy.

The data in the magazine is prepared by talent discovery and research analytics firm League of Scholars using the skills of the co-founders, Paul McCarthy and Rasika Amarasiri. It was their insights into what was possible to discover by sifting the vast amounts of data available online which led to the first list of top 250 researchers and research institutions being created in 2018. They have repeated their work each year since, using an "impact score" that takes into account the quality of research.

Paul and Rasika have not limited their data analysis to creating the top 250 list. Thanks to their work, this year we are also publishing a list of universities whose research is growing the fastest in quality and quantity (page 8-13), a list of young rising stars to highlight Australia's emerging research talent (page 16), and an innovative look at

How to read the lists

This is a data-rich magazine and there are four main lists, with some divided into sub-categories.

Fast movers (pages 8-13): The 15 universities whose research output, in both quality and quantity, grew by over 5 per cent in the past year.

Rising stars (page 16): Eight promising young researchers working in Australian institutions, one from each of the eight major disciplines. Our analysis shows that the work of these eight is the best in their particular discipline.

World's best (page 22): The 12 Australian researchers and 16 Australian universities which are not only the best in the country in a particular field, but the best on the planet.

Top 250 (pages 24-42): This is the heart of the magazine. In 250 research fields, over eight research disciplines, we use the "impact score" to name the top individual researcher and the top research institution in Australia.

What is the impact score?

We give every Australian researcher and every Australian university or research organisation an impact score in each of 250 fields of research. This score is equal to the number of citations for papers published (by the individual or the institution) in the top 20 journals of each particular field in the past five years. This ensures that only quality work, and recent work, is considered. The researcher and the institution with the top score is the leader of the field.

We use publicly available information on Google Scholar to identify researchers, to obtain data on their citations and to link their work with universities and research institutions.

the flow of research talent in and out of Australia (page 18). We also honour the researchers and research institutions that are not only the best in Australia in a research field, but are the best in the world (page 22).

We hope you enjoy reading the 2025 Research magazine and we welcome your feedback.

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Paul McCarthy



Rasika Amarasiri



THE UNIVERSITY
OF QUEENSLAND
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Fast movers

Unis explain how they grew

On the next six pages we name the 15 universities whose research grew fastest in the past year. It is a varied list ranging from two of Australia's largest universities - Sydney and Monash - to some of the smallest such as Charles Darwin, CQUniversity and Bond, a private institution.

What they have in common is they all increased their research influence by more than 5 per cent in the past year. (See below for details on how we measured this.)

The fact that we are measuring growth, rather than the amount of research output, gives smaller institutions a chance to be recognised for what they are doing to improve their research and make it valuable to industry and their local communities.

Here we have given leaders from all 15 "fast-moving" universities the opportunity to explain how they are expanding research in their institution.

Tim Dodd

Tim Brailsford Bond University

Bond University, a non-public institution on the Gold Coast, is well known for its high-quality teaching. But it is also an ambitious research institution and vice-chancellor Tim Brailsford says the university made a clear decision, five or six years ago, to "accelerate our research path".

The strategy had to be shaped to be effective in a small institution like Bond. Brailsford says they worked hard to "create a greater collaborative environment" and a consistent approach to research across the campus. "We were trying to move away from the lone ranger approach to research to more typical science-based research, which is built around teams and not so dependent upon individuals," he says.

The mantra was quality over quantity and the university made changes to ensure that decisions affecting staff - such as promotions,

awards and rewards - offered the right incentives to back the strategy. Although it was seeking quality, Bond did not try to pick winners. "We left it up to the disciplines themselves to try and mount a cogent case that they had sufficient critical mass and then we would look at supporting them," says Brailsford. "We back winners."

Bond is building on its traditional research strengths in public health, and expanding in medical research.

Other areas of strength include psychology, legal studies, business management and construction management.

The university has particular strength in data analytics, applied statistics and actuarial science.

Brailsford says the strategy has been a success, with research investment up by over 50 per cent and the university's own research assessment exercise showing that quality has significantly improved.

Methodology

The Australian's partner, League of Scholars, calculates the annual improvement in the volume and impact of each university's research.

An individual H-index is calculated for all researchers in the university based on their work in the five years

to 2024. The same is done for all researchers in the university for the five years to 2023.

The median of each of these sets of data is found and the 2024 median is compared to the 2023 median to calculate growth.



Iain Martin Deakin University

Deakin University vice-chancellor Iain Martin says a key achievement of his institution has been to boost the benefit that its research brings to industry and the community, in addition to marking a mark via the traditional academic measure of number of publications and citations.

Martin says the university's research income has more than doubled since 2019, with the biggest growth coming from industry and community-related investment. He sees that as an indicator Deakin researchers are succeeding in meeting broader needs, as well as excelling academically.

"Most of our successful research groups are actually really good at doing both at the same time," Martin says. As an example he points to Deakin's research into new materials. "There's a lot of discovery-based work going on in the lab. But at the same time there's

an awful lot of industry-facing activity in the Waurm Ponds Future Economy Precinct," he says.

One significant area of growth at Deakin is research into AI applications. "Looking at how you can use AI to shorten development cycles in manufacturing, how you can use AI to optimise movement in a number of other industrial processes, practical applications of AI in education and learning, it goes on," Martin says.

Deakin's research in robotics and autonomous systems, which was mainly concentrated on industry and defence, is now moving beyond that. For example, Martin points to a system that uses robotics to do ultrasound scans remotely at a distant hospital and interprets the scans at a central location. But he stresses research is not coming at the expense of students: "We're growing that research expertise, but it is not coming at the cost of good educational outcomes."

How 15 university leaders turbocharged research



Marnie Hughes-Warrington University of South Australia

We look at our research “outside-in” says Marnie Hughes-Warrington, the University of South Australia’s deputy vice-chancellor (research and enterprise).

“It’s a business concept which is, if you look at your own university how the rest of the world sees you, how will you do differently and better what you’re currently doing.”

This approach has led the university to open up the deliberations of its research committee. “The whole university can come long,” she says. And the key performance indicators for research have been shrunk to two items: research impact and research income.

Both are doing well, Hughes-Warrington says. Research income is up, and the proportion of research income which comes from industry is also up. “And our impact has gone up because we always ask the question, ‘why are you doing it and who are you doing it for?’”



Hughes-Warrington says UniSA has “recrafted” its system of promotions and sabbaticals for academic staff around research impact. And it doesn’t have to be

the traditional measure of research impact counting papers published in journals and the number of citations they receive. It could be a piece of research which leads to a government policy change. Or it could be a creative work.

“For instance, Rising Sun Pictures, with whom we have a partnership, was short-listed for four of the five Emmys around the special effects. And we were involved in all four of those,” she says.

Industry is interested in research links with UniSA over a wide range of disciplines, Hughes-Warrington says. “We don’t assume it’s a STEM-only world. The technical is critical, absolutely critical, but they (business) want a holistic solution for a lot of their problems.”

UniSA can assemble research teams with “across the board” capability, and also partners well with other universities to deepen the talent pool, she says.

Chris Pakes La Trobe University

La Trobe University’s deputy vice-chancellor (research and industry engagement), Chris Pakes, says the institution is changing the way it does research. It’s half way through a 10-year strategic plan, Research 2030, which is all about saying: “OK, we’re a comprehensive research university but we need to curate areas of concentrated excellence.”

It aims to bring to maturity the many facets of the university’s long-standing and highly regarded research programs. La Trobe is focusing on key areas including health and wellbeing, food and nutrition, and sustainable agriculture. Investment in these areas attracts talent, says Pakes.

“We’ve had a strategic academic recruitment program running for the past three or four years that attracted some really strong people to La Trobe on the back of our areas of focus,” he says.

The university is also boosting its “industry-facing assets”. This year the university launched a Bio Innovation Hub to provide lab space to industry to develop new products. Another facility, the Digital Innovation Hub, allows businesses and students to connect with software engineers and developers to create new digital products. German company BioNTech will soon start building an mRNA manufacturing plant on the La Trobe campus. “That provides a strong anchor in the biomedical space,” says Pakes.

La Trobe has also become notably more global in its research, with more overseas partners and collaborators, which means its research papers have a wider audience, are better read and are more influential.

Caroline Finch Edith Cowan University

Edith Cowan University is well-known as a top teaching university with a long record of exceptional scores in the government-backed funded Student Experience Survey, conducted annually. But that’s not the full story. Deputy vice-chancellor (research) Caroline Finch says the university has invested strongly in supporting its academics to reach their best as both researchers and teachers.

She says the university has been increasingly targeting research areas that have potential and allows them to grow.

“When you support areas like that, you attract more people, both

from internal to the university to work in the area, but also external appointees,” Finch says.

“It creates a culture, and a wonderful place to work, where everyone is sharing the knowledge and the approaches, but also sharing and celebrating the successes of others.”

Finch says it’s a priority for research to have impact and for the university to engage with its stakeholders. “We’ve always co-designed out projects with stakeholders. We’ve conducted the work with them.”

The university has also focused on better communicating what it

does in research. “We’ve invested in things like media training for our staff, social media training, too. Some of these things now become basic skills that our researchers have,” Finch says.

The university also strongly emphasises developing research talent, supporting people in their early to mid-career. Finch says she personally believes that giving young researchers affirming, genuine feedback is “one of the best gifts I can give them”.

“I’m really passionate about working with our early to mid-career researchers to really give them the best foundation.”

Fast movers

Bronwyn Fox UNSW Sydney

Societal impact is front and centre of research at UNSW Sydney, says deputy vice-chancellor (research) Bronwyn Fox, as the university is in the midst of developing its new long-term strategic plan.

Universities have many ways of quantitatively measuring the impact of their research through numbers of papers published and the citations they attract.

"But we're also looking more purposefully at how we know whether we're really helping society and the communities that we serve," says Fox.

"You might have some researchers who are really performing exceptionally well in doing something that's really important for society, but maybe they don't have the traditional research metrics. So it's really important to have the processes, the promotion processes, to make sure that you recognise and reward excellence in all of the many forms that it comes in."

Fox, who joined UNSW this year from her former role as CSIRO chief scientist, says an impressive feature of the university is its centralised approach to research infrastructure. The Mark Wainwright Analytical Centre manages equipment and instrumentation housed in several laboratories across the university, and also trains and supports researchers who use the facilities.

Fox says the expert staff of the centre act as "connective tissue" for UNSW researchers, breaking down the silos.

"They can say, 'Hey, you're working on carbon. Do you realise that someone down the corridor is actually doing a very, very similar experiment to you, and you might want to get together and compare techniques?'"

Calum Drummond RMIT University

RMIT is an applied university and its research must be relevant outside of the academic community, says deputy vice-chancellor (research and innovation) Calum Drummond.

So, for more than a decade the university's express strategy has been to do this through "translating excellent research" into practical applications.

In choosing its key research areas, Drummond says RMIT undertook a four-step process. First, it looked for areas where it had a "critical mass" of expertise and resources. Then it checked whether it could offer research quality in the area. Third, it queried if the university could add value, or would it merely be replicating what other universities were doing. And last, it asked what Drummond says is the most important question: "Would anybody care outside the academic community if we were working in these spaces?"



He said RMIT ended up with 100 initial suggestions for research areas and whittled them down to eight. The university calls them "enabling impact platforms".

Four of them are STEM areas – advanced manufacturing and materials, biomedical and health innovations, information systems, and sustainability technologies. The other four are social change, design and creative practice, global business innovation, and urban

futures. All RMIT academics are invited to affiliate with one or more of the platforms and they are designed to be cross-disciplinary.

"You could be in our College of Design and Social Context, but you might think that you have something to contribute to advanced manufacturing, which is traditionally in a STEM area. You can join that," Drummond says.

Additionally, RMIT has research networks that are specifically linked to a cross-disciplinary topic – for example, artificial intelligence or mental health. "We've got over 40 of these now. It doesn't matter where you are in the university. You can join these networks," he says.

Given that most of the university's research work is done by its 2500 or so PhD students, RMIT also makes sure that PhD research topics are aligned with specific projects that are part of the research strategy.

Andrew Parfitt UTS

There is a cycle to be followed when building up research in a university, says UTS vice-chancellor Andrew Parfitt.

"You take the time to build the base, then you bring the partners in to scale out the research, then build the base again in terms of the scale and quality (of research), which is where we're now at," he says.

And that, in turn, will lead to another cycle. "What we're looking to do is to leverage that into larger projects, bigger collaborations, more interdisciplinary work that enables us to tackle bigger problems," he says.

UTS is, at its core, a technology university, but it's also strong in science, business, law and health, although it does not have a medical

school. "We pick our (research) areas pretty much aligned with our teaching strengths so we're able to build on the base," Parfitt says.

He points out that UTS is not large, certainly not in the Australian model of higher education where some institutions are nearly three times the size of UTS. "So it's really important for us to leverage both teaching and research and build out our academic cohort," he says.

UTS researchers are also active in connecting with colleagues overseas, both in business and universities. "Certainly, it's well-known that international collaborations, in particular, increase the visibility of published work," Parfitt says.

The university has been

successful in increasing its research income in recent years – from government competitive grants, industry, and other funding sources – and this has boosted its research strength.

"So we've invested heavily in facilities that allow us to do interesting research in engineering and other technology areas, science as well, with really unique facilities that really bring partners to us," Parfitt says.

"They don't come to us because we're able to transact a contract piece of research. They come to us because they know we have the intellectual horsepower that's demonstrated by the academic output. So it's a virtuous cycle in many ways."

How 15 university leaders turbocharged research



Mike Ryan Monash University

Monash is a large university, with more students than any other, but it's also the youngest of Australia's research intensive universities in the Group of Eight (founded in 1958) and retains the agility of youth, says interim deputy vice-chancellor (research) Mike Ryan.

"It has a wonderfully strong innovative culture, a can-do culture," he says, adding that this makes Monash a magnet for many researchers.

"We have the breadth and depth within the institution. It's not just a smattering of research stars. We've basically got a whole galaxy of them. They work well together. Publish well together."

Medical research is the university's main game – about 60 per cent of all its research – and its broad strength is mainly in STEM

fields. It supports its STEM researchers with state-of-the-art research infrastructure available across the university; for example, the equipment in the Melbourne Centre for Nanofabrication.

"We have a lot of these types of facilities that are centralised, really well run, with core professional staff who can really do the job well," Ryan says. "That means that people can come in and just get their experiments running. The students can be well-trained."

Another strength is Monash's growing global profile and overseas research links.

"We have incredible collaborations with international researchers. We know that publishing with co-authors from the top 50, 100 institutions helps

amplify the impact of the research we do," Ryan says.

He says that Monash is also achieving strong results for industry and the community from its research, and wants to do more.

"We're thinking about the culture that we have as an institution and how we engage with communities. And many of our researchers do that incredibly well," Ryan says.

Monash is also looking to develop the next generation of research leaders. Its research talent accelerator asks up-and-comers what they need to expand their reach. "Some have identified that they need to get in front of government or they want to develop policy. And so we're matching them with mentors. As a cohort they are growing really well."

Carolyn Evans Griffith University

For the past 18 months, Griffith University has pushed forward with a "surge program" to supercharge its research, says vice-chancellor Carolyn Evans.

One key goal is to put more resources into the research work itself, and less into the administration by consolidating work into larger research institutes with better economies of scale.

Another element, says Evans, is to put more long-term planning and support into bids for major projects or pieces of research funding – whether through competitive grants or philanthropy.

"The third really critical element is very strong focus on major partnerships with people who can help add to our research, sometimes financially, but also in terms of expertise, connections, and facilities," Evans says.

She says the strategy is already paying off. Pharmaceutical company Sanofi has set up a research facility at the university to develop mRNA vaccines, and quantum tech company PsiQuantum will establish a test and validation lab on campus.

Evans says the university is focusing on deepening its research expertise in fields where it shines, for example biotechnical and biomedical research, quantum physics, and adaptive manufacturing. Also, "we've always been strong in areas like environmental and social sciences and creative arts", she says.

But this does not mean the university is not ready to pivot to new research opportunities. "We're consolidating and focusing a little bit more while leaving a door open for the next thing that we haven't thought of," Evans says.

Fast movers

Nick Klomp CQUniversity

Vice-chancellor Nick Klomp says that when he took the job in 2019 and began writing a five-year strategic plan, it was recognised that the university needed to concentrate on its research strengths. CQUniversity is one of Australia's smaller universities.

"We had lots of little flowers blooming, but we needed to make sure we focused because there was never going to be enough money," Klomp says. So in that five years, some research areas have been let go and CQUniversity now has three research institutes and eight research centres.

"That really allowed us to focus where we were doing our research and that was around industry and regional requirements. We really focused on what would give us bang for buck for our mission, which is delivering to regional Australia," Klomp says.

For example, he says the university has asked primary industries what they need, and this has informed the work of CQUniversity's Institute for Future Farming Systems which brings robotics and other new technology to agriculture.

The university also partners with industry to fund PhD students to do research in areas of industry need.

"We went to industry and said, 'If you fund one PhD in an area that you want research in, we'll give you two. We'll fund another one directly'," says Klomp.

He says the university has clearly defined the key performance indicators for academics in carrying out research. Staff have been given support, and expectations for them were aspirational but doable.

"You sort of think that there'll be a lot of pushback but actually most people were pretty excited by it," says Klomp.



Deborah Terry University of Queensland

"The big issues facing the world are going to be solved by big multidisciplinary teams," says Deborah Terry, vice-chancellor of the University of Queensland.

Collaboration between researchers is critical, she says, in key areas such as energy transition, climate, child health, infectious diseases, and AI. "We've been putting in place what we call research networks to support knowledge sharing and cross-disciplinary collaboration."

These networks have structure and support, and some modest funding from the university, Terry says. The networks pay off, she believes, not only by bringing experts from many disciplines together to solve complex problems, but also by boosting the university's measurable research

performance. Research papers that would previously have been read only within a narrow field become of interest to researchers in other fields and get cited more widely. "You end up with a bigger H-index as a consequence because your work is just exposed to more people," Terry says.

The university is also working hard to deepen its links with government and industry – a tripartite relationship, Terry calls it.

"We've put more structure, more resource in that area, really driving our strategic partnerships and government relations, and being really open, trying to be as accessible as possible, not pretending we can solve every problem," she says.

Terry believes this three-way relationship is increasingly

important in terms of making progress on the complex challenges facing the nation. "Governments are looking to leverage industry, and vice versa. And universities need to be part of the solution and part of those big teams," she says.

Terry points to the example of her university partnering with Griffith University, the Queensland government and French pharmaceutical company Sanofi for a Translational Science Hub which will use mRNA technology to develop vaccines and other therapeutics. A "Team Queensland" approach, she calls it.

For the future, Terry says the university is keeping a pipeline of early and mid-career researchers moving through the system, while making sure its strong researchers get the support they need.

How 15 university leaders turbocharged research



Alex Zelinsky University of Newcastle

University of Newcastle vice-chancellor Alex Zelinsky likens his institution to an “economic anchor” for the city and surrounding region.

“We’re very focused on delivering research excellence and collaboration and making sure there’s impact from that work. We want to be an innovation engine for our region and also be seen as a broker connecting ourselves to industry,” he says.

“We’re really focused on boosting collaboration with external partners, particularly future growth areas such as health and clean energy. We’re also doing the same with medical research, and we’re also thinking about how to transition regions into being strong, resilient communities.”

One challenge is to help the Newcastle region, a major coal exporter, to build new industries around clean energy. “That goes through research translation,



commercialisation and then trying to get impact from the work,” Zelinsky says.

The university runs an industry open day where researchers and potential industry partners come together to get to know each other and explore ways to work together.

“We just had one the other day. Over 300 industry people turned up, and it’s just like a place where you come and talk. And that leads to other things,” says Zelinsky.

The key to making it work is the university’s matrix-like research structure. Academics work in one of three colleges, but can also be affiliated with the university’s three research institutes. Cross-disciplinary work is encouraged.

The university also has “living labs” which work across the matrix on particular challenges. The living labs include ones focused on wellbeing, health innovation and the circular economy – developing ways to fully recycle materials.

Zelinsky is particularly proud of the Hunter Medical Research Institute, in which the university partners with the Hunter New England Local Health District.

“We’ve got a million people in the Hunter and we’re trying to focus on being the healthiest million people on the planet. That really drives so much great research, and we’re attracting good people, good money. It’s all going gangbusters.”

Steve Rogers Charles Darwin University

Charles Darwin is one of Australia’s smallest universities and not one known, in the past, for its major research effort. But that’s changing.

“Why are we one of the 15 fastest-growing?” asks deputy vice-chancellor (research and innovation) Steve Rogers.

“Over the past three to four years, we’ve put a major focus on research that has real relevance to the sort of issues, opportunities, and challenges in the Northern Territory, in northern Australia.”

Rogers says that when he joined the university nearly five years ago it didn’t do research in agriculture despite it being a significant industry in northern Australia. Since then the university has joined with the NT Department of Agriculture and Fisheries and industry bodies to conduct research in the area, aided by funding from Canberra for four new professorships.

He says the result has been useful research which benefits the agriculture industry, as well as leading to academic papers in respected journals.

However, Rogers says the focus is on community impact. “We really want to be doing research where it’s going to make a difference to the community,” he says.

That includes the Indigenous community which makes up about a quarter of the NT population.

One example of the university’s contribution is in its Research Institute for the Environment and Livelihoods. “It’s very much about environment and ecology. You’d be hard pushed to find one of their projects that wasn’t partnering with an Indigenous ranger group, with the First Nation,” Rogers says.

Mark Scott University of Sydney

Universities are doing the heavy lifting to keep Australia’s investment in research and development above water in the face of the decline in R&D expenditure by government and business, says University of Sydney vice-chancellor Mark Scott.

He particularly singles out the research-intensive institutions – of which the University of Sydney is one – for their contribution. Their achievement is extraordinary, he says. Australian universities now spend more on R&D than either the business or government sectors, a turnaround from 25 years ago when the business and government contributions far outweighed that from universities.

Scott says the University of Sydney is “very committed” to creating deep research partnerships which link its own researchers, from many disciplines, to external partners to work on solving the great global challenges. He says the university is focused on building a reputation of “being great to partner with”.

He says research success comes from successfully bringing together many moving parts.

“You have to find the right research talent and develop that talent. You’ve got to have the infrastructure. You have to have the structure inside the university between the different schools and faculties, and so forth,” Scott says.

He says the university’s biggest current research investment is its biomedical accelerator, a precinct linking the campus to the adjacent Royal Prince Alfred Hospital “which will facilitate multidisciplinary engagement around very challenging as yet unresolved medical and health challenges”.

Scott also points to a recent initiative to hire 40 exceptional young researchers from around the world through the new Horizon fellowship scheme.

“We were stunned by the quality of applications we got, domestically and globally,” Scott says. “And already the research efforts of those Horizon fellows look very, very encouraging for us.”



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Rising stars

Early career researchers make their mark

At the heart of the Research magazine is the list we create of Australia's top researchers – the leaders of 250 fields of research, over eight disciplines – which showcases Australia's best.

However there's also a need to shine a light on the young researchers who are not yet top of their field, but who are rising fast. Their work must be encouraged and nurtured to ensure that Australian research stays strong.

These eight have been selected because they have the highest annualised H-index in their discipline for researchers in the early stage of their careers (less than five years since the first citation of their work).

The H-index is a widely used measure of the volume and quality of a researcher's work and, by annualising it, that is dividing by the number of years a researcher has been active, it helps correct for differences due to career length and field.



Health & Medical Sciences

Genevieve Dammery
Macquarie University



Genevieve Dammery is a 2023 Ramsay Scholar who this year completed a masters degree on preventing violence against women and girls at Cambridge University. She has worked at Macquarie

University's Australian Institute of Health Innovation since 2021 and has a strong publication record over a wide range of primary care and public health topics.



Life Sciences & Earth Sciences

Oliver Eales
University of Melbourne

Oliver Eales is a statistician and mathematical biologist at the University of Melbourne where he holds a research fellowship. He has published extensively on the

transmission of Covid-19 and other viruses and describes his interests as including computational modelling of viral evolution and analysing competing strains.

Humanities, Literature & Arts

Mathias Felipe de Lima Santos
Macquarie University



Mathias Felipe de Lima Santos teaches and researches multiplatform journalism at Macquarie University and has published extensively on media,

disinformation and fake news, the impact of AI, and data journalism. He has also worked professionally as a journalist.



Business, Economics & Management

Mohd Sadiq
Australian Catholic University

Mohd Sadiq's research speciality is green marketing and services marketing, and his research ranges over tourism, online services, and green washing, that is deceptive claims

that a good or service has environmental benefits, when it does not. Dr Sadiq is a sessional lecturer at the Australian Catholic University's Peter Faber Business School.

Engineering & Computer Science

Milad Baghalzadeh Shishehgharkhaneh
Monash University



Milad Baghalzadeh Shishehgharkhaneh is a PhD student in civil engineering at Monash University who has published extensively on ways to innovate in construction management. He has

investigated use of AI to reduce risk in the construction supply chain, and the use of AI and blockchain technology to increase resilience in construction projects.



Physics & Mathematics

Maral Ansari
CSIRO

Maral Ansari is a CSIRO research engineer working on antenna and receiver systems for astronomy and space science applications. She holds a

doctorate from the University of Technology Sydney and has an extensive record of published research.

Chemical & Material Sciences

Kunsheng Hu
University of Adelaide

Kunsheng Hu holds a PhD in chemical engineering from the University of Adelaide and his research includes papers on pollution caused by

degradation of microplastics. He is currently a laboratory manager at the University of Adelaide.



Social Sciences

Benjamin Wood
Deakin University

Benjamin Wood is a research fellow at Macquarie University's Global Centre for Preventive Health and Nutrition whose work examines the political economy of food systems and ways in

which large corporate and financial actors adversely influence health and equity. Recent work includes investigation of the ultra-processed food industry.



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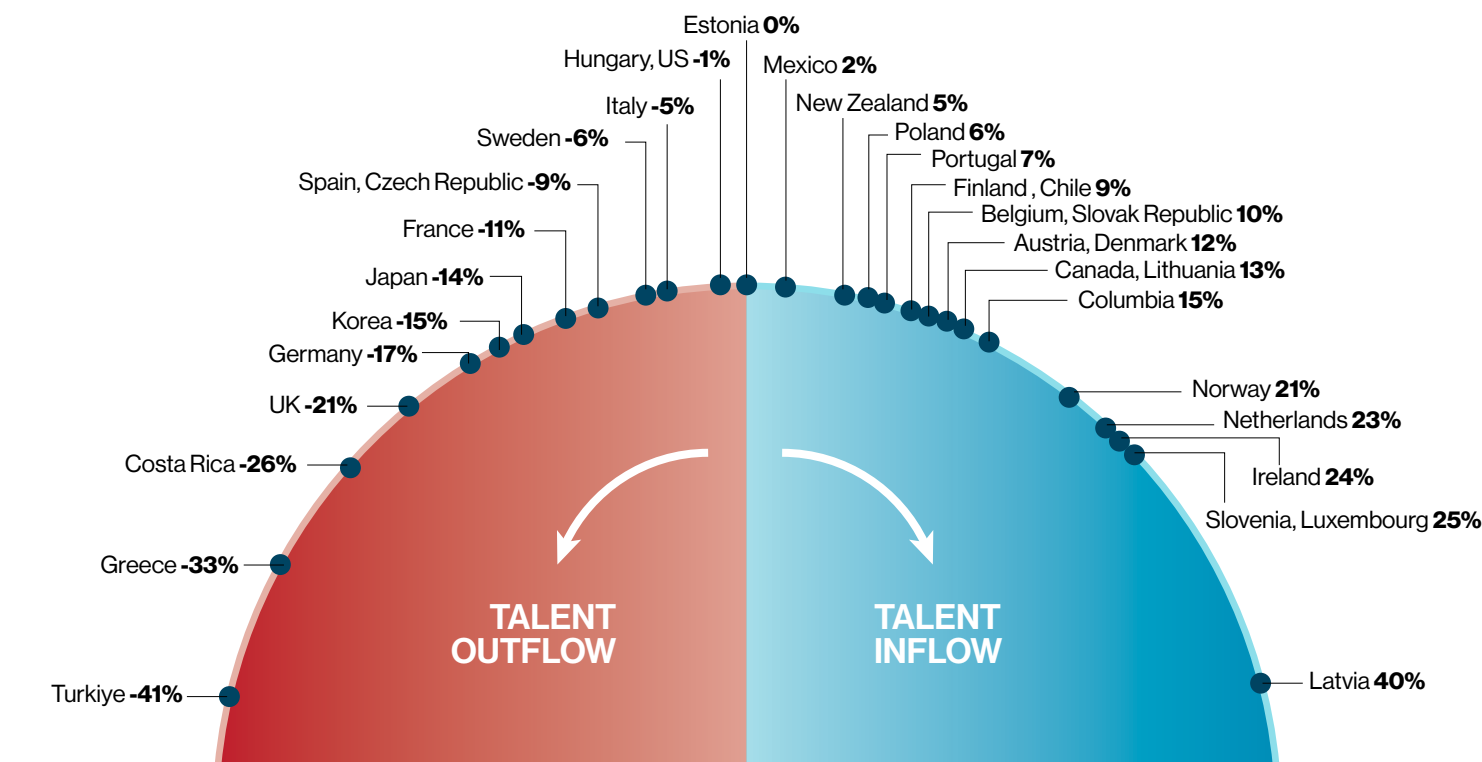
The talent express

Where our research expertise comes from

Research talent is continually being attracted to Australia, but is also exiting overseas. We show the countries who give us their talent, and take it

In and out

Where Australia's research talent comes from and where it goes, net talent change percentage, OECD countries



Source: League of Scholars

Research is global and, more than ever before, research talent is moving around the world, with researchers attracted by job opportunities, availability of funding, and the chance to work in the top facilities and teams where they can achieve their research goals.

The movement of researchers in and out of Australia is a continual ebb and flow. But over time, there is a net inflow to Australia from some countries and a net outflow to others, and that is what the data on this page is designed to show.

Australia has a net outflow of research talent to the countries on the left side of the diagram

and a net inflow of talent from the countries on the right.

Countries near the middle of the diagram, such as the US, are in balance, with the number of researchers who leave Australia for the US nearly matching the number who move in the opposite direction. But countries near the edges of the diagram have a strong net flow of researchers either to, or from, Australia.

Talent discovery and research analytics firm League of Scholars has compiled the data by examining, on a large scale, the institutional research affiliation of researchers and focusing on those who have moved to, or away from, Australia over the past seven years.

This metric, the net talent gain percentage, is an indicator of the relative size of the net

movement of researchers between Australia and each other country. It does not reflect the overall numbers of researchers moving between pairs of countries. In other words, there is no bias due to the size of a country or the size of a country's talent gains or losses.

The metric calculated by taking the net gain or net loss of researchers (those arriving in Australia minus those leaving) and dividing it by the total number of new arrivals, resulting in a percentage. It is based on a sample of over 8000 verified movements by researchers into Australia from OECD countries and out of Australia to OECD countries from 2017 to 2024.

Because we examine only OECD countries the data leaves out some significant research talent movements, such as those with China.



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AND MICROANALYSIS
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The Nobel experience

Quanta, koalas, and our research future

Each year promising young researchers from around the world have a unique opportunity to be mentored by Nobel prize winners at a week long meeting in Lindau, Germany



For two decades the Australian Academy of Science has regularly sent a group of the country's best young scientists to a unique conference held on the island of Lindau on Lake Constance in southern Germany. The annual Lindau Nobel Laureate Meetings, first held in 1951, bring over 600 young scientists from around the world each year to spend a week mixing with about 40 Nobel prize-winners. They attend lectures, participate in discussions, meet over lunch, chat over coffee and take walks with the laureates around the historic town.

This year the Academy of Science sent 11 young scientists from Australia to the meeting, which was on physics. (The topic changes every year, cycling through the Nobel science prizes – physics, chemistry and physiology/medicine – as well as economics and an interdisciplinary meeting.) The academy has now sent a total of 189 young researchers to the Lindau meetings since 2005.

Simon Weng, who was completing his astrophysics PhD at the University of Sydney, said Lindau was a “surreal” experience and definitely “motivating”. “I’m not sure when I’ll see this many Nobel laureates ever again in my life in one place,” he said.

Emily Kerrison, another University of Sydney astrophysics PhD student, said the Lindau meeting had been billed as a “once-in-a-lifetime experience”, and so it proved to be. There was a broad range of laureates from many areas of physics meeting with young physicists working in a similar broad range of areas. “Really incredible,” she said.

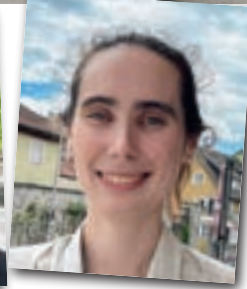
Barnali Das, an Indian astrophysicist currently working at the CSIRO, said she found it extremely valuable that the discussions had extended beyond science itself into broader areas. “One thing that I am taking from this meeting is our responsibility to society. I think, after this meeting, I will be much more enthusiastic to do outreach. It is as important as my research,” she said.

Timothy Harris, a young Australian quantum researcher at LMU Munich attending Lindau separately to the Australian delegation, said he welcomed the discussion at Lindau



Christian Flemming

Nobel prize-winner Steven Chu with young scientists in Lindau (above)



Cheryl Henkels (top left), Timothy Harris (top right), Simon Weng (bottom left), Emily Kerrison (bottom centre), Barnali Das (bottom right)

about many “big-picture problems”.

“We’ve just been discussing energy solutions. We’ve been discussing AI and the move towards machine learning and big data. And then a bit of quantum technologies on the side,” he said.

Neither did the laureates at this year’s meeting limit their activities to pure science. At the end of the week they issued a declaration warning of the rapidly growing risk of nuclear weapons, saying that “an accelerated arms race is under way” and “the situation is dire”.

Lindau is also a particularly good opportunity for young scientists from non-Western countries to build the networks they need for a research career. Cheryl Henkels, a Brazilian who is using data from the world’s biggest particle accelerator, the Large Hadron Collider, to understand the structure of the

proton and atomic nuclei, said the meeting was very helpful. “I would like to pursue an academic career but, in Brazil, there’s limited opportunities,” she said.

The Australian delegation made itself known by handing out small koalas – supplied by the Academy of Science – designed to hang from lanyards, and soon countless delegates were showing them off, including 2023 Nobel physics laureate Anne L’Huillier.

The academy says the Lindau meeting are one of the best opportunities young scientists have to promote Australian science abroad.

“Nurturing the next generation of young scientists is a priority for the academy so we can create a thriving research sector in Australia,” said Academy of Science president Chennupati Jagadish.

Tim Dodd

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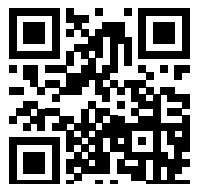
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Top of the world

Our global research leaders

Australian researchers top the world in 12 research fields and our universities are global leaders in 16 fields

It's a measure of the talent of Australian researchers that they lead the world in 12, or nearly 5 per cent, of the 250 fields of research which we list in the Research 2025 magazine. Australian universities have even more prominence. They lead in 16, or over 6 per cent of the 250 fields. Four of the world-leading researchers come from the University of Sydney. Anthony Gill is No.1 globally in the field of pathology, David Hensher is first in transportation, Deborah Jackson is first in nursing and Barbara Mintzes is first in primary health care.

Monash, another powerhouse research university, has two global leaders – Nathan Eva is first in the field of human resources and organisation, and Ben Willem Mol is first in reproductive health.

Other universities home to world-leading researchers are Deakin, Queensland University of Technology, Swinburne, UNSW, Adelaide and RMIT.

Many of these universities feature again in the list of institutions whose collective research makes them the world-leading institution in a particular field.

But four universities – Deakin, Melbourne, Queensland and UNSW – stand out by each leading globally in two fields. These are academic and psychological testing, and higher education for Deakin, gender studies and international law for Melbourne, dispersion chemistry, and audiology, speech and language pathology for Queensland, and architecture and archaeology for UNSW.

The global field leaders are identified in the same way as Australian field leaders except we are casting the net world-wide. First, we calculate an impact index, which is the number of citations received for papers published in the last five years in the top 20 journals in each particular field of research. Then the individual, and the institution, with the highest impact index is declared the global leader in that particular field.

World leading researchers

David Boud Deakin **Higher Education**
Nathan Eva Monash **Human Resources & Organisations**
Anthony Gill Uni of Sydney **Pathology**
David Hensher Uni of Sydney **Transportation**
Debra Jackson Uni of Sydney **Nursing**
Jeremy Kerr QUT **Visual Arts**
Barbara Mintzes Uni of Sydney **Primary Health Care**
Ben Willem Mol Monash **Reproductive Health**
David Moss Swinburne **Optics & Photonics**
Samad Sepasgozar UNSW **Architecture**
Shaobin Wang Uni of Adelaide **Chemical Kinetics & Catalysis**
Annan Zhou RMIT **Environmental & Geological Engineering**

World leading universities

ANU Asian Studies & History
ANU Evolutionary Biology
Deakin Academic & Psychological Testing
Deakin Higher Education
Macquarie Accounting & Taxation
Monash Rehabilitation Therapy
QUT Visual Arts
Uni of Melbourne Gender Studies
Uni of Melbourne International Law
Uni of Queensland Dispersion Chemistry
Uni of Queensland Audiology, Speech & Language Pathology
Uni of Sydney Physical Education & Sports Medicine
UTS Water Supply & Treatment
Uni of Wollongong Nursing
UNSW Architecture
UNSW Archaeology

Flinders Uni pins hopes on industry research as new rival looms

Facing the arrival in 2026 of a new large competitor institution in South Australia, Flinders University is going all out to build its research capacity and back up its claim that it's the university for industry to turn to for problem solving.

Flinders is proudly trumpeting the fact that its research income – the money that funds its research programs – has risen rapidly in recent years. It rose 138 per cent from 2017 to 2022 and was up in all categories of the officially collected data. It now earns more in competitive research grants than any other non-Group of Eight university and it's among the highest outside of

the Group of Eight for total research income.

Flinders is particularly surging ahead in medical research. Since 2023 it has had more new project funding from the Medical Research Future Fund than the University of Adelaide, its cross-town rival.

Flinders deputy vice-chancellor (research) Ray Chan said the university had performed particularly well this year in competing for Australian Research Council funding for industry research and, for the first time, a Flinders researcher had been named an industry laureate fellow. "That is a very strong message sent out, to not just the sector but our industry partners, that we're here for business.

We're here to solve their problems. We're here to solve the community's problems," he said.

Flinders' big challenge comes in 2026 when the University of Adelaide and the University of South Australia merge into the new Adelaide University, which is likely to have nearly three times as much research income as Flinders.

Professor Chan says he is asked by many how Flinders will respond to the new university.

"I would like to think that we have grown up enough to think for ourselves that we want to be the industry-facing university. Whereas I think the other university, which is part of Group of Eight, could be potentially a little bit more traditional in its thinking," he said.

Fast-tracking the energy transition

With the urgent need to decarbonise the world's energy system, achieving a just energy transition is humanity's greatest challenge. Curtin University is paving the way by educating our leaders of change.

Recognising that people are at the centre of the transition, The Curtin Institute for Energy Transition is bringing together multidisciplinary teams to reframe the way we think about energy.

Australia's Resources Technology and Critical Minerals Trailblazer is leveraging our research expertise to accelerate the transition through enhanced critical minerals extraction and processing.

And with Curtin ranked number one in Australia for Mineral and Mining Engineering¹ – we're advancing all aspects of the energy transition, putting tomorrow's innovators on track to deliver meaningful transformation.

To learn more about Curtin's research initiatives, visit curtin.edu/energy-transition



¹ QS World University Rankings by Subject 2024

Make tomorrow better.



Curtin University

Social Sciences

Australia's research field leaders

These are the top researchers and institutions in the 29 fields of the social sciences

Academic & Psychological Testing

Field leader: Kristin Gainey, UWA
Lead institution: Deakin

Anthropology

Field leader: Luca Fiorenza, Monash
Lead institution: ANU

Archaeology

Field leader: Jonathan Palmer, UNSW
Lead institution: UNSW

Cognitive Science

Field leader: Nathan Evans, Uni of Queensland
Lead institution: Uni of Sydney

Criminology, Criminal Law & Policing

Field leader: Bridget Harris, Monash
Lead institution: Griffith

Diplomacy & International Relations

Field leader: Tobias Ide, Murdoch
Lead institution: Deakin

Early Childhood Education

Field leader: Rauno Parrila, ACU
Lead institution: Macquarie

Education

Field leader: Michael Henderson, Monash
Lead institution: Monash

Educational Psychology & Counselling

Field leader: Andrew Martin, UNSW
Lead institution: ACU

Environmental & Occupational Medicine

Field leader: Peter Smith, Monash
Lead institution: Monash

Environmental Law & Policy

Field leader: Russell Smyth, Monash
Lead institution: Monash

Ethics

Field leader: Michal Carrington, Uni of Melb
Lead institution: Monash

Family Studies

Field leader: Alina Morawska, Uni of Queensland
Lead institution: Uni of Queensland

Forensic Science

Field leader: Duncan Taylor, Flinders
Lead institution: UTS

Geography & Cartography

Field leader: Neil Coe, Uni of Sydney
Lead institution: Uni of Melb

Health Policy & Medical Law

Field leader: Ruvini Hettiarachchi, Uni of Queensland
Lead institution: Monash

Higher Education

Field leader: David Boud, Deakin
Lead institution: Deakin

Human Migration

Field leader: Fethi Mansouri, Deakin
Lead institution: Deakin

International Law

Field leader: Jacqueline Peel, Uni of Melb
Lead institution: Uni of Melb

Military Studies

Field leader: Kristy Champion, CSU
Lead institution: Deakin

Political Science

Field leader: Duncan McDonnell, Griffith
Lead institution: ANU

Public Policy & Administration

Field leader: Brian Head, Uni of Queensland
Lead institution: Uni of Melb

Science & Engineering Education

Field leader: Annette Burgess, Uni of Sydney
Lead institution: Monash

Social Sciences (general)

Field leader: Rob Raven, Monash
Lead institution: Uni of Queensland

Social Work

Field leader: Ben Mathews, QUT
Lead institution: Monash

Sociology

Field leader: Leah Ruppanner, Uni of Melb
Lead institution: Uni of Melb

Special Education

Field leader: Umesh Sharma, Monash
Lead institution: QUT

Teaching & Teacher Education

Field leader: Sarah Prestridge, Griffith
Lead institution: Monash

Urban Studies & Planning

Field leader: Kim Dovey, Uni of Melb
Lead institution: Uni of Melb

Bridget Harris

Monash University

Field leader in Criminology, Criminal Law & Policing

Bridget Harris's dream is that she and fellow researchers in her field will eventually find themselves out of a job.

Her projects are centred on gendered violence – and she can't see herself doing anything else.

"I'm always going to be doing this work even though it may not always be within academia, as I also do a lot with government and non-government agencies," Harris says.

"I just hope that my work becomes irrelevant in this space, as we seek to enhance responses and prevention efforts. But in the meantime, this is the field that I am in."

Harris, director of the Monash Gender and Family Violence Prevention Centre, describes her research more broadly as exploring gender violence and spatiality.

This covers the differences in experiences of those living in non-urban and urban areas in relation to domestic, family and sexual violence, and also the impact of technology, both positive and negative.

"I think about technology as spaceless and look at how technology can be weaponised to perpetrate harm, but also how we can harness it in providing support and in disrupting, preventing and addressing harm," Harris says.

One of her current projects is looking at victim-survivors' experiences of technology-facilitated abuse and how technology is used in responding to domestic and family violence, including the use of police body-worn cameras.

Another explores elder abuse in regional, rural and remote areas.

"Anybody can be a victim-survivor or perpetrator of violence, but overwhelmingly we know that men are more likely to be perpetrators and women more likely to be targets," Harris says.

"But also gender and sexuality-diverse people experience victimisation at higher rates or with added barriers or risk, as do some other groups, such as people with disabilities, migrant and refugee communities, and also First Nations communities."

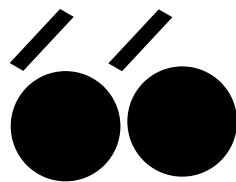


Nadir Kinani

Her favourite moments in her research have been when victim-survivors have been in touch to say her work had resonated with and was useful to them.

“When they felt like it had captured and validated their experience, that is super meaningful to me,” Harris says. “That’s kind of my measure of success I strive for.”

She also recalls when a group of police officers she had trained in responding to domestic and family



I just hope that my work becomes irrelevant

violence, using a model she’d developed, told her how her model had been applied on call-outs and to support victim-survivors.

“Hearing about and seeing that happen was really incredible,” she says. “That’s why you do the work, because you want it to help in and provide an evidence base for policy and practice.”

“And you also hope the impacts can be on an everyday level in ways you don’t even know about.”

But she says there is more to do, even though there has been progress during her decades in the field.

“There are fantastic people, including victim-survivors, working in this space,” Harris says.

“We have certainly seen progress around policy, practice and awareness raising.”

“And while we celebrate the wins, we also recognise that we have a long way to go.”

Carmel Sparke

In an era of rapid change and complex challenges, what should we prioritise? It's a question Flinders University is putting to the people, to discover what hot button issues matter most to our communities.

Our national Wicked Problems Survey of 30,000 Australians is an unprecedented opportunity for citizens to decide which issues our leading researchers should tackle.

Will it be public health crises, sustainability, cost of living, social inequality? Perhaps emerging technologies that are reshaping the world in unprecedented ways for future generations? The fact is, we don't know – and that's the point.

The way we approach science and research as a nation requires a major rethink. From climate change and biodiversity loss to artificial intelligence and ageing populations, these significant issues are multifaceted and require new thinking and new solutions.

By approaching our research differently and identifying the root of the problem through community collaboration, Flinders intends to blend expertise, breaking down scientific silos to tackle the interconnected challenges of the future on a national and global scale.

Innovation and industry collaboration will flourish when scientists from different backgrounds join forces for the greater good, sharing ideas for far-reaching solutions that may otherwise remain undiscovered or victim to tunnel vision.

We know it works – just look at Australia's response to the largest public health challenge of our time, the Covid-19 pandemic.

It required the collaboration of virologists, epidemiologists, public health officials, and community leaders. By combining scientific expertise with local knowledge and practical, real-world insights, Australia was able to implement effective public health measures and vaccination campaigns.

We believe this kind of approach ought not be the exception. The world is facing myriad challenges. We cannot afford 'more of the same'.

Transdisciplinary science combining evidence-based approaches across many fields of research, working together with industry, and listening to those with lived experience in the community creates an



Professor Ray Chan

Wicked problems inspire action at Flinders

environment where innovation and fearless thinking can flourish.

Our Wicked Problems Survey is in its early stage, but we're not resting on our laurels. We've been pioneering new approaches to collaborative research to ensure we're well prepared to respond to the community's priorities.

One example is our Flinders Health and Medical Research Institute's sleep health team, which is making lifesaving advances in sleep apnoea and insomnia. Another is our world-leading analysis of vision loss, disease prediction and prevention in the areas of glaucoma and inflammatory eye diseases such as syphilis and toxoplasmosis.

Our focus on advancing Aboriginal and Torres Strait Islander health and wellbeing sees us working with communities to ensure social and cultural contexts are driving inclusive health policies and programs.

Whether it's our award-winning point-of-care pathology testing on Country to support faster health outcomes for remote communities or collaborating in areas such as Indigenous women's memory stories, activism, protection of country and creative and visual arts, we're listening

and respecting Indigenous ways of doing, being and knowing.

Flinders is also leading an unprecedented \$34 million initiative that is transforming the way Australia supports its ageing population. Aged Care Research and Industry Innovation Australia (ARIIA) focuses on addressing critical needs in the aged care sector around workforce capability, technology innovation, collaborative research and provides trustworthy information for aged care workers, service providers, older Australians, and their families.

Flinders has researchers tackling drought resilience, the impacts of climate change and climate change policy, and the management of Australia's limited groundwater and environmental health.

We've just invested \$280 million in a state-of-the-art Health and Medical Research Building to bring together more than 600 researchers, fostering new research connections and discovering new ways of tackling challenges.

We're also investing in national security, advancing AUKUS education and research with the construction of the first-of-its-kind Factory of the Future, a world-class advanced manufacturing facility designed to bring together industry, education and researchers, to develop sovereign capabilities in key sectors including defence and digital technologies. Flinders University's Factory of the Future is supported by grant funding from the Australian Government and \$9 million funding from the South Australian government. In fact, since 2018 Flinders has enjoyed the fastest growth in research income of any Australian university*, and the latest available Higher Education Research Data Collection (HERDC) data shows almost 140 per cent growth in research income over the past 5 years**.

Traditional approaches within single disciplines aren't enough to make the difference we need. All the evidence points to collaboration as the only approach that achieves significant scientific impact. That's why Flinders is fearlessly tackling 'wicked problems' in lock-step with community, for a better future.

Professor Ray Chan
Deputy Vice Chancellor (Research),
Flinders University

* HERDC data 2018-2022

** HERDC data 2017-2022 (rounded up from 138.02%)

Chemical & Material Sciences

Australia's research field leaders

These are the top researchers and institutions in the 17 fields of chemical and material sciences

Analytical Chemistry

Field leader: Nam-Trung Nguyen, Griffith

Lead institution: Monash

Biochemistry

Field leader: Michael Jennings, Griffith

Lead institution: Monash

Ceramic Engineering

Field leader: Yongxiang Li, RMIT

Lead institution: UNSW

Chemical & Material Sciences (general)

Field leader: Md Rabiul Awual, Curtin

Lead institution: Uni of Adelaide

Chemical Kinetics & Catalysis

Field leader: Shaobin Wang, Uni of Adelaide

Lead institution: Uni of Adelaide

Combustion & Propulsion

Field leader: Zhiwei Sun, Uni of Adelaide

Lead institution: UNSW

Composite Materials

Field leader: Chun Hui Wang, UNSW

Lead institution: USQ

Crystallography & Structural Chemistry

Field leader: Mark Spackman, UWA

Lead institution: UWA

Dispersion Chemistry

Field leader: Gil Garnier, Monash

Lead institution: Uni of Queensland

Electrochemistry

Field leader: Maria Forsyth, Deakin

Lead institution: Uni of Wollongong

Inorganic Chemistry

Field leader: Deanna D'Alessandro, Uni of Sydney

Lead institution: Uni of Queensland

Materials Engineering

Field leader: Shi Xue Dou, Uni of Wollongong

Lead institution: UNSW

Medicinal Chemistry

Field leader: Christoph Nitsche, ANU

Lead institution: Uni of Queensland

Nanotechnology

Field leader: Stefan Maier, Monash

Lead institution: UNSW

Oil, Petroleum & Natural Gas

Field leader: Stefan Iglauer, Edith Cowan

Lead institution: Curtin

Organic Chemistry

Field leader: Alireza Ariafard, Uni of Tasmania

Lead institution: Uni of Queensland

Polymers & Plastics

Field leader: Cyrille Boyer, UNSW

Lead institution: UNSW



Nadir Kinani

Maria Forsyth

Deakin University

Field leader in Electrochemistry

With batteries powering everything from watches to mobile phones, computers, medical implants, homes and cars, Maria Forsyth says her field of electrochemistry impacts most people every day.

Her research at Deakin University has led to breakthroughs that have helped develop batteries that store more energy, are safer to use and are more environmentally sound.

"I'm more on the storage side of the energy transition, so if you think about taking the energy from sources such as wind or solar, we have to

Continued on Page 28

Chemical & Material Sciences continued



Our goal is to safely store more energy for when we need to use it

Maria Forsyth

Nadir Kinani

Continued from Page 27

store that somewhere in order to cover the intermittency or variability of those renewables,” Forsyth says. “So one cost-effective way of doing that is to use batteries.”

She and her team at the university’s Institute for Frontier Materials have been working on understanding and optimising the phenomenon of charge transport in battery materials and incorporating these into prototypes.

Much of their research has been on non-conventional safer materials such as new ionic liquids, organic plastic crystals and polymers that make up the electrolytes in the core of the battery. This has led to the development of devices which can store greater amounts of energy using more energetic electrodes, but remain safe.

She explains the basic components in batteries are the two electrodes, called the anode and cathode. Then in the middle is the electrolyte which transfers ions – or charge-carrying particles – back and forth between the

battery’s two electrodes and creates the electrochemistry which in turn makes the electrons to power our devices.

Since the 1990s, lithium-ion has been the most common form of rechargeable battery, used in large-scale grid storage, solar energy home storage units, in phones, laptops, and electric cars, bikes and scooters.

One of their well-publicised drawbacks is a tendency to catch fire due to the volatile nature of the organic solvents used in the batteries.

“My work over the past 30 years has been looking at safer electrolytes that are not based on those traditional organic solvents,” says Forsyth, a past Australian Laureate Fellow.

“What I am most excited about at the moment is using these safer electrolytes in more sustainable energy storage such as in sodium batteries – including using polymer electrolytes – a solid state plastic that can transfer ions.”

Forsyth is passionate about her research in this different kind of battery, where the element we find in common table salt – sodium ions – is

the main contributor. It has a number of advantages over its lithium-ion cousin, including being more sustainable, safer and ultimately more affordable – plus it won’t catch fire if the electrolytes her team develops are used.

Another important benefit of sodium-ion batteries is that the anode, which stores the sodium ions, can be sourced from plant by-products such as waste from barley, sugar cane, wheat or rice, or even biochar from the wastewater industry.

“I think, for me, my motivation was always about contributing to cleaner energy technologies, even before the conversation about global warming became so public,” she says.

“Wind and solar can generate the energy we need to power our community, including our transportation, and our goal is to use the technologies being developed in our team at Deakin to efficiently and safely store more of this energy for when we need to use it.”

Carmel Sparke

Engineering & Computer Science

Australia's research field leaders

These are the top researchers and institutions in the 50 fields of engineering and computer science

Architecture

Field leader: Samad Sepasgozar, UNSW

Lead institution: UNSW

Artificial Intelligence

Field leader: Seyedali Mirjalili, Torrens

Lead institution: UTS

Automation & Control Theory

Field leader: Peng Shi, Uni of Adelaide

Lead institution: Swinburne

Aviation & Aerospace Engineering

Field leader: Timothy McIntyre, Uni of Queensland

Lead institution: RMIT

Bioinformatics & Computational Biology

Field leader: Thuc Le, UniSA

Lead institution: Uni of Queensland

Biomedical Technology

Field leader: Cuie Wen, RMIT

Lead institution: Uni of Queensland

Biotechnology

Field leader: Yi Li, UNSW

Lead institution: Uni of Queensland

Civil Engineering

Field leader: Hong Hao, Curtin

Lead institution: RMIT

Computational Linguistics

Field leader: Reza Haffari, Monash

Lead institution: Macquarie

Computer Graphics

Field leader: Tim Dwyer, Monash

Lead institution: Monash

Computer Hardware Design

Field leader: Van Thanh Huynh, Deakin

Lead institution: Swinburne

Computer Networks & Wireless Communication

Field leader: Derrick Wing Kwan Ng, UNSW

Lead institution: UNSW

Computer Security & Cryptography

Field leader: Willy Susilo, Uni of Wollongong

Lead institution: CSIRO

Computer Vision & Pattern Recognition

Field leader: Dacheng Tao, Uni of Sydney

Lead institution: Uni of Sydney

Computing Systems

Field leader: Rajkumar Buyya, Uni of Melb

Lead institution: UNSW

Data Mining & Analysis

Field leader: Geoff Webb, Monash

Lead institution: QUT

Databases & Information Systems

Field leader: Jia Wu, Macquarie

Lead institution: QUT

Educational Technology

Field leader: Dragan Gasevic, Monash

Lead institution: Monash

Engineering & Computer Science (general)

Field leader: Lemuria Carter, UNSW

Lead institution: UNSW

Environmental & Geological Engineering

Field leader: Annan Zhou, RMIT

Lead institution: RMIT

Evolutionary Computation

Field leader: Ahmed Gad, UNSW

Lead institution: Deakin

Food Science & Technology

Field leader: Bhesh Bhandari, Uni of Queensland

Lead institution: Uni of Queensland

Fuzzy Systems

Field leader: Gleb Beliakov, Deakin

Lead institution: UTS

Human Computer Interaction

Field leader: Marc Adam, Uni of Newcastle

Lead institution: Uni of Newcastle

Library & Information Science

Field leader: Allen Au, ECU

Lead institution: UniSA

Manufacturing & Machinery

Field leader: Ang Liu, UNSW

Lead institution: RMIT

Mechanical Engineering

Field leader: Behrouz Karami, Uni of Adelaide

Lead institution: UNSW

Medical Informatics

Field leader: Anthony Smith, Uni of Queensland

Lead institution: Uni of Queensland

Metallurgy

Field leader: Huijun Li, Uni of Wollongong

Lead institution: Uni of Queensland

Microelectronics & Electronic Packaging

Field leader: Sima Dimitrijevic, Griffith

Lead institution: RMIT

Mining & Mineral Resources

Field leader: Ranjith Pathegama Gamage, Monash

Lead institution: UNSW

Multimedia

Field leader: Abeer Alsadoon, Asia Pacific International College

Lead institution: UTS



Bhesh Bhandari

University of Queensland

Field leader in Food Science & Technology

Thanks to the work of food scientist Bhesh Bhandari and his team, one day you could be eating mashed-up insects, 3D printed into the shape of a tasty chicken drumstick.

He's also developed a drink with probiotics contained in tiny capsules to protect the bacteria from stomach acid. It is already on supermarket shelves.

But ask Bhandari whether he can cook, and the answer's an unequivocal no, as he's much handier in the laboratory than the kitchen.

"When I tell people I work with food science research, they ask me whether I can cook, and I really can't," says the University of Queensland professor.

"I think of food like a material. I work on food materials, science and engineering. Most of the things I do are in terms of developing a process."

Originally from Nepal, Bhandari did his PhD in food process engineering in 1992 at ENSIA, a large agricultural university in Massy, near Paris, before coming to Australia the following year.

Since then, he's been at the University of Queensland, where he and his team have been at the forefront of a range of innovations, including microencapsulation, using nanobubbles as a food

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Bhesh Bhandari

Continued from Page 29

processing aid and 3D printing of food.

“I’ve been working for the last 30 years, so that means I’ve covered a lot of areas,” Bhandari says. “My motivation is mostly driven by my curiosity and a desire to introduce new innovative technologies.”

Among many breakthroughs has been his world-leading work on 3D printing of food materials, a technology he says has a huge range of future applications. Bhandari describes how any food, such as fish, can be converted into powder form, which can be printed in layers to form a food product. One idea is to print insect protein into a more palatable foodstuff.

“Insects are something that most people will not eat,” he says. “But convert it into a powder form, and print it in a nice shape and people will eat it. Insect protein is cheap, and a good source of animal protein, so it’s very healthy.”

He’s also worked extensively on using nanobubbles in food processing. These tiny

bubbles of gas have unique properties that can make a food product softer, or decrease its viscosity or extend its shelf life.

Another of his key research areas has been encapsulation techniques for food stuffs using tiny capsules smaller than 50 microns. Bhandari has used these capsules in developing a probiotic rich drink, PERKii.

“Probiotics normally die in the stomach, but when you encapsulate them they survive in the stomach, and then reach the intestine where they’re needed,” Bhandari says.

The novel encapsulation technology has also been used to create a dried form of ethylene, which can be used to ripen food in a powder form, rather than a gas.

“It’s fascinating developing these processes, but it’s never ending, because as soon as you get something to work on you think you’ve got it covered, but then there’s another issue,” he says. “But I like to keep working on fresh ideas and technologies that keep me and the team excited.”

Carmel Sparke

Engineering & Computer Science continued

Continued from Page 29

Ocean & Marine Engineering

Field leader: Dong-Sheng Jeng, Griffith

Lead institution: UNSW

Operations Research

Field leader: Guilherme Luz Tortorella, Uni of Melb

Lead institution: Uni of Melb

Plasma & Fusion

Field leader: Boyd Blackwell, ANU

Lead institution: ANU

Power Engineering

Field leader: Jian Guo Zhu, Uni of Sydney

Lead institution: UNSW

Quality & Reliability

Field leader: Paul Salmon, USC

Lead institution: UNSW

Radar, Positioning & Navigation

Field leader: Jinling Wang, UNSW

Lead institution: UNSW

Remote Sensing

Field leader: Biswajeet Pradhan, UTS

Lead institution: CSIRO

Robotics

Field leader: Michael Milford, QUT

Lead institution: QUT

Signal Processing

Field leader: Ba-Ngu Vo, Curtin

Lead institution: Uni of Sydney

Software Systems

Field leader: Rashina Hoda, Monash

Lead institution: Monash

Structural Engineering

Field leader: Qing Li, Uni of Sydney

Lead institution: Curtin

Sustainable Energy

Field leader: T M Indra Mahlia, UTS

Lead institution: UNSW

Technology Law

Field leader: Roger Clarke, Xamax

Lead institution: Monash

Textile Engineering

Field leader: Lijing Wang, RMIT

Lead institution: Deakin

Theoretical Computer Science

Field leader: Andre van Renssen, Uni of Sydney

Lead institution: Monash

Transportation

Field leader: David Hensher, Uni of Sydney

Lead institution: Uni of Sydney

Water Supply & Treatment

Field leader: Hokyong Shon, UTS

Lead institution: UTS

Wood Science & Technology

Field leader: Warren Batchelor, Monash

Lead institution: Deakin

Not all heroes wear white coats. **But some do.**

Vote now for the Shaping Australia People's Choice Awards.

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Recognises groundbreaking research work that has already transformed, or holds the potential to transform, the lives of Australians for the better.



Future Builder award

Celebrates an individual or a team who has gone above and beyond to equip their students with the knowledge and skills to make a positive impact in the world.



Community Champion award

Honours an individual, team or university with deep ties to its community and the people who call it home, beyond just those who attend the institution.



VOTE NOW

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Life Sciences & Earth Sciences

Australia's research field leaders

Here are the top researchers and institutions in the 30 fields of life sciences and earth sciences

Agronomy & Crop Science

Field leader: Kadambot Siddique, UWA

Lead institution: Uni of Queensland

Animal Behaviour & Ethology

Field leader: Culum Brown, Macquarie

Lead institution: Macquarie

Animal Husbandry

Field leader: Shubiao Wu, UNE

Lead institution: UNE

Atmospheric Sciences

Field leader: Juergen Knauer, Western Sydney

Lead institution: CSIRO

Biodiversity & Conservation Biology

Field leader: John Woinarski, CDU

Lead institution: Uni of Queensland

Biophysics

Field leader: Janet Bornman, Murdoch

Lead institution: Uni of Sydney

Birds

Field leader: Leo Joseph, CSIRO

Lead institution: ANU

Botany

Field leader: Sergey Shabala, UWA

Lead institution: UWA

Cell Biology

Field leader: Douglas Fairlie, ONJCRI

Lead institution: Uni of Queensland

Developmental Biology & Embryology

Field leader: Megan Munsie, Uni of Melb

Lead institution: Uni of Queensland

Ecology

Field leader: Jane Elith, Uni of Melb

Lead institution: Uni of Queensland

Environmental Sciences

Field leader: Nanthi Bolan, UWA

Lead institution: Uni of Queensland

Evolutionary Biology

Field leader: Robert Lanfear, ANU

Lead institution: ANU

Forests & Forestry

Field leader: David Forrester, CSIRO

Lead institution: Uni of Melb

Geochemistry & Mineralogy

Field leader: Ian Graham, UNSW

Lead institution: Curtin

Geology

Field leader: Peter Cawood, Monash

Lead institution: Curtin

Hydrology & Water Resources

Field leader: Okke Batelaan, Flinders

Lead institution: CSIRO

Insects & Arthropods

Field leader: Wee Tek Tay, CSIRO

Lead institution: CSIRO

Life Sciences & Earth Sciences (general)

Field leader: Dale Garsed, Peter Mac

Lead institution: Monash

Marine Sciences & Fisheries

Field leader: Thomas Wernberg, UWA

Lead institution: CSIRO

Microbiology

Field leader: Brajesh Singh, Western Sydney

Lead institution: Uni of Queensland

Mycology

Field leader: Laszlo Irinyi, NSW Health

Lead institution: Uni of Sydney

Oceanography

Field leader: Jessica Benthuyzen, AIMS

Lead institution: CSIRO

Paleontology

Field leader: Anthony Romilio, Uni of Queensland

Lead institution: Macquarie

Pest Control & Pesticides

Field leader: Paul Umina, Uni of Melb

Lead institution: Uni of Melb

Plant Pathology

Field leader: Martin Barbetti, UWA

Lead institution: UWA

Proteomics, Peptides & Aminoacids

Field leader: David Greening, Baker

Lead institution: Murdoch

Soil Sciences

Field leader: Budiman Minasny, Uni of Sydney

Lead institution: UWA

Sustainable Development

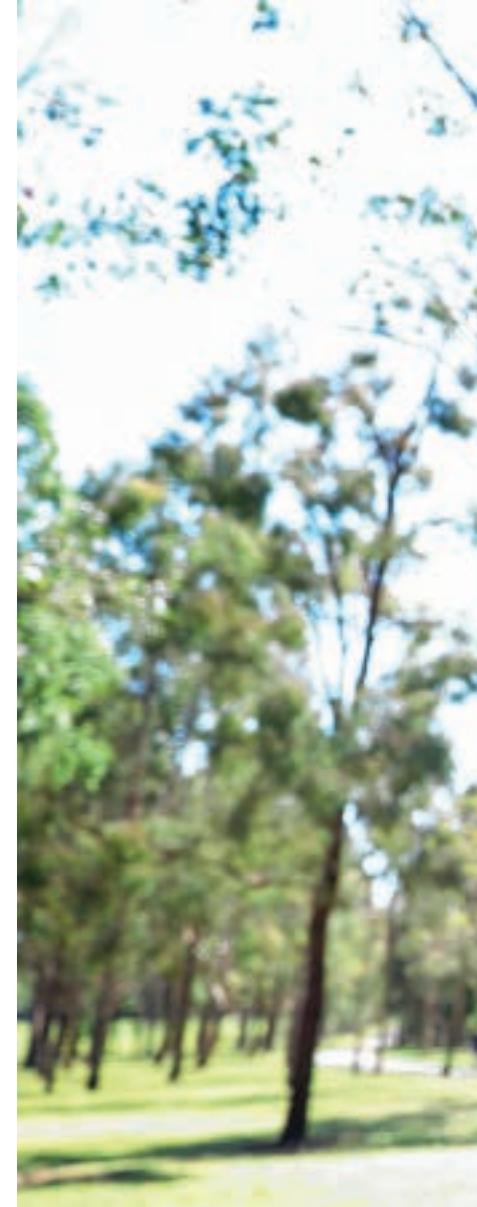
Field leader: Carina Wyborn, ANU

Lead institution: Uni of Queensland

Zoology

Field leader: Chris Dickman, Uni of Sydney

Lead institution: JCU



Juergen Knauer

Western Sydney University

Field leader in Atmospheric Sciences

As a child Juergen Knauer loved gardens and plants, a fascination that has flourished into researching flora on a global scale.

The environmental modeller now simulates the impact of vegetation on the climate system, along with how plants respond to a changing environment.

His models look decades into the future to inform climate change policy and also have potential in



John Feder

predicting threats closer to home, such as bushfire risk.

“Vegetation plays an important role in the climate system, as it acts as a carbon sink, taking up CO₂ from the atmosphere,” the Western Sydney University researcher says.

“That’s essential for the climate because we emit CO₂ from fossil fuel use and land use change. Vegetation takes up around 30 per cent of the human emissions, and that mitigates climate change. That’s why these models are quite important, from a society point of view, and an economic perspective as well.”

His interest in vegetation started early, when growing up in Germany he was always intrigued by his garden, watching how plants germinated and grew.

After studying geography as an undergraduate, Knauer moved into an area called global change ecology and was introduced to the power of

modelling while doing his masters, and later his PhD, at the Max Planck Institute for Biogeochemistry in Germany.

“It opened up so many new possibilities and perspectives of what we can do and how we can predict things,” he says.

Following the PhD he moved to the CSIRO in Canberra for his first postdoctoral position in modelling and then to Western Sydney University.

Since then he has been refining models and focusing on Australian vegetation, diving more into processes that shape local ecosystems including effects of drought, nutrient limitation and disturbances such as fire.

Knauer describes how his models take into account information from small-scale experiments – for example, how plants respond to increasing CO₂ concentrations –

and combine those findings with measurements taken in the field and satellite photos.

Last year he published modelling that suggested the world’s plants might be able to take up more CO₂ than previously predicted, after he accounted for several critical physiological processes that governed how plants conducted photosynthesis.

The information can be scaled up to show impacts of carbon sequestration on forests, or regions or the globe, and are used for informing policies on climate mitigation strategies.

“But then there are other applications at smaller scales, such as predicting the level of fire fuels that would be useful for bushfire forecasting, or what vegetation or management options are best suited to conserve or restore a certain ecosystem,” Knauer says.

“We haven’t made full use of its potential yet.”

Carbon sequestration is one key metric, but his model can look at everything from how much biomass there is to how much water the vegetation uses. “Think of it as a sort of a mini ecosystem in your computer,” Knauer says.

“Everything is connected; the vegetation grows in response to what happens in the atmosphere and in the soil. At the same time, plants influence key functions in both the atmosphere and the soil.

“All the processes that matter in real life, we aim to represent in the model. A key motivation in doing this work is to really contribute to our understanding of what we need to do to reduce climate change to sustainable levels because this is so important to the future of the planet.”

Carmel Sparke



he University of South Australia's Adelaide campuses are located on the

land of the Kurna People, and we are fortunate to have the wise counsel of Kurna senior elder Uncle Lewis O'Brien.

A few years ago, Uncle Lewis taught me a Kurna word, ngadlurlu. It means we act together, we act now, and we are unstoppable. In helping me understand ngadlurlu, Uncle Lewis explained that the middle of the word, adlur, means that what hits our ears is translated into action. One step hearing, second step action.

I can't think of a better way to describe UniSA's approach to research excellence, or a better way to explain why our research successes have grown so rapidly.

UniSA's research starts with the assumption that good ideas take flight in partnership. We work with industry and community organisations, listening out for ways in which we can support social and economic growth. We then act together to realise that growth. So, while our research excellence results have grown rapidly, we are also proud of the business and organisation growth we accelerate. We count our successes in discoveries as well as the number of people employed in jobs that will provide a strong future for Australia and the region.

Achieving these results turns on listening and inclusion in our own community. Our research committees are open to all staff, and we generally attract five times as many observers as committee members. It's great knowing how much our research community is supported.

A large part of the appeal is that we feature founders, industry and community leaders in all our meetings. This ensures that we stay calibrated with what South Australia, Australia and the world most need.

Inclusion is also reflected in our commitment to diverse talent and diverse sources of research income. We work to



Distinguished Professor Marnie Hughes-Warrington AO

Listen, then act: wise counsel that drives UniSA's proud research vision

stay balanced across all four research income categories, and all our large grant applications and bids reflect the best of our talent from across the University.

Industry and community tell us repeatedly how much they value our nimbleness, holistic view, and commitment to working with them and with other universities and other research organisations. Competition amongst universities only gets Australia so far. If

we are to sustain and to accelerate our successes, we need to harness our talents, together.

These principles are seen in our award-winning Enterprise Hub, a single physical and virtual front door that works successfully to connect our community with industry and organisations.

The Enterprise Hub helps partners with things like developing a strategic plan, establishing IP pathways and training pipelines, and accessing manufacturing networks, all of which helps ensure successful outcomes – and impactful research.

Acting on what we hear also requires harnessing innovations from across the globe. During Covid, thanks to generous donors, we raised funds to support an extensive Visiting Research Fellows program. We learn and we take action together, across the world.

It also means, as Uncle Lewis reminds us, taking the second step. That means

anticipating what research excellence and impact can be, not simply accepting what it is. For instance, we are garnering international attention for our approach to what have been called non-traditional outputs – like creative works and industry reports – redefining them as 'x-traditional research outputs', or Xtros, to move beyond the idea that they are non-traditional. All credit to our creative leaders in UniSA and across Australia for leading that change.

At the end of the day, we are one team. If you look around the room and you see only people like you, or you only hear your own voice, you are missing the world's best opportunity to act for the good. That's the secret of our success, and it's no surprise to me that our research is taking off like a rocket. Uncle Lewis is right, and our community is right. Listen, act. That's the secret of research excellence.

Distinguished Professor Marnie Hughes-Warrington AO
Standing Acting Vice Chancellor
University of South Australia

Physics & Mathematics

Australia's research field leaders

These are the top researchers and institutions in the 21 fields of physics and mathematics

Aaron Nicolson

CSIRO

Field leader in Acoustics & Sound

At first, an academic career was just a sideline to Aaron Nicolson's dream of gaining an overseas scholarship to play American football.

Studies for his computer and electronic engineering degree took a back seat to training and playing football at a national level. But shortly after semester one at Griffith University, Nicolson injured his knee so badly it needed reconstruction surgery – and put his dream out of reach for good.

"It was devastating, I had put all this work into trying to achieve this sporting goal, which was admittedly far-fetched," Nicolson says. "But then all the focus that I had applied to football was then directed to this degree."

That was a decade ago, and since shifting priorities he's gone on to develop AI models that can be used to improve hearing aids, enable better speech-to-text and more recently enhance medical imaging.

Nicolson was introduced to AI in 2016 during a project at the Hong Kong University of Science and Technology, which was part of his honours study on speech recognition.

"It was such a powerful tool that, given some data to learn from, could perform complex tasks such as recognising language from speech," he says. "From there, I was hooked on doing research involving AI."

During his PhD at Griffith University, he shifted focus to speech enhancement, developing AI models to remove the background noise from audio containing speech.

"Speech enhancement has many applications," he says. "It makes it easier for those with hearing aids to hear someone talking in a noisy environment, it enables speech



recognition or speech-to-text tools that are used by virtual assistants to better understand your speech, or (make) conference calls clearer."

The core tool to make it all happen is the AI models, which he describes as being an artificial brain of connected neurons. Researchers chop and change the structure of these artificial neural networks, making some parts bigger and others smaller, and tweaking how each neuron fires to get the best results on certain data.

After his PhD, Nicolson wanted to continue developing AI models in areas that could be impactful, such as in health and medicine. He now works for the CSIRO's Australian e-Health Research Centre (AEHRC) on medical imaging, using an AI technology called large language models to read a patient's medical images.

"Large language models are quite astounding and have very powerful reasoning capabilities," he says. "I get to develop large language models in order to make automatic radiology report generation as diagnostically accurate as possible."

Recently, Nicolson and his team beat off tough competitors to win an international competition on automatic radiology reporting. "I have found research to be more of a marathon than a sprint," he says. "You chip away slowly at a problem, and cumulatively, over many years, you can see an impact."

Carmel Sparke

Acoustics & Sound

Field leader: Aaron Nicolson, CSIRO

Lead institution: UNSW

Algebra

Field leader: Aidan Sims, Uni of Wollongong

Lead institution: UNSW

Astronomy & Astrophysics

Field leader: Joss Bland-Hawthorn, Uni of Sydney

Lead institution: ANU

Computational Mathematics

Field leader: Ricardo Ruiz Baier, Monash

Lead institution: UNSW

Condensed Matter Physics & Semiconductors

Field leader: Oleg Tretiakov, UNSW

Lead institution: Monash

Discrete Mathematics

Field leader: David Wood, Monash

Lead institution: Monash

Electromagnetism

Field leader: Amin Abbosh, Uni of Queensland

Lead institution: UTS

Fluid Mechanics

Field leader: Ivan Marusic, Uni of Melb

Lead institution: Uni of Melb

Geometry

Field leader: David Baraglia, Uni of Adelaide

Lead institution: ANU

Geophysics

Field leader: Dietmar Müller, Uni of Sydney

Lead institution: ANU

High Energy & Nuclear Physics

Field leader: Paul Jackson, Uni of Adelaide

Lead institution: Uni of Sydney

Mathematical Analysis

Field leader: Yihong Du, UNE

Lead institution: UNSW

Mathematical Optimization

Field leader: Fred Roosta, Uni of Queensland

Lead institution: Uni of Sydney

Mathematical Physics

Field leader: Ian Marquette, La Trobe

Lead institution: Uni of Melb

Nonlinear Science

Field leader: Tonghua Zhang, Swinburne

Lead institution: RMIT

Optics & Photonics

Field leader: David Moss, Swinburne

Lead institution: ANU

Physics & Mathematics (general)

Field leader: Tony Murphy, CSIRO

Lead institution: Monash

Probability & Statistics with Applications

Field leader: Christopher Drovandi, QUT

Lead institution: Monash

Pure & Applied Mathematics

Field leader: Sever Dragomir, VU

Lead institution: Monash

Spectroscopy & Molecular Physics

Field leader: Lars Goerigk, Uni of Melb

Lead institution: UNSW

Thermal Sciences

Field leader: Chunrong Zhao, Uni of Sydney

Lead institution: Uni of Adelaide

Health & Medical Sciences

Australia's research field leaders

Here are the top researchers and institutions in the 66 fields of health and medical sciences

The Health & Medical Sciences list is supported by Flinders University

Addiction

Field leader: Louisa Degenhardt, UNSW

Lead institution: UNSW

AIDS & HIV

Field leader: Martin Holt, UNSW

Lead institution: UNSW

Alternative & Traditional Medicine

Field leader: Amie Steel, UTS

Lead institution: Western Sydney

Anaesthesiology

Field leader: Paul Myles, Monash

Lead institution: Monash

Audiology, Speech & Language Pathology

Field leader: Robert Eikelboom, Ear Science Institute

Lead institution: Uni of Queensland

Bioethics

Field leader: Bridget Pratt, ACU

Lead institution: Uni of Sydney

Cardiology

Field leader: Andrew Coats, HRI

Lead institution: Monash

Child & Adolescent Psychology

Field leader: Ronald Rapee, Macquarie

Lead institution: Deakin

Clinical Laboratory Science

Field leader: Tony Badrick, RCPAQAP

Lead institution: NSW Health

Communicable Diseases

Field leader: Monica Slavin, Peter Mac

Lead institution: UNSW

Critical Care

Field leader: Naomi Hammond, George Inst

Lead institution: Monash

Dentistry

Field leader: Ove Peters, Uni of Queensland

Lead institution: Uni of Queensland

Dermatology

Field leader: Rod Sinclair, Uni of Melb

Lead institution: QIMR Berghofer

Developmental Disabilities

Field leader: Julian Trollor, UNSW

Lead institution: La Trobe

Diabetes

Field leader: Dianna Magliano, Monash

Lead institution: Monash

Emergency Medicine

Field leader: Peter Morley, Uni of Melb

Lead institution: Monash

Endocrinology

Field leader: Peter Ebeling, Monash

Lead institution: Monash

Epidemiology

Field leader: Joanne McKenzie, Monash

Lead institution: Monash

Gastroenterology & Hepatology

Field leader: Peter Gibson, Monash

Lead institution: UNSW

Genetics & Genomics

Field leader: Nick Martin, QIMR Berghofer

Lead institution: Uni of Queensland

Gerontology & Geriatric Medicine

Field leader: Perminder Sachdev, UNSW

Lead institution: Uni of Sydney

Gynaecology & Obstetrics

Field leader: Fabricio da Silva Costa, Griffith

Lead institution: Monash

Health & Medical Sciences (general)

Field leader: Benn Sartorius, Uni of Queensland

Lead institution: Monash

Heart & Thoracic Surgery

Field leader: Paul Bannon, Uni of Sydney

Lead institution: RCH Melbourne

Haematology

Field leader: Emmanuel Favaloro, Westmead

Lead institution: Monash

Hospice & Palliative Care

Field leader: Lauren Breen, Curtin

Lead institution: Uni of Sydney

Immunology

Field leader: James McCluskey, Uni of Melb

Lead institution: Uni of Melb

Molecular Biology

Field leader: Melanie Eckersley-Maslin, Peter Mac

Lead institution: Uni of Queensland

Natural Medicines & Medicinal Plants

Field leader: Ian Cock, Griffith

Lead institution: Uni of Queensland

Neurology

Field leader: Tissa Wijeratne, RMIT

Lead institution: Monash

Neurosurgery

Field leader: Jeffrey Rosenfeld, Alfred

Lead institution: Monash

Nuclear Medicine, Radiotherapy & Molecular Imaging

Field leader: Michael Hofman, Peter Mac

Lead institution: Peter Mac

Nursing

Field leader: Debra Jackson, Uni of Sydney

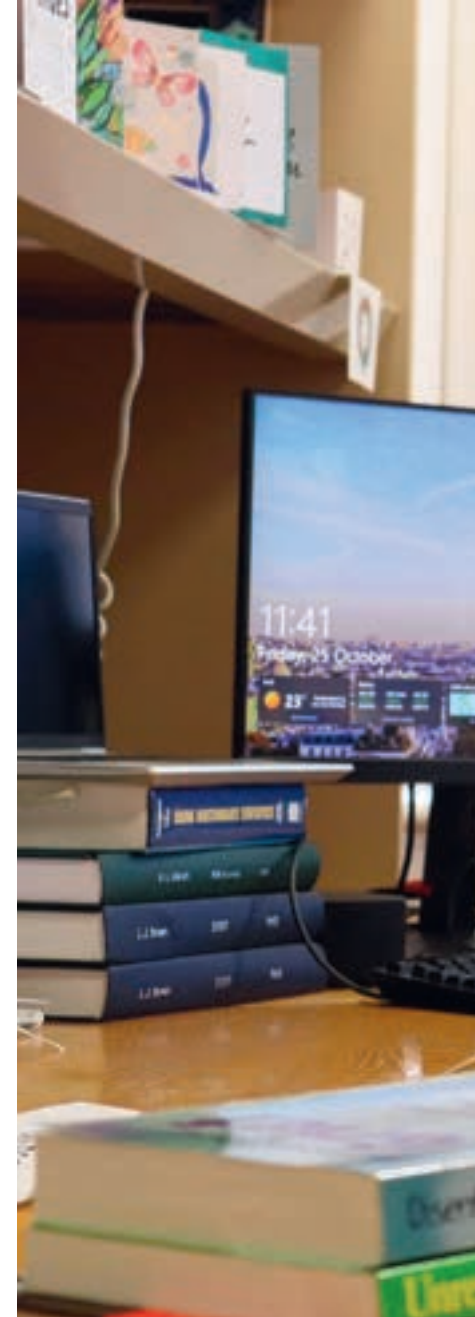
Lead institution: Uni of Wollongong

Nutrition Science

Field leader: Elizabeth Isenring, Bond

Lead institution: Deakin

Continued on Page 38



Lauren Breen

Curtin University

Field leader in Hospice & Palliative Care

As a community psychologist whose work is focused on loss, Lauren Breen says she felt like she was seen as that “weird grief lady” in the early days of her research.

When she began in the field two decades ago, only a handful of researchers worked in the area.

“For a long time, it felt that few people thought grief was a worthy



Curtin University

topic of study and that it didn't have the weight or gravitas of other areas," Breen says.

"It has changed over time, but I felt like the 'weird grief lady' for years."

Her research has centred on understanding the psychology of grief and loss, and its impact on mental health. This has included work to improve palliative and end-of-life care, developing interventions to support people experiencing loss and promoting grief literacy in the community.

Using a variety of methodologies, the Curtin University professor hopes her research will help create a connected, caring society where grief is acknowledged and supported.

She says grief is not only a response to death, but can be the loss of something a person is attached to, such as the loss of identity or a job, or moving countries or ecological grief.

"Dying, death, loss and grief are part of life," she says.

"I feel extraordinarily privileged to sit with people in these experiences and listen to their stories, and to use these stories to make a difference – in theory, policy and practice.

"I've interviewed people who have terminal and life-limiting illnesses, or their family members, or people who are grieving, and in many cases they haven't had a chance to talk about it, because people shy away from these topics."

In a recent project, she and her team have been investigating the kinds of questions bereaved children have about death and grief. They've explored grief literacy in the 14-to-24 age group and have been making social media videos with young people talking about their experiences.

It was when Breen was in her early 20s that the seeds for her future research were sown.

"I started in this area following the death of a family member in a car crash," she says.

"I could see the ripples of impact it had and I wanted to understand it a lot more. I went to the literature, but I couldn't find the answers I had assumed would be there.

"A few years later when I was

looking for a research project for my PhD, I thought I could look into that."

She's since discovered a multitude of misperceptions, starting with the notion that grieving is a process to be moved through in an orderly fashion, culminating in acceptance.

"That's rubbish, the idea that it goes through these neat, distinct stages in a set order, and that it ends in closure," Breen says.

"I have banned the following words from my vocabulary: closure; moving on; letting go and recovery.

"It's a process of adapting to and accommodating loss into your life. A lot of what I do is trying to bust those myths."

Carmel Sparke

Health & Medical Sciences cont

Continued from Page 36

Obesity

Field leader: John Dixon, Swinburne

Lead institution: Monash

Oncology

Field leader: Sherene Loi, Peter Mac

Lead institution: Peter Mac

Ophthalmology & Optometry

Field leader: Robyn Guymmer, Uni of Melb

Lead institution: Uni of Melb

Oral & Maxillofacial Surgery

Field leader: Martin Batstone, Uni of Queensland

Lead institution: Griffith

Orthopaedic Medicine & Surgery

Field leader: Aaron Buckland, Melbourne Orthopaedic Group

Lead institution: Monash

Otolaryngology

Field leader: Richard Harvey, Macquarie

Lead institution: Macquarie

Pain & Pain Management

Field leader: Michael Nicholas, Uni of Sydney

Lead institution: Uni of Sydney

Pathology

Field leader: Anthony Gill, Uni of Sydney

Lead institution: Uni of Sydney

Pediatric Medicine

Field leader: Nigel Curtis, RCH Melbourne

Lead institution: RCH Melbourne

Pharmacology & Pharmacy

Field leader: Kamal Dua, UTS

Lead institution: Monash

Physical Education & Sports Medicine

Field leader: Emmanuel Stamatakis, Uni of Sydney

Lead institution: Uni of Sydney

Physiology

Field leader: Jiake Xu, UWA

Lead institution: Monash

Plastic & Reconstructive Surgery

Field leader: David Hunter-Smith, Monash

Lead institution: Monash

Pregnancy & Childbirth

Field leader: Caroline Homer, Burnet

Lead institution: Monash

Primary Health Care

Field leader: Barbara Mintzes, Uni of Sydney

Lead institution: Uni of Sydney

Psychiatry

Field leader: Helen Christensen, UNSW

Lead institution: UNSW

Psychology

Field leader: Kit Double, Uni of Sydney

Lead institution: Uni of Melb

Public Health

Field leader: Corneel Vandelanotte, CQU

Lead institution: Uni of Sydney

Pulmonology

Field leader: Adam Benjafield, ResMed

Lead institution: Monash

Radiology & Medical Imaging

Field leader: Gregory Scalia, Uni of Queensland

Lead institution: Uni of Sydney

Rehabilitation Therapy

Field leader: Jennie Ponsford, Monash

Lead institution: Monash

Reproductive Health

Field leader: Ben Willem Mol, Monash

Lead institution: Monash

Rheumatology

Field leader: Peter Nash, Griffith

Lead institution: Monash

Social Psychology

Field leader: Jolanda Jetten, Uni of Queensland

Lead institution: Uni of Queensland

Surgery

Field leader: Dieter Weber, UWA

Lead institution: Monash

Toxicology

Field leader: Bryan Fry, Uni of Queensland

Lead institution: UTS

Transplantation

Field leader: Daniel Chambers, Uni of Queensland

Lead institution: Uni of Sydney

Tropical Medicine & Parasitology

Field leader: Una Ryan, Murdoch

Lead institution: Uni of Melb

Urology & Nephrology

Field leader: Jeremy Grummet, Monash

Lead institution: Uni of Sydney

Vascular Medicine

Field leader: Aletta Schutte, UNSW

Lead institution: Monash

Veterinary Medicine

Field leader: Paul McGreevy, Uni of Sydney

Lead institution: Uni of Sydney

Virology

Field leader: Leon Caly, Uni of Melbourne

Lead institution: Monash

Humanities, Literature & Arts Australia's research field leaders

These are the top researchers and institutions in the 21 fields of humanities, literature and arts

Marcus Mietzner Australian National University Field leader in Asian studies & History

Political scientist Marcus Mietzner remembers his first “eye-opening” visit to Indonesia as a teenager, a trip that sparked a lifelong fascination with the region and its leaders.

Born and raised in Germany, Mietzner was 11 when his best friend moved to Jakarta. Three years later, he decided to visit his elementary school buddy and the pair spent time travelling around Indonesia.

“As someone who had never left Europe before, this was an eye-opening visit to me,” Mietzner says. “I’d always been interested in politics from a very young age, and when I visited Indonesia it was ruled by long-time autocrat Suharto.

“This was so different from my own experience with Germany’s post-war democracy that I decided to read extensively on Indonesia’s political history and present.”

His interest turned into an academic career that has focused on Indonesia and its political parties and presidency, including the political role of the military in Indonesia, campaign financing issues, elections and similar politics in Southeast Asia.

He’s written three books on the region and has recently conducted a series of interviews with former president Joko Widodo for an upcoming book.

The ANU associate professor says he also regularly briefs agencies such as the Department of Foreign Affairs and Trade about his research and has been called on by media in Australia and Indonesia for comment.

“I believe that my work on Indonesian politics has informed many Australian policymakers and some in the general public, too, about how the country’s institutions and processes function,” he says.

After that first trip to Jakarta as a teenager, Mietzner started a degree in Southeast Asian studies at Frankfurt’s Goethe University once he’d finished high school

Part of his course in Frankfurt included an



My first visit to Indonesia as a teenager was eye-opening for me



exchange year in Indonesia, where he became fluent in Indonesian and began his first research, a thesis on a rebellion in the Moluccan islands in the 1950s.

On graduating, he moved to Canberra and the ANU to do a PhD on the Indonesian military. But while doing fieldwork for his research, he began working for USAID in Indonesia, where he remained for seven years.

Mietzner returned to ANU to finish his PhD by 2005, and began as a lecturer in 2008, focusing his projects on political parties and the presidency in democratic Indonesia.

“My research approach is mostly qualitative in nature. I believe in interviewing the political actors I write about,” he says.

“I also spend a lot of time on the ground to directly observe processes, such as elections, party congresses or presidential events.”

In mid-2023, he was surprised to be approached by an aide to then president Widodo to ask if he'd be interested in writing a book about the president.

“This was despite my critical writings on him for much of his rule. This was the beginning of a fascinating year in which I could spend time up close with Widodo,” he says.

Mietzner is intrigued by the dilemmas faced by leaders making decisions that affect entire nations, such as temptations of power and corruption and the utilitarian choices they make to keep populations content.

“I enjoy looking behind the scenes; I often find during my research that events unfolded very differently from what was reported in the press, and that actors took decisions for reasons that were very different from what was stated publicly.”

Carmel Sparke

Asian Studies & History

Field leader: Marcus Mietzner, ANU

Lead institution: ANU

Chinese Studies & History

Field leader: Ligang Song, ANU

Lead institution: ANU

Communication

Field leader: Mark Johnson, Uni of Sydney

Lead institution: QUT

Drama & Theatre Arts

Field leader: Gene Moyle, QUT

Lead institution: QUT

English Language & Literature

Field leader: Subhan Zein, ANU

Lead institution: Macquarie

Epistemology & Scientific History

Field leader: Pierrick Bourrat, Macquarie

Lead institution: Macquarie

Ethnic & Cultural Studies

Field leader: Stuart Cunningham, QUT

Lead institution: QUT

Feminism & Women's Studies

Field leader: Maggie Kirkman, Monash

Lead institution: Monash

Film

Field leader: Agata Frymus, Monash

Lead institution: Deakin

Foreign Language Learning

Field leader: Sender Dovchin, Curtin

Lead institution: Curtin

Gender Studies

Field leader: Meredith Nash, KPMG

Lead institution: Uni of Melb

History

Field leader: Matthew Champion, Uni of Melb

Lead institution: Uni of Melb

Humanities, Literature & Arts (general)

Field leader: Ingrid Piller, Macquarie

Lead institution: Macquarie

Language & Linguistics

Field leader: Evan Kidd, ANU

Lead institution: Macquarie

Literature & Writing

Field leader: Alyson Miller, Deakin

Lead institution: Uni of Sydney

Middle Eastern & Islamic Studies

Field leader: Zouhir Gabsi, Deakin

Lead institution: Deakin

Music & Musicology

Field leader: Gary McPherson, Uni of Melb

Lead institution: Uni of Melb

Philosophy

Field leader: Neil Levy, Macquarie

Lead institution: Macquarie

Religion

Field leader: Ihsan Yilmaz, Deakin

Lead institution: Deakin

Sex & Sexuality

Field leader: Alan Mckee, Uni of Sydney

Lead institution: UNSW

Visual Arts

Field leader: Jeremy Kerr, QUT

Lead institution: QUT

We can't afford to kick the can down the road



When Universities Australia launched the Shaping Australia Awards last year, we wanted to shine a light on the unsung heroes working in our universities who, often without recognition, shape the future of our nation.

Having worked in and close to this sector for virtually my entire professional life, the significant contribution our university workforce makes to the lives of all Australians is not lost on me.

Researchers are chief among these shining stars, and our universities are chock full of them – academics dedicating their careers to solving the world's biggest problems. They are working to cure disease, calm conflict, and develop new technologies – all to make our lives and the world we live in better and safer.

The Shaping Australia Awards celebrate these individuals, and so many others. Last year's winners included researchers who have developed ways to help people with diabetes better manage their condition and fire-proof paint to protect homes from bushfires. This year, entries include innovative initiatives that are producing the world's cheapest green hydrogen and harnessing spider venom to treat heart attack and stroke.

This is the power of research on full display, and we can't progress as a nation without it. The Australian Universities Accord final report made this point very clearly. It warned: "Rapid technological, social, political and environmental change means the pressure is always on to produce more knowledge, skills, opportunities and research. Fall behind in this race and Australia will see its productivity, innovation and standard of living decline."



Luke Sheehy

We already have ground to make up in this global competition. Australia does not spend nearly as much as our global peers on research and development.

In fact, the government's contribution to this critical endeavour has never been lower at 0.51 per cent of gross domestic product, while our total spend is at 1.68 per cent of GDP. This is far below the OECD average of 2.73 per cent. Germany, the United States and Japan all spend more than 3 per cent of GDP on R&D. These countries, arguably, lead the world in manufacturing and technological development – two areas Australia has identified as key to diversifying its economic mix.

We are clearly trailing the pack by some way, which is why it is an area that needs serious attention and, better yet, proper funding. There is acknowledgment in the government of this. Industry and Science Minister Ed Husic is on the record saying, "We still have a lot of work to do". After all, what good is the government's \$22.7 billion investment to build a Future Made in Australia without the R&D work required to spur the growth of new industries?

The government's commitment to undertaking a strategic examination of the R&D system is a good first step, but what is well understood and urgently needed is increased and sustainable funding for university research and development. In the face of declining business and

government investment in research over decades, universities have turned to international student revenue to fund more of what they do for Australia, historically research and more recently the domestic student experience.

Our sovereign research capability is now under threat as the government seeks to reduce international student numbers to deal with migration pressures. This short-term solution to one political problem will have long term ramifications, not just for universities but for the entire economy and our country's future prosperity which hinges on the solutions and advancements R&D helps deliver.

We can't afford to kick the can down the road, not when our productivity, economic growth and a major component of the government's own agenda depend on this work. Australia doesn't aspire to be average in any other global competition, yet our politicians seem to be acceptant of performing far below average in this most crucial of domains.

We can't have a strong economy without the ideas, products and solutions our brilliant researchers generate. Their work matters to Australians, which is why it should matter to our elected officials. Australia needs to take R&D seriously, and it needs to do it now.

Luke Sheehy
Chief Executive Officer
Universities Australia

Business, Economics & Management

Australia's research field leaders

These are the top researchers and institutions in the 16 fields of business, economics and management

Accounting & Taxation

Field leader: John Dumay, Macquarie

Lead institution: Macquarie

Business, Economics & Management (general)

Field leader: Anastasios Panagiotelis, Uni of Sydney

Lead institution: Monash

Development Economics

Field leader: Lisa Cameron, Uni of Melb

Lead institution: Monash

Economic History

Field leader: Laura Panza, Uni of Melb

Lead institution: Uni of Melb

Economic Policy

Field leader: Alex Acheampong, Bond

Lead institution: QUT

Economics

Field leader: Kaveh Majlesi, Monash

Lead institution: Monash

Educational Administration

Field leader: Jessica Holloway, ACU

Lead institution: Uni of Melb

Emergency Management

Field leader: Jonatan Lassa, CDU

Lead institution: QUT

Entrepreneurship & Innovation

Field leader: Vanessa Ratten, La Trobe

Lead institution: QUT

Finance

Field leader: Md Akhtaruzzaman, ACU

Lead institution: Monash

Game Theory & Decision Science

Field leader: Jonas Fooker, Uni of Queensland

Lead institution: Monash

Human Resources & Organisations

Field leader: Nathan Eva, Monash

Lead institution: Monash

International Business

Field leader: Dinh Phan, La Trobe

Lead institution: Monash

Marketing

Field leader: Catherine Prentice, USQ

Lead institution: Griffith

Strategic Management

Field leader: Tak Yan Leung, USC

Lead institution: Monash

Tourism & Hospitality

Field leader: Brent Ritchie, Uni of Queensland

Lead institution: Uni of Queensland



Nadir Kinani

Lisa Cameron

University of Melbourne

Field leader in Development Economics

Lisa Cameron's role as a development economist may sound dry but her research has covered sex workers in Indonesia, China's one-child policy and the impact of building toilets in Mali.

Cameron's latest project involves using tiny recording devices sewn into Bonds singlets worn by children in East Timor villages. She and her colleagues are evaluating a program encouraging parents to talk more to their babies to see how it impacts their vocabulary, speech and development in years to come.

Continued on Page 42

Business, Economics & Management continued



Lisa Cameron

Nadir Kinani

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Projects like these have been part of her work on economic and social issues in developing countries, primarily Indonesia and China, over the past 30 years.

“I’ve looked at the effect of economic growth on people’s lives, and because I’m interested in the wellbeing of disadvantaged people, I’ve also done a lot of work looking at policies to measure and alleviate poverty, as well as health outcomes from different policies,” says Cameron.

Now a professorial research fellow at the Melbourne Institute of Applied Economic and Social Research at the University of Melbourne, Cameron took a winding path to her field. She started by doing a year of a science degree before switching courses after the physics, chemistry, biology and maths proved a bit dry.

“I changed to a bachelor of commerce under the misguided idea that I might be a business person, but actually I’m not at all suited to being a business person,” she says.

“The economics side of the degree appealed far more than the spreadsheet subjects.”

After backpacking for a year, Cameron headed to Princeton University in 1992 to do her PhD, hoping to research environmental economics. However, academics in the area were scarce as the field was so new, and she had to shift her focus.

“I’ve always loved travelling, and I’m so interested in other cultures and other ways of living, as well as learning languages, that I thought development economics was a great opportunity to combine those interests.”

It has meant a wide-ranging career, undertaking projects for organisations such as the World Bank and the Department of Foreign Affairs and Trade, along with a diverse range of research.

“I’ve done a relatively recent paper on the effect of the criminalisation of sex work, which doesn’t sound like a typical economics problem. But you can use the tools of economics, particularly evaluation, to evaluate lots of different types of policy changes or changes in

people’s circumstances,” she says.

In this case she compared districts in East Java in Indonesia where sex work had been criminalised with others where it was still legal, looking at the impact on the women’s livelihoods, health outcomes and children. Overall, criminalising sex work had a negative effect on the women, reducing their earnings, increasing rates of sexually transmitted infections and seeing more children drop out of school to work.

She hopes her research influences local leaders to consider the potential downsides of their decisions, as well as “seeps into the consciousness” of future policy makers in the development space, working at institutions like the World Bank.

“You see the resilience of people in places like Indonesia, where they’re less guarded and really make the most of what they have. I think it’s a skill we could really do with here in the West. We just tend to complain more and more over time as our living standards rise.”

Carmel Sparke

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If you're reading this at 1am It may be time for a *wakeup call*.

“ For the first time, we can objectively say that there is a significant connection between regular nighttime snoring and high blood pressure. ”

Dr Bastien Lechat

It feels like it happens all night, every night; the rumbles, grumbles, snorts and roars that turn your sleep into a constant tossing, turning annoyance.

But your snoring could hide a deeper problem. New research from Flinders University sleep experts found that people, particularly overweight middle-aged men, who regularly snore at night are more likely to have elevated blood pressure and uncontrolled hypertension.

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