



Innovative
Research
Universities



Celebrating IRU Impact

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Acknowledgement of Country and respect for First Nations cultures

The IRU recognises First Nations people across Australia as the Traditional Owners of the unceded lands upon which our campuses sit today. We believe that education and research play an important role in reconciliation, recognition, justice, and First Nations advancement.

Chair's welcome

20 years ago, six young Australian universities formed a new group to collaborate across the country, share best practice, and together have a stronger voice in public policy. This group was the Innovative Research Universities (IRU).

The guiding principles agreed by the members of the IRU in 2003-2004 reflected their distinct character as universities specifically established to serve growing communities. The universities in the IRU champion access and equity, with a student-centred approach that values innovation in teaching and learning. They are research universities with a commitment to new knowledge and its application. IRU members' commitment to deliver impact spans local, national, and international communities.

A lot has changed over the last 20 years — the IRU has lost some members and gained some more — but its shared values and priorities are more important than ever. In 2023 we are in the middle of a major national review of the role of universities in our economy and society, which

will lead to a new Australian Universities Accord. The IRU's reputation for constructive, evidence-based contributions to public policy make it a leading voice in this important national debate.

As we look ahead to the future, we applaud the foresight of the colleagues who established the IRU in 2003. We are committed to furthering our work together and contributing to a more equitable and innovative Australia.



Professor Paddy Nixon
Chair, Innovative Research Universities.
Vice-Chancellor and President,
University of Canberra.

Executive Director's welcome

Over the last 20 years, the impact of the universities in the IRU has changed lives and communities across Australia and our region.

Hundreds of thousands of students have benefitted from the opportunity to attend

university and have gone on to highly-skilled jobs, delivering an enormous uplift to their families, employers, and communities. The expansion of high-quality research has led to economic, social, cultural, and environmental benefits that have improved national wellbeing.

This is an Australian success story, with the expansion of the university system providing a platform for inclusion and innovation into the future.

By working together, the members of the IRU have increased their impact, through academic and research collaboration, international engagement at scale, and influence in public policy. This focus on maximising impact and public value through collaboration will continue to guide us as we embark on the next stage in our history.



Paul Harris
Executive Director, Innovative
Research Universities.

20 years of the IRU: Data snapshot

students

THEN

NOW

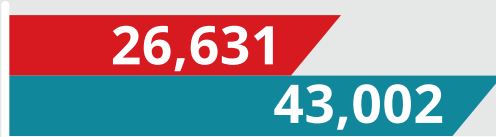
In 2003, IRU members had **127,714** domestic student enrolments

In 2021, IRU members had **175,139** domestic student enrolments



In 2003, IRU members had **26,631** international student enrolments

In 2021, IRU members had **43,002** international student enrolments

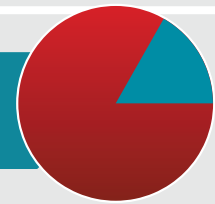


In 2003, the IRU domestic student cohort was **16%** low-SES students, **1%** First Nations students, and **16%** regional and remote students.

In 2021, the IRU domestic student cohort was **19%** low-SES students, **2.4%** First Nations students, and **18%** regional and remote students.

graduates

In 2021, IRU members educated **17%** of all domestic undergraduate students in Australia



Since 2003, IRU members have educated **849,836** graduates

In the past decade (2011-2021), IRU members graduated **5,061** First Nations students

Since 2003, IRU members have educated

109,015 nurses and health professionals



37,709 teachers



12,760 engineers



employment

In 2003, IRU members employed **12,408** staff



Now (2021), IRU members employ **15,767** staff



campuses



IRU members have

56 campuses in Australia and around the world

19 metro campuses

4 international campuses

33 regional and rural campuses

research

Since 2006, IRU members' **total number of research publications has more than doubled**. In the last decade, they **have produced 11% of all research publications in Australia**.

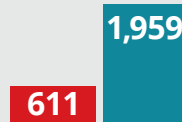


In 2003, IRU members had a total of **\$143,199,549** in research income and funding



Now (2022), IRU members have a total of **\$489,656,130** in research income and funding

In the period 2006-2009, IRU members **published 611 highly cited publications**



In the period 2017-2020, IRU members **published 1,959 highly cited publications**

In 2003, IRU members **produced a total of 1,093 international co-publications**



IRU members now **produce a total of 5,888 international co-publications annually**

In the last decade, IRU members have produced 15% of Australia's highly cited and 12% of very highly cited publications in **Social Sciences and Humanities**.

In the last decade, IRU members have produced 14% of Australia's highly cited and 14% of very highly cited publications in **Life and Earth Sciences**.

In the last two decades, the top 10 countries for IRU international co-publications have been the **United States, United Kingdom, China, Canada, Germany, Sweden, New Zealand, Netherlands, France & Japan**.

Research collaboration between IRU members has

grown by more than 1500% between 2003 and 2023.

The top fields for IRU co-publication are **Medicine, Social Sciences, Agricultural and Biological Sciences, and Environmental Science.**

rankings

In both 2022 and 2023, **Western Sydney University** was ranked **number one in the world** in the **Times Higher Education (THE) Impact Rankings**.

All five members of the Innovative Research Universities that participated in THE Impact Rankings were **highly ranked in 2023**, with **La Trobe University, Griffith University**, and the **University of Canberra** in the **top 100** and **James Cook University** in the **101-200 band**.

IRU Secretariat successes

Public policy and thought leadership

From its establishment, the Innovative Research Universities (IRU) has collaborated on evidence-based approaches to public policy and strengthened the voice of its members with government. In 2003, one of the founding priorities was to provide members' perspectives on the 2002 higher education reforms put forward by then Minister Dr Brendan Nelson within the *Higher Education at the Crossroads* paper. In 2007, the IRU convened a major event to discuss the national implications of university rankings after the first Academic Ranking of World Universities (ARWU) was announced.

Since 2003, the IRU has made 185 formal submissions to Australian Government policy reviews, in addition to many other discussion papers, statements, and appearances before government and parliamentary committees. The IRU's national leadership in significant higher education policy and debates has included:

- **2005** Setting out the case for 'third stream' funding to support the mission of universities in their communities.
- **2005, 2015, and 2022** Design of national systems for assessing research quality and impact.
- **2014** The importance of investing in outbound student mobility and internships in the Indo-Pacific, prior to the introduction of the New Colombo Plan.
- **2015** Discussion papers for research and innovation policy reform focusing on industry-driven research; collaboration with Asia; building regional research systems; and translational research.
- **2018** The future of the tertiary education system.
- **2020-2023** Modelling impacts of the Job-Ready Graduates Package and options for reform.

Leadership in public policy has been a mainstay of the IRU Secretariat's work for two decades and it remains an influential and trusted voice in higher education. In 2022, the IRU released a joint pre-election policy statement with the Australian Technology Network of Universities (ATN) that recommended the uncapping of Commonwealth supported places for all First Nations students, regardless of where they live. In July 2023, this policy was announced by Education Minister the Hon. Jason Clare MP.

“The Innovative Research Universities group matches policy precision with original ideas.” *Campus Morning Mail, 2022*

Sharing best practice

The members of the IRU came together in 2003 to establish mechanisms for sharing best practice. Since 2003, this has taken many forms, including regular meetings among Vice-Chancellors and Deputy Vice-Chancellor committees focusing on Academic, Research, First Nations, International, and Corporate issues. These committees have established working groups to address priority university issues, with 13 such groups operating in 2023.

First held in 2005 at La Trobe University, the Innovative Research Universities Senior Leaders’ Forum is an annual in-person event (with the exception of a break during the COVID-19 pandemic in 2020-2021) that highlights the important work of the Innovative Research Universities and their leadership teams. Operating on a rotating schedule between members, the Forum enables university leaders to hear from key policy makers and provides opportunities for collaboration, discussion, and advancing IRU’s strategic goals.

Vice-Chancellors’ Fellow

In 2016, the IRU Vice-Chancellors’ Fellow program was established to boost collaboration among IRU members in areas of shared priority. Each VC Fellow has brought exciting and innovative projects that build capacity within the IRU and have led practice within the Australian higher education sector.

In 2016-2017, Professor Jessica Vanderlelie (La Trobe University) developed the National Innovation Case Studies Collection with over 100 exemplars of innovative programs to support student success and employability. The collection was launched by then-Minister the Hon. Simon Birmingham in 2017.

In 2018-2019, Associate Professor Amani Bell (Western Sydney University) led a project to reimagine Work Integrated Learning, with new resources and a toolkit for student employability.

In 2019-2020, Brendon Douglas (Charles Darwin University) was appointed as Vice-Chancellors’ Fellow for Medical Research to build the IRU’s capacity in health and medical research, including engagement with the Medical Research Future Fund.

Academic calibration and collaboration

In its 20 years, the IRU has remained focused on developing educational collaboration and capacity among its members and supporting student success. This began with Flinders University's and Griffith University's collaboration on curriculum in 2004, and has since expanded to multi-year, multi-university projects.

In 2006-2007, IRU members collaborated on a series of masterclasses for PhD scholars. In 2009, the IRU signed a two-year Memorandum of Understanding with the Australian Chamber of Commerce and Industry to develop new resources to support Work Integrated Learning. In 2012, the Digital Futures Initiative incorporated collaborative projects and forums that focused on technology-enabled teaching and learning, while in 2013 the IRU Asian Languages Network was established to facilitate languages teaching and practice.

Operating since 2012, the IRU Academic Calibration Program has been the longest running collaborative project among members. The program facilitates an external peer review process to calibrate academic assessment and student outcomes among members to support accreditation through the Tertiary Education Quality Standards Agency. The program is a documented endorsement of the consistency and reliability of education, quality, collaboration, and assessment within the IRU.

These projects have been followed by other benchmarking activities, including new collaboration in cybersecurity in 2022. IRU member universities continue to collaborate on innovative approaches to teaching and learning.



2022 IRU Senior Leaders Forum, hosted by the University of Canberra. L-R: The Hon. Jason Clare MP, Minister for Education; Professor Glyn Davis AC, Secretary of Prime Minister and Cabinet; Professor Carolyn Evans, IRU Chair (2021-2022).



2014 IRU Senior Leaders Forum, hosted by Flinders University. Including special guest the Hon. Christopher Pyne, Minister for Education, pictured with IRU member Vice-Chancellors and Conor King, IRU Executive Director (2011-2021).

International partnerships and engagement

Internationally, the IRU has facilitated partnerships in both education and research. Developing new opportunities has been a key focus since 2005, when a Memorandum of Understanding was signed with the 1994 Group of Universities in the United Kingdom. Into the 2020s, the group continues to work together on new strategic international initiatives.

Since 2003, IRU student exchange programs have facilitated ongoing collaborations between our institutions. In 2005, the IRU established a European Union Centre and facilitated EU funding for student exchange in environmental sciences. From 2014, ahead of the New Colombo Plan, the IRU created the Scholars in Asia program that provided study abroad and internship opportunities for students in China, India, and Cambodia. In the same period, early career researchers participated in a mobility program with Thailand. In 2018, a Memorandum of Understanding was signed with the French Embassy for internships in student mobility.

In 2014, the IRU and the Malaysia Research University Network (MRUN) signed a Memorandum of Understanding and began a program of collaborative and innovative international research. At its conclusion, the IRU-MRUN project had successfully completed four collaborative teaching and learning projects, and funded another 11 research projects. In 2018, the IRU and MRUN published a joint report on the implications of digital learning.

The IRU Pakistan Project commenced in 2018 to build partnerships and increase brand awareness. With a joint in-country presence, this five-year partnership has facilitated educational webinars and workshops, school engagement, formalised meetings between government and senior education officials, as well as formal agreements through Memoranda of Understanding. It enabled IRU members to continue to build partnerships and support students through the COVID-19 pandemic.



Professor John Dewar, IRU Chair (2014-2016), at the IRU Research in Asia event at Parliament House, Canberra 2015.



His Excellency Mr Christoph Penot, French Ambassador to Australia and Professor Colin Stirling, IRU Chair (2017-2018), sign a MoU between the French Embassy and IRU members in 2018.

IRU member impact case studies



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Equity and access

In the last two decades, Australian society has grown, diversified, and faced unprecedented changes. For people and communities across the country, access to important services in health and education remain a challenge. Within this landscape, the IRU has been proud to expand its members' commitment to access and inclusion within the higher education system, as well as facilitating research that expands equity and access to essential services for all Australians.

The IRU is a leader in providing access and support for student groups that have traditionally faced barriers to higher education. Half of all IRU domestic students are the first in their family to attend university and IRU members also educate disproportionately high numbers of First Nations students and students from low-SES backgrounds. The IRU educates approximately one in five students from regional and remote areas of Australia. The research and education programs undertaken by IRU members give priority to improving access and participation in higher education, while developing impactful support systems for student success.

Leading the way for Māori and Pāsifika students

Queensland is home to the largest Māori and Pacific Islander populations anywhere in Australia. These diverse communities are often underrepresented in higher education, but Griffith University is leading the way in creating pathways and opportunities for students. The Māori and Pāsifika Legacy Education Achievement Dream (LEAD) program and the Pathways in Place (PiP) program are committed to supporting the success of these communities.

Through camps, conferences, immersion days, and workshops, LEAD provides a positive and impactful experience for Māori and Pāsifika students. Following recent changes to Australian citizenship requirements, the program facilitates many Pacific Islander students' increased opportunities to access higher education through HECS-HELP and Commonwealth-

supported places. Built upon four foundational concepts — demystifying university, building self-efficacy and confidence, understanding university and career pathways, and drawing strength from culture — the program provides targeted and ongoing support that caters to the concerns and contexts of the Māori and Pāsifika students throughout South East Queensland.

The PiP program seeks to elevate Māori and Pāsifika voices by supporting community-led organisations to provide services, advocate for change, and lead research in collaboration with Griffith University. The program seeks to grow capacity, connections, data sovereignty, and funding across a variety of community-led projects that focus on early childhood care, health justice, and education. Grounded in place and community, PiP works for the empowerment of Māori and Pāsifika peoples.



Māori and Pāsifika community members with Professor Andrew Harvey, Director of Pathways in Place.

Creating safe spaces for vulnerable students

While more than 1.4 million students enter Australian universities each year, many barriers to accessing higher education remain for young Australians. Utilising multidisciplinary expertise and educators, researchers at La Trobe University have developed a series of programs to improve the educational attainment of vulnerable students in both secondary and tertiary education. Focusing on key factors that place students most at-risk, researchers have implemented practical, productive, and data-driven solutions to help students succeed.

Through the *Raising Expectations* program, researchers developed support mechanisms including application assistance, financial aid, and counselling to improve the participation rates of young people from out-of-home care. As a result, more than 670 care-leavers

are now studying at partner universities and TAFEs, with over 150 completions since 2020. Researchers from the Australian Research Centre in Sex, Health and Society have also undertaken a longitudinal study to inform policy relating to sexual health and educational resources for young people. For other vulnerable young Australians, changes in school curriculum, resources, and design were implemented to improve education outcomes for students from low-SES backgrounds and those with challenging behaviours.

Focusing on the specific needs of vulnerable student groups in educational settings, this research from La Trobe University has brought together holistic strategies to improve students' wellbeing and success in education.



Readying a rural health workforce for northern Australia

Since its establishment in 2000, James Cook University's (JCU) medical education program has undertaken an ambitious and research-driven approach to building the medical and health capacity of northern Australia. As the first medical school located entirely in regional Australia, JCU's initial intake of 60 students has since grown and the university has now supplied more than 2,000 medical graduates.

With seven million people living in remote and regional Australia, JCU's medical education pipeline has developed a socially-accountable curriculum to guide students in undertaking careers as generalist practitioners within these underserved communities. The program preferences students from rural backgrounds and provides focused training within regional and remote contexts. All JCU medical students undertake final year

placements in regional and remote areas and are supported by infrastructure across ten regional training centres. Almost two-thirds of JCU's domestic medical graduates go on to careers in regional, rural and remote locations, compared to fewer than 20% across all of Australia's medical schools.

Following JCU's medical school model, the university continues to train health professionals for rural and remote Australia, including nurses, physiotherapists, dentists, pharmacists, and occupational therapists. In Queensland, JCU accounts for only nine percent of health graduates, but makes up more than 40% of health graduates in outer regional and remote locations. JCU's medical education program has ensured that its graduates — whatever their origin — are ready and willing to support northern Australia's underserved communities.

James Cook University medical student at a clinical skills session in Townsville.



First Nations communities

First Nations people are the first educators and innovators, with long-held philosophies of Country. As institutions of knowledge, our universities are proud to play a role in continuing these traditions.

Taking a leadership role in the Australian higher education system, in 2014 the IRU signed a Statement of Intent on Aboriginal and Torres Strait Islander Higher Education that saw members commit to student and staff success, increasing First Nations research, and the privileging of First Nations knowledge in universities.

The IRU Indigenous Leaders Network is central to this work. Members facilitate collaboration for First Nations student and researchers' success, which in turn informs proposals for policy reform. Focusing on students' transition into university, Yunggoorendi Student Engagement at Flinders University provides support systems for First Nations students. To ensure students' success, James Cook University is seeking to close the gap between First Nations and non-Indigenous students' university completion rates. La Trobe University amplifies Aboriginal students' voices through an emphasis on Aboriginal education and pedagogical practices, and Murdoch University is expanding Aboriginal women's participation in the sector. The University of Canberra seeks to grow the representation of First Nations staff and students while building community partnerships, and Griffith University shares this commitment to Indigenous futures, diversity, and inclusion. At Western Sydney University, research is focused on supporting First Nations students in their post-university careers.

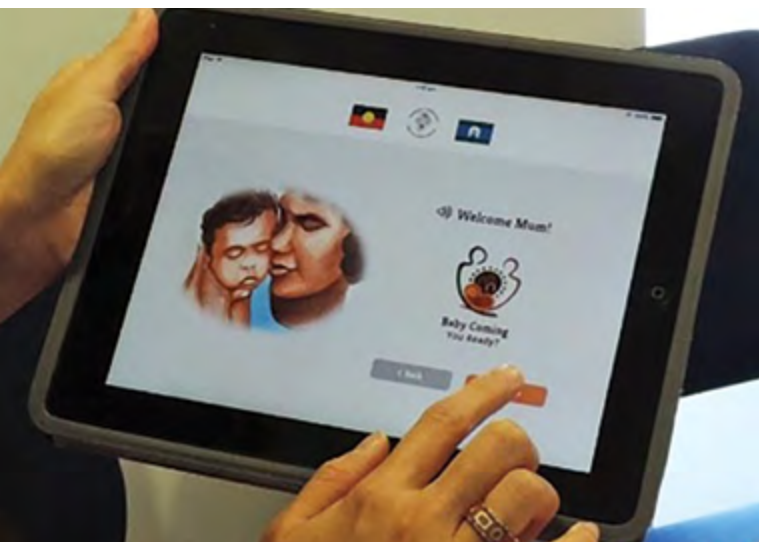
Peer support for Aboriginal mothers

Monitoring and ensuring the wellbeing of mothers is a critical, but often overlooked, part of perinatal health care. Researchers at Murdoch University have developed an innovative digital platform named *Baby Coming – You Ready?* to support Aboriginal mothers in telling their own story. The digital tool empowers mums to have an active part in their own pregnancy and birthing journey by facilitating culturally relevant and safe discussions between mothers and clinicians.

Co-designed by First Nations researchers, Murdoch University's research team worked closely with Aboriginal communities and organisations throughout Western Australia to develop this technology-based tool for culturally safe and strengths-based health care. Mothers are guided through the app with Aboriginal voice-overs and a yarning style

self-reflective assessment, which acts as a focal point for medical discussions. Through this platform, mothers can build trust, establish relationships, and take a shared approach to problem solving with health practitioners.

Baby Coming – You Ready? enables Aboriginal women to tell their own story and in their own way; these stories create a record to support mothers' wellbeing and ensure they don't have to tell practitioners the same information again and again throughout their pregnancy journey. *Baby Coming – You Ready?* is an ongoing project that is embedded in routine midwifery clinical practice in all pilot locations with further pilot studies being conducted in metro, rural, and regional sites throughout Western Australia.



The *Baby Coming – You Ready?* app.



Health practitioner, mother and her child with the *Baby Coming – You Ready?* app.

Empowering community wellbeing

For more than two decades, the Family Wellbeing program has provided a trauma-informed approach to healing for more than 80 First Nations communities in partnership with researchers at James Cook University. From Far North Queensland, to New South Wales, South Australia, and across to the Northern Territory, the community-driven program has developed a national network of researchers and organisations that are working to empower First Nations communities.

Since it began, Family Wellbeing has been co-led and co-designed by Aboriginal community organisations and researchers. As it has grown, this network has collaborated with First Nations service providers to embed the program within their core services, particularly in areas focusing on child protection, family support, and pre-employment and tertiary access. The program delivers workshops that enhance individuals' capacity to exert greater control over factors that influence their social and emotional wellbeing. As a result, Family Wellbeing participants have reported positive outcomes, including a 13% increase in family functionality, a 74% increase in cultural participation, and 21% improvement in levels of participation in local decision making.

In the last 23 years, Family Wellbeing has supported over 5,405 participants with \$2.3 million in investments that have grown the program's resources year by year. The program has facilitated stories of transformation and change, with positive improvements in participants' wellbeing. Family Wellbeing has increased capacity for communities to achieve collective goals, including community-controlled health care, suicide prevention, and housing.



Family Wellbeing program conference and participants.

Creativity and connection with arts-based service learning

Since 2009, more than 1,000 students, Elders, and community members have participated in an innovative initiative in the remote Barkly Region of the Northern Territory. This project has supported the development of the creative arts by delivering an arts-based service learning (ABSL) program and evidence-based research. Led by researchers at Griffith University, the ABSL program involved arts students collaborating with Warumungu and Warlpiri artists and Elders on community-led projects in the performing arts and education.

Emphasising the importance of service learning for social change, Griffith University students worked alongside artists at Barkly Regional Arts and Winanjjikari Music Centre. Students and artists collaborated on a range of projects, including recording and writing albums, documenting cultural activities, staging festival performances, and building community arts infrastructure. These projects focused on flexibility and responsiveness to community needs to support mutually beneficial learning partnerships.

This ABSL program expanded to a nationally-funded collaborative project that incorporated intercultural collaborations with partner universities, First Nations communities, and non-government organisations. Participating students were also prepared for working in diverse contexts. The program has seeded further nationally-funded research and the inclusion of this remote creative arts sector within national policy, regional economic growth strategies, and the Barkly Regional Deal. The ABSL project also informed the development of models for embedding meaningful, collaborative, and respectful First Nations' perspectives in higher education arts curricula both in Australia and internationally.



Queensland Conservatorium Griffith University students performing with Warren H Williams at the Desert Harmony Festival.



Professor Brydie-Leigh Bartleet with Warumungu Traditional Owner Rosemary Plummer OAM, who has supported and guided this work since 2009.



The Creative Barkly logo artwork commissioned by local Tartukula artist Lindy Brodie.

Universities in their local communities

The IRU has played a major role in the expansion and intensification of research activities across Australia over the last two decades, including industry partnerships and commercialisation projects. This research strength, however, is equally measured in collaboration with public- and community-sector partners and support for local community needs. Diverse communities throughout Australia require tailored and targeted research and programs for their unique contexts and challenges. The role of IRU members in their communities has driven positive and productive research that makes a difference to people from all walks of life.

Each year, the IRU educates professionals to supply much-needed skills in priority fields, including health, engineering, information technology, and education. In the last two decades alone, the IRU share of graduates in the fields of health, natural and physical science, information technology, and engineering has expanded. Across Australia over the last decade, the IRU has supplied more than 100,000 health professionals and 37,000 teachers. In both education and research, IRU members bring positive and impactful change to the communities that they serve.

Connecting students with seniors

For members of Australia's culturally and linguistically diverse (CALD) communities, aged care can present unique challenges. Often, it is important that care for senior community members considers cultural traditions and provides linguistically and culturally appropriate information. In 2012, researchers at Flinders University launched the Language in Action Program to bring together language students and CALD community members in aged care to achieve these aims.

Developed as a community engagement program, Language in Action saw university-level language students undertaking placements in local aged care facilities where their language is spoken. In recent

years, placements have expanded to ethnic media, schools, and cultural associations. For students, the program provides valuable experiences in dealing with unexpected linguistic and cultural challenges, as well as greater awareness of their linguistic self-worth and self-efficacy.

The Language in Action program found that students who participated in these placements were more likely to pursue further language studies while sustaining their community engagement. For members of the CALD community, these partnerships provide positive and language-appropriate interactions that are beneficial to their social and mental wellbeing.



Language in Action participants in 2019 (left) and 2017 (right) with community members.



A creative force for healing

With up to 30% of returned servicemen and servicewomen developing mental illnesses after deployment, researchers at the University of Canberra developed the Arts for Recovery, Resilience, Teamwork and Skills (ARRTS) program that helps defence force members heal, reflect, express, and create following their trauma.

Since 2015, around 500 Defence and Emergency Services personnel have participated in the ARRTS program, which provides servicemen and servicewomen experiencing service-related trauma with opportunities to participate in creative writing, music, theatre, and visual arts workshops. Researchers at the University of Canberra mentored participants in creative practice and artistic thinking with a focus on making and reflecting. Since their time in the program, some participants have gone on to publish their work as a children's book or an autobiography. Researchers found that ARRTS had a positive impact on participants' wellbeing with the program enhancing confidence and increasing participants' sense of acceptance. After the conclusion of the program, more than 85% of participants continued engaging with their chosen creative arts practice.

In 2018, the University of Canberra and the Australia War Memorial launched the Napier Waller Art Prize in recognition of the significance and healing potential of creative arts for defence force personnel. In recent years, the reach of recovery through creative arts has also been extended to other programs such as Regeneration, which supports recovery for bushfire affected communities.



ADF Arts for Recovery, Resilience, Teamwork and Skills (ARRTS) program participant Petty Officer Lee-Anne Cooper develops an art piece during the program held at the University of Canberra's Inspire Centre.
Credit: Australian Defence Imagery



Participants of the ADF Arts for Recovery, Resilience, Teamwork and Skills Program 22.2 on the showcase night of the program, held at the University of Canberra.
Credit: Australian Defence Imagery

Shining a light on Western Sydney's literary voices

Throughout Western Sydney, writers and artists from diverse backgrounds are finding their voice within Australia's literary scene. Now home to some of the most well-known writers in Australia, many of whom are winners of major Australian literary prizes, Western Sydney University's Writing and Society Research Centre nurtured the growth of this new literary movement.

Providing writers with the opportunity to form networks and sustain their practice within writing communities, researchers from Western Sydney University have facilitated the capacity building of an entire community of creatives. Partnering with Sweatshop Literacy Movement, Giramondo Publishing, and the Sydney Review of Books, researchers

nurtured a new generation of writers through workshops and mentoring to give voice to people growing up in Sydney's culturally diverse and often disadvantaged western suburbs.

As a result of this research project, writers were brought together to facilitate writing workshops and mentoring for secondary school students. The students and mentors published their work in both prose and poetry, including *The Big Black Thing: Chapter 1*, containing both established and emerging young writers. The capacity-building program for writers within this region of Sydney saw the emergence of new voices in Australian literature with exciting writers from culturally diverse backgrounds.



Partners in the Indo-Pacific

Beyond Australian borders, the IRU has been charting a course for building research impact and collaboration throughout the Indo-Pacific region. With patterns of knowledge production shifting dramatically around the globe in the past 20 years, this region has come into focus as an area of rapid growth in research and education.

Partnering with universities, researchers, industry, and local communities throughout the vast Indo-Pacific neighbourhood, the IRU has developed innovative and sustainable solutions for the challenges facing the region. These collaborations have built two-way partnerships from the local community level — impacting the safety, wellbeing, and livelihoods of day-to-day residents — all the way through to local, state, and federal governments.

International education also remains valuable to Australia's economy and employment now and into the future. For IRU members, educating international students has forged relationships throughout the Indo-Pacific region. In the last decade, the top four countries for IRU international students (both onshore and offshore) have been Singapore, China, India, and Vietnam. Since 2003, the total number of international students educated within the IRU has almost doubled, highlighting the growing strength of these Indo-Pacific partnerships.

Taking cyclone safety standards by storm

Climate models have predicted that over the next few decades, tropical cyclones are likely to have greater intensity with stronger winds and higher rainfall. This is not only a threat to communities in northern Australia, but also people living throughout the Pacific. Born out of Cyclone Althea's and Cyclone Tracy's devastation during the 1970s, James Cook University's Cyclone Testing Station (CTS) has brought about significant improvements in building safety throughout Australia and the Pacific.

CTS research has identified design and construction methods to ensure that buildings in northern Australia, Fiji, and Tonga have increased resistance to cyclones. In Australia, the CTS found that garage and large exterior doors were often the most

vulnerable part of a building and were linked to extensive building damage during cyclones. CTS engagement with industry stakeholders has improved standards for the design, installation, and testing of garage doors in both Australia and New Zealand.

CTS also undertook regional projects in Fiji and Tonga to increase cyclone resilience among communities in the Pacific. Collaborating with the Fiji Institute of Engineers, CTS provided education workshops for builders and engineers that focused on wind-resistant building designs. Through this research, people and communities throughout the Asia-Pacific region are prepared, proactive, and informed about cyclone resilience.

Building assessments in Fiji.
Photo: Cyclone Testing Station, JCU.



A sustainable walk on the wild side

Throughout the Asia-Pacific region, including Australia, millions of people travel, tour, and experience the natural environments of holiday destinations through ecotourism and wildlife tourism. But how can we ensure these practices are socially responsible, environmentally friendly, and culturally appropriate? Researchers at Murdoch University sought to understand and raise awareness among tour operators and stakeholders within the ecotourism industry to ensure its sustainability, including management practices for the environment and wildlife.

Researchers developed models for sustainable ecotourism by undertaking analysis and assessment of ecotourism models throughout Australia, including those run by First Nations groups. Partnering with tour operators and companies in Malaysia and Sri Lanka from 2018, these models raised the awareness of stakeholders about the impacts of tourism on wildlife and natural environments. In Western Australia, extension activities resulted in the development of government policies aimed at improving the protection and management of national parks. In the post-pandemic era, researchers have expanded their research-oriented engagement with government and tourism partners to the Philippines, Indonesia, and Thailand.

Working with these stakeholders, Murdoch University researchers were able to collaborate with industry partners and problem-solve to ensure the sustainability of the ecotourism industry in Australia and South Asia. Since 2020, this engagement has become increasingly focused on working with scientists, government, and tour operators to address issues of over-tourism following the resumption of international travel.



Ecotourism in Borneo, Malaysia.

Agriculture for changing climates

As the world's population grows year on year, the earth's natural resources come under increasing pressure. This burden of providing for the increasing global population is also placing stress on farmers' livelihoods in South Asia. Western Sydney University's Smart Agriculture Research Cluster sought to understand and develop innovative solutions to the challenges that farmers are facing in uncertain climates, particularly throughout South Asia.

In India, farmers were facing increasingly depleted groundwater and were struggling to water crops to sustain their livelihoods. In Sri Lanka, many crops were going to waste and failing to provide sufficient income due to inefficient crop production cycles and planning. As a result of the Smart Agriculture Research Cluster, researchers and farmers

collaborated to create local and innovative solutions that resulted in more sustainable farming practices. Working together, they produced increased crop yields and improved incomes, with positive results for communities and their resources.

In partnership with local farmers in India, researchers from Western Sydney University developed methods for monitoring and restoring groundwater to improve crops. In Sri Lanka, farming practices were adjusted to incorporate technology within systems for monitoring crops and facilitated a more coordinated and strategic approach to planting. Throughout South Asia, these innovative and practical solutions to climate-based challenges increased the resilience of farmers' livelihoods and the sustainability of farming methods.

A farmer in India measures groundwater levels.



Sustainability

For two decades, the IRU has been a leader in sustainability research and education. Research activities have remained focused on sustainable and socially-responsible solutions for communities in Australia and internationally. This is reflected in the growth in very highly cited publications in Life and Earth Sciences in the past decade, with IRU members accounting for 15% of Australia's total of very highly cited publications in this field in 2020.

Research collaboration among IRU members over the last 20 years has also focused on environmental sciences and multi-disciplinary approaches to sustainability issues. For example, the IRU created the Australian Water Partnership in 2004 as the first step in building stronger collaboration within the group. In 2010-2011 IRU members co-funded a research initiative on Ecosystem Tipping Points, leading to three collaborative projects and a forum. In 2011 IRU members also launched a publication on disaster preparedness and resilience.

A fresh take on groundwater modelling

Groundwater is a finite but valuable resource in Australia that makes up around 17% of Australia's accessible water resources. Understanding the age, flow rate, and recharge rates for aquifers and groundwater is critical to enabling industry to sustainably manage these fresh groundwater resources. Researchers from Flinders University at the National Centre for Groundwater Research and Training (NCGRT) investigated the mechanics of river water seepage, variations, and management to support the conservation of floodplains and improvements in vegetation growth.

Collaborating with non-government organisations, state environmental departments, and local communities, the NCGRT developed models of groundwater systems and methods for evaluating water management plans. By developing methods to examine the extent, growth, and decline of

these groundwater systems — including field measurements, computer modelling, and laboratory experiments — researchers could more efficiently understand the broader consequences of water variability within degraded ecosystems.

Throughout Australia, particularly in remote parts of northern Australia, many communities face challenges associated with water supply problems. This affects not only drinking water, but also agriculture, industry, and livelihoods. Depletions or seepage in groundwater can have detrimental and far-reaching environmental consequences. By collaborating with local communities and industry partners to investigate the management of freshwater on resource-constrained islands and in riverine environments, the NCGRT's research has been able to develop solutions for the future of these systems.

Flinders University PhD student Peter Reeve tests water at Oaklands Wetland.



Spilling the secrets on bat virus spillovers

As a type of fruit bat, flying foxes play a vital role in Australia's ecosystems by connecting pockets of eucalypt forest across the continent. As the habitats of these long-distance pollinators come under increasing stress, the potential for their contact with humans also increases. Long before the emergence of the COVID-19 pandemic, global bodies such as the World Health Organisation had foreseen the major threat posed by environments where infectious diseases could spill over from animals, such as flying foxes, to humans.

Monitoring and analysing the viruses that threaten flying foxes in Australia, researchers from the Centre for Planetary Health and Food Security at Griffith University are using the well-known Hendra virus as a model to understand the emergence of other infectious

diseases in wildlife. In partnership with universities in North America, Africa, Asia, and Europe, researchers are also working to understand the dynamics of bat diseases globally and how they fluctuate through high-risk periods of transmission.

As a result of this work, scientists better understand the environmental drivers of virus spillover and can predict up to two years ahead of when infectious clusters are likely to occur. Research focused on virus spillover is also driving conservation efforts and highlights the importance of preserving the natural habitats of Australia's wildlife as well as the global health consequences of climatic changes.



Answering burning questions in Australian conservation

In Australia, fire is an important agent of natural disturbance, particularly in the semi-arid Murray Mallee region of South East Australia. Since 1972, more than 1,000 fires have burned in the region, with 16 fires larger than 10,000 hectares of land. The Mallee is a patchwork of environments that, understood together, map a mosaic of fire histories scorched across the landscape.

Since 2008, researchers from the Mallee Fire and Biodiversity project at La Trobe University have developed broad-scale models of the mallee ecosystem to map the region's fire history and understand the consequences of planned burning on native ecosystems. Researchers found that frequent extensive burning has detrimental effects on native species, with a great variability in the time

response to burning. For example, some species of fire-prone plant communities flourished in the periods following fire and decreased with time, while other species were more abundant as the time since the last fire increased.

Understanding these fire mosaics has enabled government agencies and local land managers to plan for and mitigate the risks associated with both planned burning and wildfire on landscapes, ecosystems, and personal property. The project continues to make contributions to fire management and practice across Victoria, including policy for endangered species, wildfire mapping, fire strategies for national parks, and achieving statewide biodiversity targets.



High severity fires in the Mallee region.



Futures for Australia

In the years leading up to the IRU's 20th anniversary, the world has witnessed a remarkable transformation with major geopolitical, demographic, and technological shifts. A commitment to innovation is at the heart of the IRU's shared goals. This commitment highlights members' openness to new ideas and a collaborative approach to developing methods, models, and solutions for partners in a way that contributes to social progress.

Now and into the future, Australian universities remain critical to the nation's economy, productivity, and living standards through the graduates and research they produce. In the past two decades, the IRU has facilitated the attainment of higher education qualifications for more than 800,000 students. Collectively, IRU members provided employment to over 15,000 people. The economic value and productivity of research within the IRU is similarly crucial, with members more than tripling their research income and funding in two decades and contributing research that is essential to the future of Australia.

Research for industry productivity and sustainability

As a lightweight, flexible, and durable metal, aluminium is an essential resource that is used in construction, transportation, electronics, and packaging industries around the world. Australia remains the world's largest producer of bauxite — an alumina-containing ore from which aluminium is refined — with approximately 390,000 metric tonnes produced in 2021. Each year, the Australian alumina industry employs more than 19,000 people and its exports contribute over \$7.5 billion to the nation's economy.

The Solution Chemistry Group at Murdoch University has significantly improved the bauxite refinement process by developing thermodynamically consistent models that can more efficiently remove organic impurities. In Australia, removing these organic impurities from mined bauxite is an ongoing challenge that results in lower

alumina yields and requires an energy-intensive refinement process at a cost of more than \$500 million per year. Researchers have developed models that can more accurately calculate the thermodynamic, chemical, and physical properties of 'liquors' produced throughout the refinement process.

The models developed by Murdoch University researchers have resulted in improved methods for processing and refining bauxite and alumina in Australia and have informed refinements in plant designs and control of impurities processing. These innovations enhance the energy efficiency and the quantity and quality of output from alumina refineries. Through the Solution Chemistry Group's research, Australian companies are able to remain globally competitive in their production of alumina for the world.



Bringing technology to people

Whether working with robots, sensor-enabled real or virtual environments, or artificial intelligence, the Human-Centred Technology Research Cluster (HCTRC) at the University of Canberra undertakes world-class research that places human users at the heart of technological innovations. Bringing together a multidisciplinary team that combines technical expertise with researchers in psychology, design, rehabilitation, sports, and healthy ageing, the HCTRC finds technology-based solutions for practical uses.

The research at HCTRC focuses on developing advanced technologies to solve societal challenges by augmenting human abilities and enhancing how we think, move, live, and work. Current HCTRC research is undertaking a collaborative project to develop collision-avoidance sensors on motorcycles to keep riders safe, as well as an industry partnership to evaluate the performance of a 'balance mat' that enables an accurate, accessible, and affordable falls-prevention assessment for at-risk groups. Other research has focused on how interactions between people and technology can be improved, including teaching computers to better understand the complexity of human emotions and how individuals interact or communicate with robots.

The HCTRC's research highlights how rapidly emerging digital technologies are becoming an opportunity to address productivity challenges in the Australian economy, as well as within the rehabilitation, health, and aged care sectors. The innovations developed within the HCTRC have created fit-for-purpose and effective solutions to everyday problems that improve the lives of thousands of Australians.



(Top) University of Canberra's Pepper robot, an advanced retail robot. (Middle and Bottom) Development of a balance mat for falls prevention.

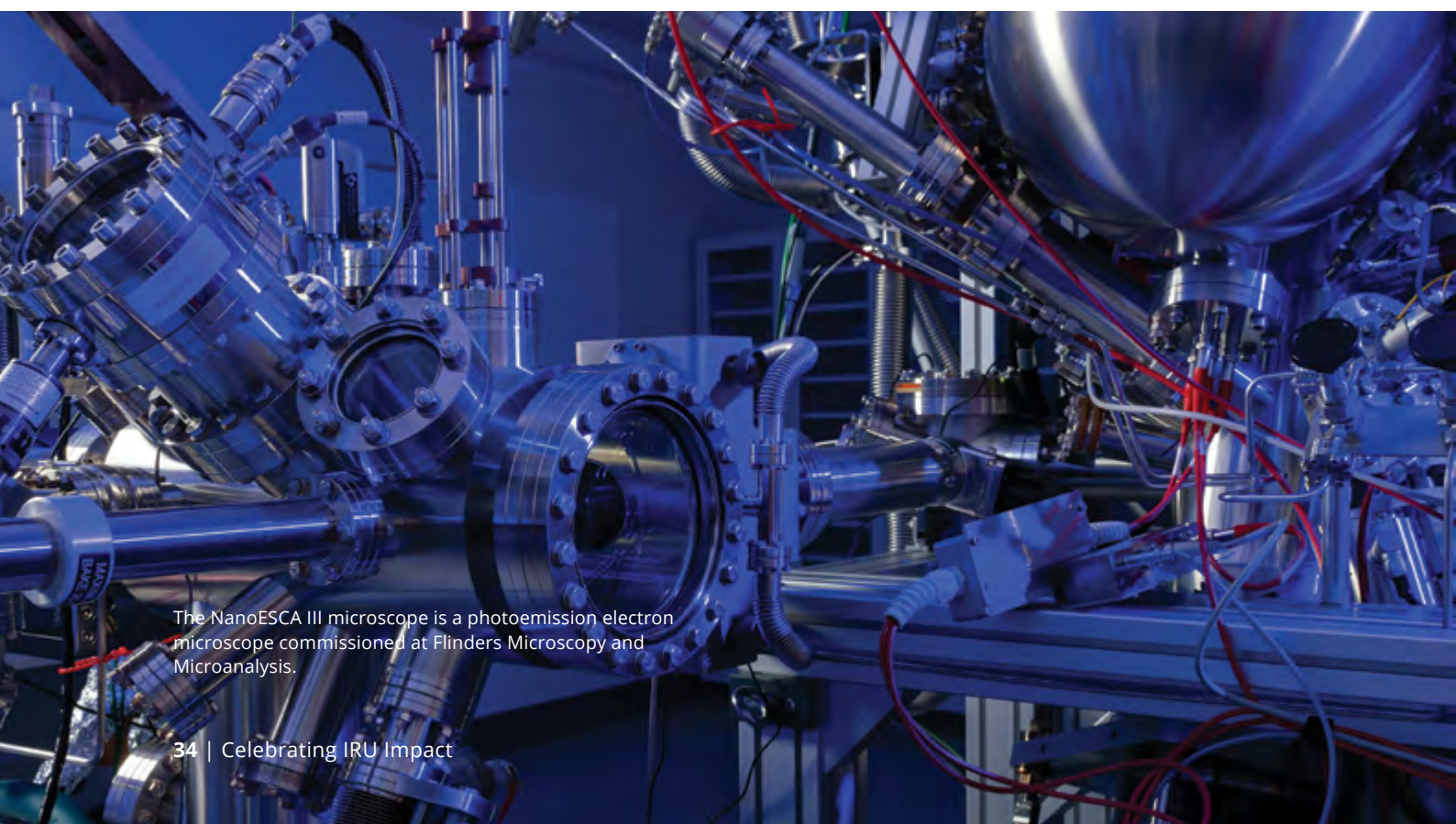
Advancing nanoscience for industry and research

The Institute for Nanoscale Science and Technology at Flinders University undertakes focused research and interdisciplinary collaborations to form new and useful materials that develop research-driven solutions for real-world problems. Working with materials at a molecular level, the Institute combines research expertise in chemistry, physics, biology, and materials science to connect with business and industry.

From its establishment, the Institute and its NanoConnect program has operated as a hub for researchers, innovators, and small to medium-sized enterprises to develop and commercialise ideas involving nanoscience and technology. Researchers have developed innovative materials for wide applications, including electronically-controlled shock absorbers for use in racing cars, as well as a new machinable ceramic material suitable for use in watch case parts.

More recent research has applied nanotechnology to the fields of water, energy, health, and security. This has included developments in alternative materials for plastic and rubber that are produced from waste, as well as refinements in carbon nanotubes that have wide applications for drug delivery, solar panels, and electronics. The NanoESCA III was recently commissioned as a 'super microscope' that can spatially map the surface structure, elemental and chemical composition, and electron-band structure of materials.

At the core of the Institute's work is the concept that multidisciplinary, nanotechnology-based research is essential to Australia's economic future. This broad research expertise in manipulating matter at the molecular level produces practical, commercial, and innovative solutions to the social and industrial challenges facing Australia now and in the future.



The NanoESCA III microscope is a photoemission electron microscope commissioned at Flinders Microscopy and Microanalysis.

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