

# Charles Sturt University Research Showcase

## Message from the Vice-Chancellor



At Charles Sturt University, we are guided by the Wiradjuri ethos of Yindyamarra Winhanganha, which means the wisdom of respectfully knowing how to live well in a world worth living in. It is a reminder that the work we do should uplift others, strengthen our communities and contribute to a better future for all.

As we near the end of the year, this edition of the Research Showcase celebrates the people behind our research – their ideas, their curiosity and their commitment to making a difference. The stories that follow highlight researchers working side by side with industry, community and partners to solve problems that matter and to expand knowledge in ways that benefit regional Australia and beyond.

This is a community that cares deeply about its purpose, and I hope you feel that spirit in every page.

**Professor Renée Leon PSM**  
Vice-Chancellor and President



## Message from the Deputy Vice-Chancellor (Research)

At Charles Sturt, our focus is clear – research translation that makes a difference to our regions and creates impact far beyond them. Our strength lies in connecting discovery with real-world application: ensuring that what we do in the lab, field and community translates into better practices, policies and outcomes for people, industries and the environment.

Research is about nurturing ideas, people and possibilities – creating an environment where innovation thrives, collaboration comes naturally and impact is intentional. Looking after research means looking after researchers: enabling creativity, supporting resilience and removing the barriers that limit potential.

Every day, I am inspired by what we can achieve when our people, ideas and purpose unite. Across our campuses and institutes, our researchers are tackling the challenges shaping our future – from climate-resilient agrifood systems and water security to digital transformation, regional health and inclusive communities. Together, we are building knowledge that sustains both people and the planet.

The [Digital Agrifood Summit 2025](#) was a powerful reflection of this mission in action – bringing together industry, producers, policymakers and researchers from across Australia and the world. It showed what’s possible when government, industry, academia and diplomacy work together to shape the future of our food systems. These borderless collaborations are where ideas turn into impact, where technology meets sustainability and where Charles Sturt’s regional innovation connects to global outcomes.

This edition of the Showcase celebrates that spirit – providing a glimpse into research that is purposeful, collaborative and deeply connected to our regions. To our partners across various dimensions, thank you for your engagement and support throughout 2025. We look forward to strengthening our partnership and creating new opportunities together in 2026.

Warm regards,

**Professor Neena Mitter**  
Deputy Vice-Chancellor (Research)

### In this edition

1	2	3	4	5	6	7	8
Message from the Deputy Vice-Chancellor (Research)	Charles Sturt continues to be a global leader in climate action, gender equality and sustainability	Innovating regional agriculture: Circular, digital, prosperous	Resilient ecosystems for regional futures	Educated, adaptive and inclusive regional communities	Cyber secure, innovative and connected regional communities	Health, safety and wellbeing in regional communities	Charles Sturt researchers leading the way



The [United Nations Sustainable Development Goals](#) (SDGs) provide a global blueprint for achieving a better and more sustainable future for all. Many of Charles Sturt University’s research projects align closely with these goals. In this issue of Research Showcase, we’ve highlighted the most relevant SDGs for each article, where applicable, to demonstrate how our research contributes to global priorities.



## Finding regional solutions to regional problems with global reach and impact

Research is, and will always be, vital to what we do at Charles Sturt. We aim to be the leading regional university known for solving real-world challenges in our targeted strategic investment areas by bringing together Western knowledge and Indigenous wisdom. Through strong and enduring partnerships with industry, government, local communities and international networks, we will meet the research needs of our communities.

## Charles Sturt continues to be a global leader in climate action, gender equality and sustainability

Charles Sturt continues to deliver strong outcomes in the Times Higher Education (THE) Impact Rankings, reflecting our commitment to sustainability and all its facets in our university strategy.

THE's Impact Rankings are the only global university rankings that measure progress towards the United Nations 17 Sustainable Development Goals. They evaluate our university programs and initiatives, including research, teaching and learning, partnerships and engagement, and facilities and operations.

Charles Sturt achieved impressive results within individual SDGs, including ranking:

- in the top 1 per cent for SDG 13: Climate Action
- in the top 4 per cent for SDG 5: Gender Equality
- in the top 6 per cent for SDG 10: Reduced Inequalities
- in the top 7 per cent for SDG 6: Clean Water and Sanitation
- in the top 9 per cent for SDG 15: Life on Land.

These results are particularly impressive given increasing competition and participation of global universities in the THE Impact Rankings.



Charles Sturt Research now has a dedicated [LinkedIn page](#). Follow us to stay up to date with the latest research and initiatives that deliver regional solutions with a global reach and impact.

## Innovating regional agriculture: Circular, digital, prosperous

Research that enables sustainable production

### New RNA technology supports safer, chemical-free crop protection

Researchers have taken a major step toward sustainable agriculture with new software enabling chemical-free crop protection. The tool addresses global challenges such as pesticide resistance, harmful residues and loss of efficacy.

Developed by Mr Stephen Fletcher and validated by Dr Chris Brosnan's team at The University of Queensland's Centre for Horticultural Science, dsRNAmax designs double-stranded RNA (dsRNA) molecules that precisely target pests and pathogens while avoiding beneficial species. The technology was co-created with Queensland Department of Primary Industries' nematology team under the ARC Hub for Sustainable Crop Protection, led by Charles Sturt University's Deputy Vice-Chancellor (Research), Professor Neena Mitter.

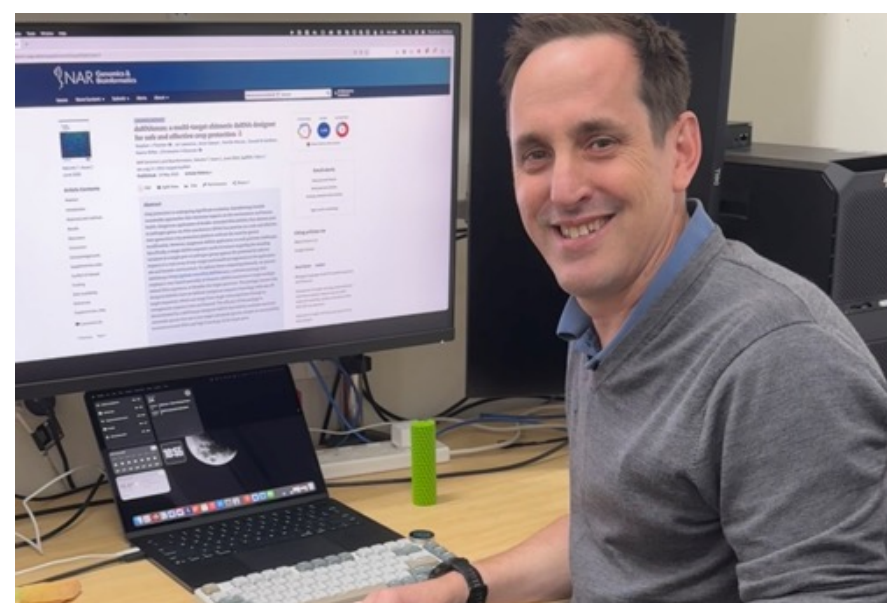
Now a Research Fellow at Charles Sturt's Gulbali Institute, Mr Fletcher said the intuitive software enables researchers to silence essential genes in viruses, insects, fungi and nematodes without modifying host plants.

"These biopesticides are far less toxic than traditional chemicals, offering an environmentally friendly and socially acceptable pest control option," he said.

Professor Mitter said the innovation bridges the gap between discovery and application, reducing off-target effects and strengthening social licence for biological pest control.

"The world needs technology like this to pave the way toward safer, sustainable, pesticide-free agriculture," she said.

The [research](#) was published in *NAR Genomics & Bioinformatics*.



Mr Stephen Fletcher, Gulbali Institute



#### Impact summary

Researchers have developed dsRNAmax, a powerful new software tool that enables precise, chemical-free crop protection by designing double-stranded RNA (dsRNA) molecules that target specific pests while sparing beneficial organisms. The innovation supports a global shift towards sustainable, pesticide-free agriculture, tackling challenges of chemical resistance, harmful residues and social acceptance.

#### Research problem

Conventional pesticides often lack precision, causing damage to non-target species and the environment. Excessive chemical use has also led to increasing pest resistance, bans on certain chemicals and declining public confidence. There is a need for targeted, environmentally friendly alternatives that can be broadly implemented without harming biodiversity or food supply systems.

#### Collaborators

Centre for Horticultural Science, Queensland Alliance for Agriculture and Food Innovation (QAAFI), The University of Queensland, Gulbali Institute, Charles Sturt University, Department of Primary Industries (DPI) Queensland – nematology team

#### Beneficiaries

- Farmers and producers gain access to safer, targeted and more sustainable pest control methods.
- Consumers benefit from reduced chemical residues in food and greater transparency.
- Researchers and bioinformaticians can now design dsRNA more efficiently.
- Environmental regulators and policymakers are provided with a viable pathway towards reducing chemical usage.
- Beneficial insect species and biodiversity are protected through decreased off-target exposure.

Charles Sturt University is working on establishing Australia's first Agricultural RNA Innovation & Manufacturing Hub (ARIM) in Wagga Wagga to position our region and the nation as a global leader in RNA-based agricultural solutions.

## Resilient ecosystems for regional futures

Research that contributes to carbon reduction through renewable energy innovation, sustainable use of biomass and natural capital, and the protection and restoration of freshwater, terrestrial and marine ecosystems

### \$7.94 million project to build drought resilience in viticulture and horticulture



Staff from the Gulbali Institute, Dr Ketema Zeleke, Dr Xinyi Zhang, Dr Jason Smith, Professor Leigh Schmidtke and Dr Joanne Ashnest, at the Charles Sturt University vineyard in Wagga Wagga

Charles Sturt University's Gulbali Institute has secured \$7.94 million to strengthen viticulture and horticulture resilience through the Department of Agriculture, Forestry and Fisheries' [Future Drought Fund](#).

The project, titled Adapting Temperate Viticulture and Horticulture to Seasonal Drought and Climate Volatility, aims to address the issue of drought risk in perennial cropping systems that have high reliance on rainfall and limited irrigation security.

The project team will design and test new agronomic practices to build economic and social drought resilience in Australia's cooler viticulture and horticultural regions.

[Read more.](#)



### Charles Sturt tackles frost losses in grains with new national projects



Dr Felicity Harris in the research plots in Wagga Wagga

Charles Sturt University is helping future-proof grain growers against frost through three new national projects funded by the Grains Research and Development Corporation.

Led by CSIRO with support from Charles Sturt and other national partners, the research aims to identify genetic solutions to frost damage. [Dr Felicity Harris](#) and [Dr Sergio Moroni](#) from the School of Agriculture, Environment and Veterinary Sciences and Gulbali Institute are leading field and lab evaluations at the Wagga Wagga campus, focusing on novel germplasm and frost simulation.

Frost currently costs southern Australian growers over \$360 million annually – an impact expected to worsen with climate change.

[Read more.](#)



## Resilient ecosystems for regional futures

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## Digital Agrifood Summit 2025: Immersive collaboration to secure Australia's agrifood future

Charles Sturt University's [Digital Agrifood Summit 2025](#) was convened at the Wagga Wagga campus during November under the theme Securing Australia's Agrifood Future. With immersive engagement at its core, the summit brought together producers, researchers, government leaders and industry influencers to address the challenges and opportunities shaping Australia's agrifood landscape.

The immersive programs were a defining feature, offering delegates hands-on exposure to real-world farming systems, research innovations and supply chain technologies. These sessions enabled direct dialogue with industry and researchers, while facilitating rare access to senior industry decision makers from across the agrifood and finance sectors including McDonald's, Woolworths, Mars, PepsiCo, Allied Pinnacle, Elders, Deloitte, NAB, research and development corporations (RDCs) and Rabobank. Their active participation underscored the summit's role as a national convening point for strategic collaboration.

Climate smart agriculture was a central theme, with discussions focused on adaptive technologies, regenerative practices and policy frameworks to build resilience in the face of climate volatility. Charles Sturt researchers and partners showcased initiatives that integrate climate responsiveness into production systems, reinforcing the university's leadership in future-focused agrifood research.

The summit also featured strong representation from Australia's leading RDCs, including Meat & Livestock Australia (MLA), Wine Australia, Hort Innovation, the Fisheries Research and Development Corporation (FRDC), and AgriFutures. Their presence highlighted the importance of coordinated investment and collaborative innovation across the agrifood value chain.

International insights were delivered by three Danish speakers, who shared Denmark's national approach to agrifood resilience and climate smart practice integration. The summit's influence extended to Canberra through the Global Voices event, connecting emerging leaders with policymakers and amplifying the national conversation on food security and global engagement.

Strategic outcomes included new collaborations, opportunities for research and strengthened government relations, particularly with the Department of Agriculture, Fisheries and Forestry (DAFF) and the NSW Government Department of Primary Industries and Regional Development (DPIRD). These connections are expected to drive future co-investment, policy development and research translation.

The Digital Agrifood Summit 2025 reaffirmed Charles Sturt's role as a catalyst for securing Australia's agrifood future where immersive learning, climate-smart innovation and cross-sector leadership converge.



# Resilient ecosystems for regional futures

Research that contributes to carbon reduction through renewable energy innovation, sustainable use of biomass and natural capital, and the protection and restoration of freshwater, terrestrial and marine ecosystems



## Resilient ecosystems for regional futures

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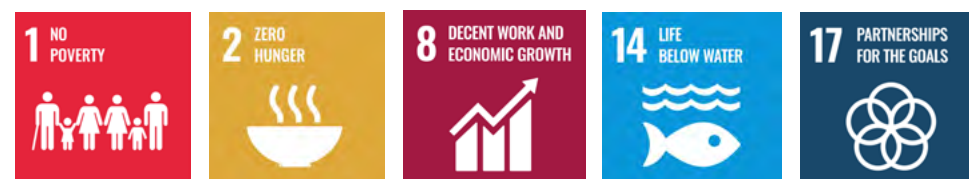
### The King, the Prime Minister and a fishway: Gulbali Institute project gains royal attention



A fisheries sustainability initiative led by the Gulbali Institute has captured national attention in Cambodia. During the National Ploughing Ceremony in June, the FishTech Cambodia project was presented to His Majesty King Norodom Sihamoni, Prime Minister HE Hun Manet, Minister for Agriculture, Forestry and Fisheries HE Dith Tina and other senior officials.

To communicate the science of fish migration and fishway technology, the Cambodian team developed a working model fish ladder using model railway components. This engaging educational tool enabled non-technical audiences, including government leaders, to gain a deeper understanding of the importance of sustainable fish passage.

FishTech Cambodia is part of a broader initiative titled FishTech: Integrating Technical Fisheries Solutions Into River Development Programs Across South-East Asia. The program is funded by the Australian Centre for International Agricultural Research (ACIAR).



#### Impact summary

The FishTech project supports regional food security, biodiversity conservation and sustainable livelihoods by promoting the design and adoption of fish-friendly infrastructure. It addresses both the technical challenges and institutional barriers to implementation, while fostering strong local partnerships, building capacity and influencing policy at both national and regional levels.

The project focuses on strengthening the capacity to conserve fisheries while securing long-term economic and environmental benefits.

#### Research problem

In South-East Asia, the rapid development of irrigation and hydropower infrastructure is severely impacting freshwater fish populations by blocking critical migration pathways. These migrations are essential for breeding, feeding and sustaining local fish stocks. At the same time, rice production – equally vital for regional food security – depends on flood control systems that unintentionally obstruct fish movement. There is an urgent need to reconcile these competing demands on river systems through sustainable, integrated solutions.

#### Collaborators

- Gulbali Institute
- Department of Foreign Affairs and Trade (DFAT)
- Australian Centre for International Agricultural Research (ACIAR)
- Inland Fisheries Research and Development Institute, Cambodia
- National Research and Innovation Agency, Indonesia
- Royal Thai Irrigation Department, Thailand
- National University of Laos

#### Beneficiaries

- Fishing communities across South-East Asia, whose livelihoods depend on seasonal fish migrations.
- Government agencies and planners, now better equipped to integrate fishways into infrastructure projects.
- Research institutions in Cambodia, Indonesia, Lao PDR and Australia, strengthened through long-term partnerships.
- Policymakers and donors, with evidence to support investment in sustainable infrastructure.

Funded by the Australian Centre for International Agricultural Research.

## Resilient ecosystems for regional futures

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Professor Cameron Clark  
Deputy Director, Gulbali Institute,  
Professor of Farming Systems

## Enhancing livestock nutrition and resilience through Napier grass management training in Bangladesh

Professor Cameron Clark from Charles Sturt University recently travelled to the Bangladesh Livestock Research Institute (BLRI) in Savar, Dhaka to deliver a targeted and evidence-driven training program. The training aimed to address a key constraint in Bangladesh's smallholder cattle production systems: the poor nutritional quality of Napier grass, which remains a staple feed for ruminants across the country.

This initiative, supported by the Crawford Fund and delivered in collaboration with Charles Sturt University, was designed to empower farmers, extension agents and researchers with practical, research-based tools for improving feed-based management. The training program was a direct outcome of an ongoing partnership between Charles Sturt and BLRI.

“Over the past year, collaborative research demonstrated that strategic adjustments in sowing density and harvest frequency could significantly improve both the crude protein and metabolisable energy levels of Napier grass,” said Professor Clark.

“These enhancements directly translate into better livestock growth, improved milk yields, and greater resilience to climatic shocks,” he said.

“Recognising the essential role that women play in livestock care, the training was also tailored to support inclusive participation and knowledge application at the household level,” said Professor Clark.

Held over five days, the program brought together 50 participants from across Bangladesh, including farmers, early-career researchers and livestock extension officers. Delivered bilingually in Bangla and English, the sessions provided a mix of classroom learning, field demonstrations and group discussion. Participants engaged directly with trial plots, observed growth variations under different management regimes, and practised techniques to assess plant quality and detect toxicities.

[Read more.](#)



### Impact summary

The project delivered practical, research-backed training to improve Napier grass management in Bangladesh, resulting in enhanced livestock nutrition, increased milk yield and greater resilience of smallholder farming systems to climate shocks. It strengthened local capacity through inclusive, hands-on learning and deepened international collaboration in sustainable agriculture.

### Research problem

Smallholder cattle producers in Bangladesh rely heavily on Napier grass as a feed source, but its low nutritional quality significantly limits livestock productivity and resilience. Poor feed base management contributes to undernourished cattle, reduced milk yields and economic vulnerability, especially under increasingly variable climatic conditions.

### Collaborators

- Charles Sturt University – Lead research and training design
- Bangladesh Livestock Research Institute (BLRI) – Local delivery partner and research collaborator
- The Crawford Fund – Project funder and supporter of capacity building
- Local farmers, extension agents and early-career researchers across Bangladesh

### Beneficiaries

- Smallholder cattle farmers in Bangladesh, particularly those with limited access to high-quality feed.
- Women in livestock roles, through targeted, inclusive engagement.
- Agricultural extension agents and early-career researchers, who now have practical tools to support farming communities.

Funded by the Crawford Fund.

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Dr Ivor Stuart  
Faculty of Science and Health  
Gulbali Institute

### Mapping fish migrations to revive our rivers

Regulating the Murray–Darling Basin fuels farming but has harmed native fish. ‘Environmental flows’ now help restore rivers, yet we still need to learn what flow patterns – when, where, how much and how often – best support fish recovery across the Basin.

Associate Professor of Fisheries Dr Ivor Stuart leads a Charles Sturt team to investigate native fish that migrate vast distances to spawn and grow in dispersed habitats and face barriers presented by river dams and channels which have changed water flow conditions.

The research focused on the golden perch, a medium-sized, long-lived and highly migratory fish once prevalent across the Basin but now only found in small, fragmented populations in unregulated rivers and streams.

Since 2020, the team have tracked where the perch spawn, hatch and grow as they have dispersed over 1,000 kilometres in the Darling and Murray rivers after major flooding.

Collaborating with NSW government agencies and funded by the Commonwealth government, they use larvae sampling and acoustic tracking to identify how juvenile golden perch have dispersed and what attracts them into the southern Basin.

This will show how future environmental flows could be best managed to support spawning and dispersal of young fish and recover native fish populations and rivers across the Basin.

[Read more.](#)



#### Impact summary

This research transformed the understanding of how environmental water management supports native fish recovery across the Murray–Darling Basin. By tracking the full life cycle and long-distance migrations of golden perch, the project revealed how seasonal flow events triggered spawning, dispersal and juvenile survival across thousands of kilometres of connected rivers. The findings informed multi-year water flow strategies by the NSW Government and the Commonwealth Environmental Water Holder, enhancing fish recruitment, ecosystem resilience and the long-term recovery of native species while maintaining water access for other users.

#### Research problem

The research explored how altered water flows caused by dams and weirs have disrupted the natural connectivity of rivers in the Murray–Darling Basin, leading to a decline in native fish populations. Specifically, it aimed to determine when, where and how much environmental water is required to support the spawning, dispersal and survival of migratory fish – particularly golden perch – across fragmented river systems.

#### Collaborators/countries

- NSW Department of Climate Change, Energy, the Environment and Water, Commonwealth Environmental Water Holder
- NSW Department of Primary Industries and Regional Development

#### Impact

Improved dispersal and resilience of native fish populations, and improved health of riverine ecosystems in the Murray–Darling Basin.

#### Beneficiaries

Fish populations and the natural environment, while still enabling water access for other users across the Basin.

Funded by the NSW Department of Climate Change, Energy, the Environment, and Water.

## Resilient ecosystems for regional futures

Research that contributes to carbon reduction through renewable energy innovation, sustainable use of biomass and natural capital, and the protection and restoration of freshwater, terrestrial and marine ecosystems



Professor Andrew Hall  
Faculty of Science and Health  
Gulbali Institute

## Using data from drought to improve environmental water flows in wetlands

The Murray–Darling Basin is Australia’s most regulated river system, with dams and diversions reducing seasonal flows and degrading globally significant wetlands.

Restoring these ecosystems relies on carefully planned releases of ‘environmental water,’ but with limited water available, decisions on when, where and how much to deliver must be carefully considered. A major barrier has been the lack of precise data on wetland extents and volumes, and connections between them.

Professor Andrew Hall, a senior researcher in geospatial science at the Gulbali Institute, has led innovative research to address this gap. Using data collected during the Millennium Drought, his team developed methods to map hundreds of wetlands with high accuracy.

By simulating the slow filling of wetlands as they would in a flood, they identified flooding limits, water volumes, and connections to surrounding channels and floodplains.

Checking against satellite images and vegetation patterns showed that this semi-automated, repeatable approach showed each wetland’s location, depth, capacity and connectivity in detail.

This research is directly informing water planning by the NSW Government, the Commonwealth Environmental Water Holder and other partners. It enables more targeted and efficient delivery of environmental flows, demonstrating how geospatial science can create cost-effective solutions to complex ecological challenges.

[Read more.](#)

### Impact summary

This research improved environmental water management across the Murray–Darling Basin by developing high-precision digital maps of wetlands and floodplains. Using LiDAR terrain data and advanced modelling, the project identified the size, depth and connectivity of hundreds of wetland systems, enabling water managers to determine how much water is needed to fill and connect them. The findings have directly informed long-term environmental water plans in New South Wales, supporting more efficient and targeted delivery of limited water resources to high-value wetland ecosystems and endangered species, while balancing the needs of other water users.

### Research problem

Environmental water in the Murray–Darling Basin is limited, making it essential to know where, when and how much water is needed to sustain wetlands and floodplains. However, the absence of detailed, large-scale maps showing the size, volume and connectivity of these intermittent water bodies made it difficult to plan and prioritise environmental flows effectively. This research set out to develop precise, scalable mapping methods to fill that critical knowledge gap.

### Collaborators

- Karunya Prasad, Deanna Duffy, Associate Professor Ana Horta, Professor Skye Wassens
- NSW Department of Climate Change, Energy, the Environment and Water

### Beneficiaries

The natural environment, while still enabling water access for other users across the Basin.

Funded by the NSW Department of Climate Change, Energy, the Environment, and Water.



## Educated, adaptive and inclusive regional communities

Research that builds community capability and reduces barriers to social, economic and political participation

### Pioneering gender equity in the Australian wine industry

The Australian grape and wine sector, a global leader in wine production, is not immune to the challenges of promoting equity and inclusion within its workforce. The importance of this issue is emphasised by the fact that women and gender diverse individuals, who are vital to vineyards, wineries, research and leadership, often encounter barriers to advancement, unequal working conditions and cultural obstacles that limit their full participation.

Recognising the need for change, Wine Australia and the Australian Grape & Wine Diversity, Equality and Inclusion in Wine (DEIW) Committee partnered with researchers from Charles Sturt University and the University of New South Wales (UNSW) to conduct a comprehensive study. Their work has produced the first resource of its kind – the [Australian Wine Industry Gender Equity Toolkit](#) – to assist businesses in moving beyond mere compliance towards genuine workplace equity.

The Australian Wine Industry Gender Equity Toolkit is now available online through industry organisations across Australia. By providing clear, practical solutions, it marks a significant step forward for the wine sector.

As the industry continues to expand globally, embracing gender equity is not only the right choice – it is also a smart strategy for building a stronger, more competitive future.

[Read more.](#)



#### Impact summary

This project advanced gender equity in the Australian wine industry through the *Gender Equity Toolkit* – a first-of-its-kind national resource developed with Wine Australia and the DEIW Committee. The toolkit provides practical strategies to build inclusive workplaces and strengthen the sector's diversity, innovation and global competitiveness.

#### Research problem

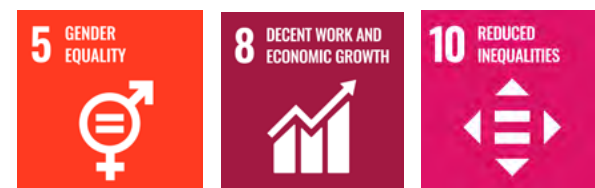
Women and gender diverse people are vital to the wine sector, but face unequal working conditions, limited career pathways and cultural obstacles. The challenge was to build a clear picture of gender equity in the industry and provide practical strategies that businesses could adopt, no matter their size or location.

#### Collaborators

- Charles Sturt University
- University of New South Wales, Canberra
- Wine Australia

#### Beneficiaries

- Businesses – from family vineyards to multinational companies, with tools to strengthen workplace culture and resilience.
- Employees – particularly women and gender diverse people, who gain fairer, safer and more supportive working environments.
- Industry bodies – through consistent standards and resources to lead systemic change.
- Consumers and society – benefiting from an industry that demonstrates leadership in diversity, equity and inclusion.



## Educated, adaptive and inclusive regional communities

Research that builds community capability and reduces barriers to social, economic and political participation

### Transforming global understanding of speech development: *The Oxford Handbook* launch

*The Oxford Handbook of Speech Development in Languages of the World*, edited by Charles Sturt University Distinguished Professor Sharynne McLeod, marks a major shift in global speech development research. Challenging English and Western-centric traditions, the Handbook honours diverse linguistic knowledge systems, including those that have never been translated into English. It gives equal status to First Nations, marginalised and dominant languages. Written by 173 scholars from around the world, the 1,008-page volume features 80 chapters covering 49 languages and 27 dialects, alongside companion audio recordings and a [Charles Sturt-hosted YouTube playlist](#) offering summaries of multilingual children's speech development in English and the language(s) of focus (e.g., Danish, Kurdish, Spanish, Slovak, Thai, Tok Pisin). Launched at the 2025 International Clinical Phonetics and Linguistics Association (ICPLA) Conference in Greece, the Handbook sets a new global benchmark in speech-language research, providing a consistent framework for cross-linguistic comparison and offering tools to help professionals support children's speech development and language preservation in culturally respectful ways.



#### Impact summary

*The Oxford Handbook of Speech Development in Languages of the World*, edited by Charles Sturt University Distinguished Professor Sharynne McLeod, represents a landmark contribution to inclusive, multilingual speech research. By decentring English and Western dominance in the field, the Handbook provides equitable recognition of Indigenous and traditionally marginalised languages. With more than 170 contributors from around the globe, it offers evidence-based tools and resources that are already informing practice across continents, enabling professionals to support children's speech development in their home languages.

#### Research problem

Traditional research on speech development has been largely grounded in English-language norms and Western-centric frameworks, limiting its relevance to multilingual and non-Western populations. This gap in representation has created barriers for researchers, educators and speech-language professionals working with linguistically diverse communities.

#### Collaborators

The project brought together 173 authors from across the globe, with significant contributions from Charles Sturt University.

#### Beneficiaries

- Speech-language pathologists and clinical practitioners worldwide.
- Children and families from linguistically diverse and marginalised backgrounds.
- Policymakers and international organisations (e.g., American Speech-Language-Hearing Association, International Consortium for Health Outcomes, World Health Organization) adopting inclusive assessment tools such as the [Intelligibility in Context Scale](#) created by the Charles Sturt team.
- Researchers and students in phonetics, linguistics and speech pathology.
- Communities working to maintain and revitalise Indigenous and minority languages.

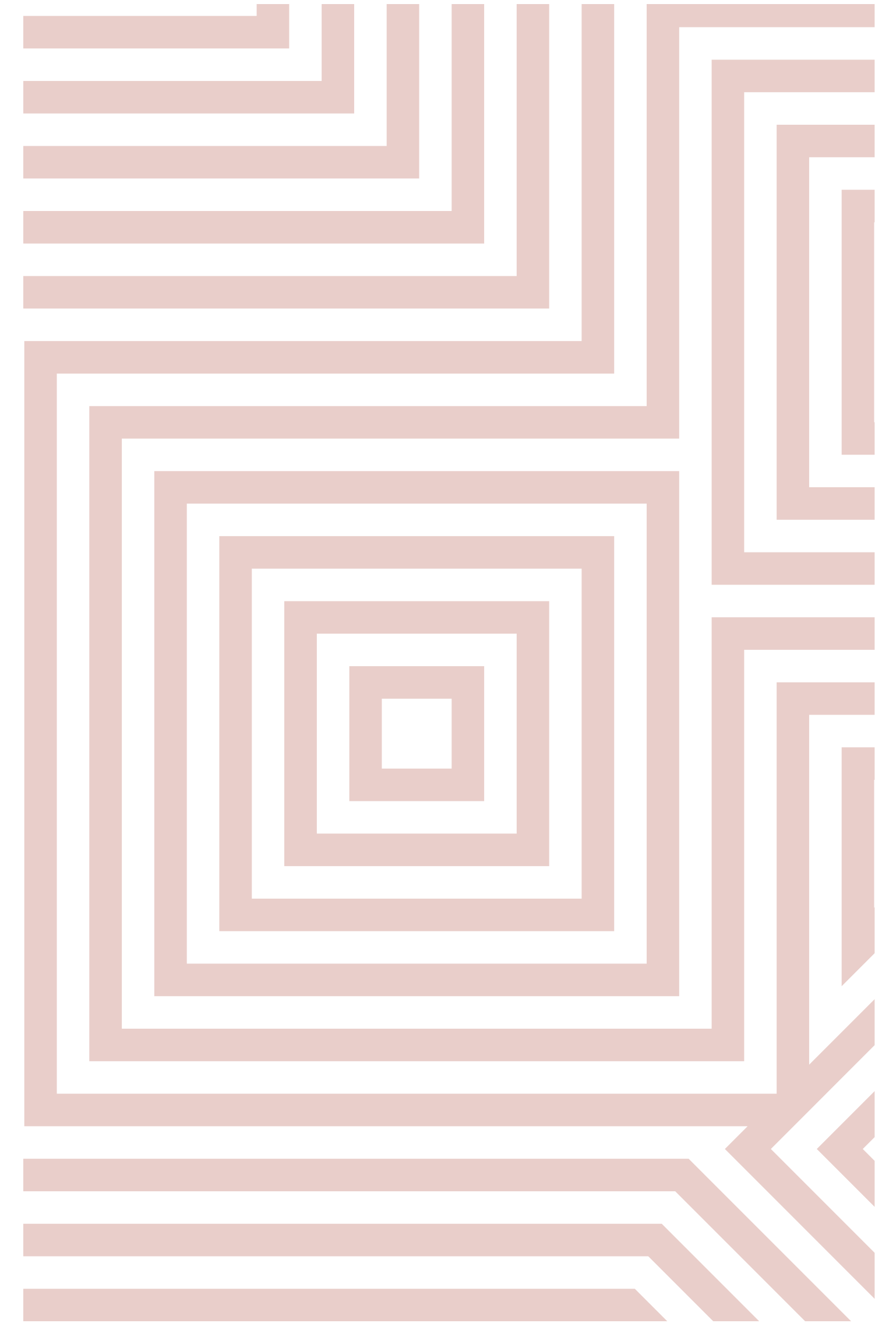
This publication is a powerful example of Charles Sturt University's global research leadership in inclusive education and health. It exemplifies how respectful, collaborative and community-driven scholarship can drive meaningful change.

# Educated, adaptive and inclusive regional communities

Research that builds community capability and reduces barriers to social, economic and political participation



**The Oxford Handbook of  
SPEECH  
DEVELOPMENT  
IN LANGUAGES OF THE WORLD**



## Educated, adaptive and inclusive regional communities

Research that builds community capability and reduces barriers to social, economic and political participation

### The 2025 Yindyamarra Fireside Oration delivered by Scott Stephens

The 2025 Yindyamarra Fireside Oration was held on Wednesday 9 July at the Place of Meeting, Australian Centre for Christianity and Culture, Charles Sturt University Canberra campus.

Guests gathered at 5:00pm for a 5:15pm start, with the oration concluding at 6:00pm, followed by a reception at the Chambers Pavilion. The event was held outdoors around the fire pit, with attendees braving the winter chill to be part of this special occasion. For those unable to attend in person, the oration was also available via live stream.

This year's orator was Scott Stephens, the ABC's Religion & Ethics online editor and co-host of *The Minefield* on ABC Radio National. A renowned writer and thinker, Scott has published extensively on moral philosophy, literature and democratic theory. He is the author (with Waleed Aly) of *Uncivil Wars: How Contempt is Corroding Democracy* and the editor of *Justice and Hope: Essays, Lectures and Other Writings* by Raimond Gaita.

In his thought-provoking address titled *On the beauty of decency*, Scott reflected on the increasing "indecentcy" of our public life – from coarseness in debate and politics to moral vanity disguised as seriousness. He contrasted this with a more profound understanding of morality, inspired by thinkers like Simone Weil, Iris Murdoch, Martin Buber and Albert Camus – one that begins not with ego or politics, but with the reality and dignity of the other.

He explored the quiet power of decency – not as a minimal obligation, but as a moral act that can uplift others while remaining humble and invisible. In Scott's words, decency "trains our vision, chastens our speech, and tempers our conduct," offering a way to reclaim what Camus called "the language of humanity".

The oration offered a timely and moving meditation on how we might resist cynicism and contempt – and instead recover a politics, a society and a self shaped by care, humility and human connection.

[Watch the Yindyamarra Fireside Oration.](#)



## Educated, adaptive and inclusive regional communities

Research that builds community capability and reduces barriers to social, economic and political participation



Dr Maree Martinussen  
Postdoctoral Research Fellow in  
Educational Equity



Distinguished Professor Sarah O'Shea  
Dean, Graduate Research

## HEERU launches national research initiative on trauma awareness in Australian universities

The Higher Education Equity Research Unit (HEERU) at Charles Sturt University is leading Australia's first national study examining trauma awareness amongst university staff who teach, supervise or support students.

Led by Distinguished Professor Sarah O'Shea and Dr Maree Martinussen, the national survey research addresses a critical gap in understanding how prepared universities are to respond to students with trauma.

With over one in four Australians experiencing complex trauma, universities need evidence-based approaches to support student success. While trauma can affect anyone, [students from equity backgrounds face higher prevalence rates and often navigate additional barriers](#), making it especially important that universities understand how to respond effectively to their needs.

### National survey launched

Building on this foundation, HEERU has launched its national survey – 'Trauma awareness in Australian higher education: A survey for university employees'. The study invites any employee of an Australian university who delivers, supervises or supports students to participate.

Critically, the research welcomes perspectives from staff with all levels of familiarity with trauma-informed practice, including those with little or no prior knowledge. This approach recognises that effective trauma-informed universities require understanding across the entire academic and professional staff community, rather than placing the burden solely on those already experiencing marginalisation.

### Real-world impact

Trauma can significantly impact students' university experiences, affecting memory, concentration and their ability to engage fully in academic life. Students from equity backgrounds face higher prevalence rates of trauma, yet current approaches to trauma-informed practice in higher education remain underdeveloped.

Without adequate understanding of how trauma intersects with educational experiences, universities risk implementing responses that fail to address the complex needs of their most vulnerable students. This research aims to establish what university staff currently know about trauma and identify the gaps that need addressing to create more responsive educational environments.

### Looking ahead

The survey findings will inform evidence-based recommendations for creating trauma-informed learning environments across Australian universities. This positions Charles Sturt as a leader in developing frameworks that support student success whilst recognising that if we want all students to thrive – not just survive – universities must be willing to do the hard, human work of institutional change.

Participate in the research: If you work at an Australian university and deliver, supervise or support students, [take the survey](#).



## Educated, adaptive and inclusive regional communities

Research that builds community capability and reduces barriers to social, economic and political participation

### Charles Sturt research shapes community-based disaster preparedness strategies

The newly published final report (Howard et al., 2025), titled *Resilient Villages: Action Research Project*, involved Associate Professor Valerie Ingham and Dr Lucia Wuersch from Charles Sturt University and researchers from the University of Sydney.

The research project was carried out over three years to assess the Resilient Villages Pilot Project, which supported disaster-prone communities in the Blue Mountains. It was a federally funded initiative, awarded to Mountains Community Resource Network, aiming to develop long-term, community-led strategies for disaster resilience instead of creating new programs that communities could not sustain after funding ended.

The research team worked closely with the Resilient Villages Team, made up of local community development workers, to support their planning and strategy for each participating village. The aim was to create Resilience Action Plans. Participating in various local events, such as the Megalong Valley Expos and Makers Markets in participating villages, built trustworthy connections, laying a foundation for potential future projects.

The research found that an integrated trauma-informed approach, coupled with community development and coordination with emergency management agencies, is essential for disaster resilience. The shift from traditional top-down strategies to more flexible, locally informed practices could guide local councils in their disaster preparedness and response initiatives.

The research was presented at the 9th Regulating for Decent Work Conference, organised by the International Labour Office, from 2 to 4 July 2025 in Geneva, Switzerland.

[Read the final Resilient Villages report.](#)



#### Impact summary

The Resilient Villages Action Research Project has established a practical, community-led framework for enhancing disaster resilience in vulnerable communities. It underscores the success of trauma-informed, locally driven methods and provides guidance for incorporating community voices into emergency planning and policy at local and regional levels.

#### Research problem

Traditional top-down disaster preparedness strategies often fail to consider the specific needs, trauma histories and social dynamics of local communities, especially in areas prone to cascading disasters. There is a need for sustainable, community-led approaches that promote long-term resilience and can be sustained beyond short-term government funding cycles.

#### Collaborators

Charles Sturt University, The University of Sydney, Mountains Community Resource Network (MCRN) – Project lead and community liaison and participating villages in the Blue Mountains

#### Beneficiaries

- Residents of the Blue Mountains, especially in villages at high risk of natural disasters.
- Local councils and emergency response planners adopting new policies and preparedness strategies.
- Community development workers and non-government organisations (NGOs) focusing on disaster resilience.
- National and international policymakers interested in adaptable, community-led disaster planning models.
- Scholars and practitioners in emergency management, labour studies and community resilience.

[Read the report.](#)

## Educated, adaptive and inclusive regional communities

Research that builds community capability and reduces barriers to social, economic and political participation

### Charles Sturt and Govind Ballabh Pant University launch dual PhD program

Charles Sturt University has partnered with Govind Ballabh Pant University of Agriculture and Technology (GBPUAT) in India to launch a new dual PhD program aimed at strengthening international research collaboration and agricultural innovation.

Under the agreement, candidates will undertake a single, integrated research project leading to the award of a Doctor of Philosophy (PhD) degree from both institutions.

The program will see candidates spend time onshore at GBPUAT and Charles Sturt, with joint supervision and examination processes ensuring academic excellence across both universities.

Deputy Vice-Chancellor (Research) at Charles Sturt, Professor Neena Mitter, said the partnership reflects the university's commitment to building global research networks that address shared challenges in food security, sustainability and rural development.

"This dual PhD program brings together Charles Sturt's strengths in applied agricultural research and GBPUAT's leadership in agricultural science to train the next generation of globally engaged researchers," Professor Mitter said.

The program will admit up to four PhD candidates annually.

Charles Sturt will provide tuition fee waivers and living stipends for candidates during their time in Australia, while GBPUAT will support candidates during their time in India.



Govind Ballabh Pant University of Agriculture and Technology's Professor Shiva Prasad, Director of International Affairs, and Professor Neena Mitter, Deputy Vice-Chancellor (Research)



## Cyber secure, innovative and connected regional communities

Linkage research across all domains that builds innovative and digitally connected communities free from the risk of cyber attack

### Cybersecurity and farmers – new website helps farmers to “shut the gate on cyber intruders”

A Charles Sturt-led initiative is helping Australian farmers protect their businesses from cyber threats. In collaboration with three other universities, researchers developed the [Farmers' Guide to Cybersecurity](#) – a free, practical, web-based resource specifically designed for the agriculture sector.

The guide includes training modules, fact sheets, videos and additional resources to help producers understand risks and enhance their cyber resilience.

The initiative is led by [Professor Mark Morrison](#) (Professor of Economics, Charles Sturt School of Business). This project is one work package within a larger research program called SCATES: Securing Critical Agriculture Technology and Emerging Solutions, which aims to enhance cybersecurity in the Australian Agricultural Sector, led by [Associate Professor Rafiqul Islam](#).

The project is funded by the [Cyber Security Cooperative Research Centre \(CRC\)](#), which is mainly funded by the Australian Government and various CRC partners including six Australian universities, the Australian Cyber Security Centre, the Australian Signals Directorate, the Australian Federal Police, CSIRO, the NSW Government, the Government of Western Australia and other organisations focused on supporting safe cyber security practices.

[Read more and access the guide.](#)



#### Impact summary

The Farmers' Guide to Cybersecurity project equips Australian farmers with practical, accessible tools to protect their businesses against cyber threats. Through a web-based resource hub, the initiative raises awareness, translates technical cybersecurity knowledge into everyday language and supports the adoption of safe digital practices across the agricultural sector.

#### Research problem

As Australian agriculture adopts more advanced digital and connected technologies, farm businesses have become increasingly vulnerable to cyberattacks. However, many producers are unaware of the risks or lack the knowledge and skills to manage them. There is a pressing need for accessible, farmer-friendly resources that make cybersecurity understandable and actionable.

#### Collaborators

Charles Sturt University – Lead institution, Adelaide University, Queensland University of Technology (QUT), Edith Cowan University, Cyber Security Cooperative Research Centre (CRC) (primary funder), Tata Consultancy Services, Quintessence Labs, CSIRO Data61, Cisco Systems Australia and state governments of Western Australia – Supporting partners, Producer groups and farming organisations – Dissemination partners.

#### Beneficiaries

- Australian farmers, especially small to medium producers.
- Rural communities and agribusinesses that rely on digital connectivity.
- Agricultural advisors, extension agents and producer groups.
- Supply chains and consumers, through reduced disruption risk.
- Cybersecurity educators and policymakers, by providing a tested outreach framework.

Funded by The Cyber Security Cooperative Research Centre.

## Health, safety and wellbeing in regional communities

Charles Sturt researchers are making new discoveries to ensure that all regional Australians lead dignified and rewarding lives



Dr Vivian Isaac  
School of Allied Health, Exercise and Sports Sciences  
Faculty of Science and Health

## New global study to define and measure psychological capacity in older adults

Researchers from Charles Sturt University, Flinders University and the University of Adelaide, in collaboration with the World Health Organization (WHO), will embark on a momentous multi-centre, international project to develop a scale to measure psychological capacity in older adults.

The project, From Deficit to Capacity in Healthy Ageing: Development and Validation of a Measure of Psychological Capacity in Older People, has been awarded a 2.5-year grant of \$1.22 million by Velux Stiftung, Switzerland.



### Impact summary

This pioneering research will contribute to global monitoring systems for healthy ageing by delivering the world's first single comprehensive measure of psychological capacity in later life that is fit for purpose and appropriate for a wider global community. The project will empower governments, health systems and aged care services to better support older adults by focusing on their capabilities rather than deficits.

### Research problem

As populations age worldwide, the challenge is not just longer life but ensuring those years are healthy and fulfilling. In 2015, the WHO introduced a framework for healthy ageing built on intrinsic capacity – the combination of mental and physical abilities. However, one of its key components, psychological capacity, remains poorly defined and unmeasured. This gap limits the effectiveness of policy, care planning and services that aim to promote healthy ageing.

### Collaborators

Charles Sturt University, Flinders University, The University of Adelaide, World Health Organization, Velux Stiftung.

### Beneficiaries

- Older adults across diverse global contexts.
- Health professionals and aged care providers.
- National and international policymakers.
- The World Health Organization and public health monitoring bodies.
- Researchers and educators in ageing and health sciences.

This transformative research underscores Charles Sturt University's commitment to leading health innovation that supports inclusive, empowered and healthy communities.

Funded by Velux Stiftung, Switzerland.

## Health, safety and wellbeing in regional communities

Charles Sturt researchers are making new discoveries to ensure that all regional Australians lead dignified and rewarding lives



Professor Julaine Allan

## Supporting families affected by substance use in rural Australia

Charles Sturt University led a first-of-its-kind study offering free support to family members and friends of people experiencing alcohol and other drug (AOD) use.

Delivered through the [Family Empowerment Program](#), the initiative is a collaboration between the Charles Sturt Rural Health Research Institute and trained, accredited clinical psychologists. It was the first program in Australia to deliver the Community Reinforcement and Family Training (CRAFT) model virtually – a proven, evidence-based therapy designed to help families navigate the challenges of AOD use.

Participants from rural and regional areas were offered six free one-hour sessions with a psychologist, mostly online, addressing a critical service gap in these communities.

Dr Julaine Allan, Professor of Rural Health (Mental Health and Addictions), said the program helped participants build communication, planning and problem-solving skills, improving their own wellbeing and ability to support loved ones.

“It also equipped participants with new strategies and a greater sense of control in managing difficult situations,” said Professor Allan.

“Their feedback is already shaping how we think about virtual care and structured support around substance use for rural families.”

Results indicate that participants developed stronger coping mechanisms, improved communication and reduced stress. However, many also called for better links between support services and treatment options for their loved ones, and highlighted the continued stigma surrounding substance use.

Funded by the Australian Government Department of Health and Aged Care, the study began in 2023 and concluded in June 2025. A podcast series has now been launched to share findings and real-life insights with families, practitioners and policymakers.

[Listen to the podcast on Acast.](#)



### Impact summary

The Family Empowerment Program provided structured, evidence-based psychological support to rural Australians affected by a loved one's AOD use. Delivered virtually, the program helped participants develop coping strategies, enhance communication and improve emotional resilience. The research team aims to shape future policy around virtual care for substance use and family support in rural and remote communities.

### Research problem

There is a critical lack of accessible support services for families and friends of individuals struggling with substance use in rural and remote Australia. These families often face additional barriers such as stigma, limited local services and geographic isolation.

### Beneficiaries

- Family members and close contacts of people with substance use issues, particularly in rural and remote areas.
- Mental health professionals seeking to use virtual models of care.
- Policymakers developing virtual support strategies.
- The broader rural health community impacted by substance use disorders.

## Health, safety and wellbeing in regional communities

Charles Sturt researchers are making new discoveries to ensure that all regional Australians lead dignified and rewarding lives



Dr Sharmin Aktar

## Cancer detection transformed through new 'molecular switch' technology

A Charles Sturt University researcher is helping reshape cancer diagnosis through a new low-cost testing method that could speed up access to treatment, especially in rural and resource-limited settings.

Dr Sharmin Aktar, Postdoctoral Research Fellow at the Charles Sturt Rural Health Research Institute, co-led two studies introducing a simple, highly sensitive platform – the PNA-LNA molecular switch – that detects key genetic mutations linked to colorectal cancer.

“Our goal was to create an accurate, affordable test that doesn’t require high-end lab equipment,” Dr Aktar said. “This technology could make cancer diagnostics more accessible for Australians and communities worldwide.”

Developed with Griffith University and supervised by [Distinguished Professor Muhammad Shiddiky](#), the platform identifies important mutations such as KRAS and BRAF, which guide clinicians in predicting tumour behaviour and selecting the most effective treatments. In a larger patient study, the team found the KRAS G12V mutation was associated with more advanced disease, providing valuable information for risk assessment.

The method shows exceptional sensitivity and 89 per cent agreement with next-generation sequencing while remaining low cost and adaptable for diagnosing other human, animal and plant diseases.

The findings are published in *Biosensors and Bioelectronics* and *Biochimica et Biophysica Acta – Molecular Basis of Disease*.

[Read more.](#)



### Impact summary

A low-cost, accurate diagnostic tool that improves early cancer detection and expands access to precision testing for rural, remote and under-resourced communities.

### Research problem

Current genetic testing for colorectal cancer relies on expensive, complex equipment, limiting access outside major centres.

### Collaborators

Charles Sturt Rural Health Research Institute, Griffith University.

### Beneficiaries

Patients, clinicians, rural communities and sectors that require adaptable diagnostic tools.

## Charles Sturt researchers leading the way

Charles Sturt has a range of advanced facilities that provide a unique environment for interdisciplinary collaboration and cutting-edge research and development to support and validate our research outcomes



Professor Amy MacDonald  
School of Education  
Faculty of Arts and Education

## Professor Amy MacDonald awarded prestigious ARC Future Fellowship

Charles Sturt University's Professor Amy MacDonald has been awarded a highly competitive Australian Research Council (ARC) Future Fellowship, securing \$1,264,129 for a ground-breaking project that aims to transform the way early mathematics is assessed in Australian classrooms.

The project, Meaningful Assessment in Early Mathematics, will develop a suite of drawing-based mathematical tasks for young children, aligned with the Australian Curriculum: Mathematics. These tasks will be supported by analysis tools and professional resources to help early years teachers elicit and assess a broad range of mathematical concepts in students from Foundation to Year 2.

By adopting a collaborative, design-based research methodology, the study seeks to create an innovative, evidence-based approach to early mathematics assessment. The outcomes are expected to provide new insights into children's mathematical experiences and understanding and to support the integration of meaningful, drawing-based assessment into everyday classroom practice.

Professor MacDonald's success highlights Charles Sturt's growing leadership in educational research and commitment to advancing impactful, real-world teaching practices.



## Honorary Doctorate for Distinguished Professor Sharynne McLeod

Distinguished Professor Sharynne McLeod was awarded an Honorary Doctorate by the [University of Patras](#) during the International Clinical Phonetics and Linguistics Association (ICPLA) Conference in Greece. The honour recognises her outstanding contributions to the field of speech and language therapy on a global scale.



## Charles Sturt researchers leading the way

Charles Sturt has a range of advanced facilities that provide a unique environment for interdisciplinary collaboration and cutting-edge research and development to support and validate our research outcomes

## ARC awards funding to two emerging research leaders



Dr Maree Martinussen  
Postdoctoral Research Fellow in  
Educational Equity



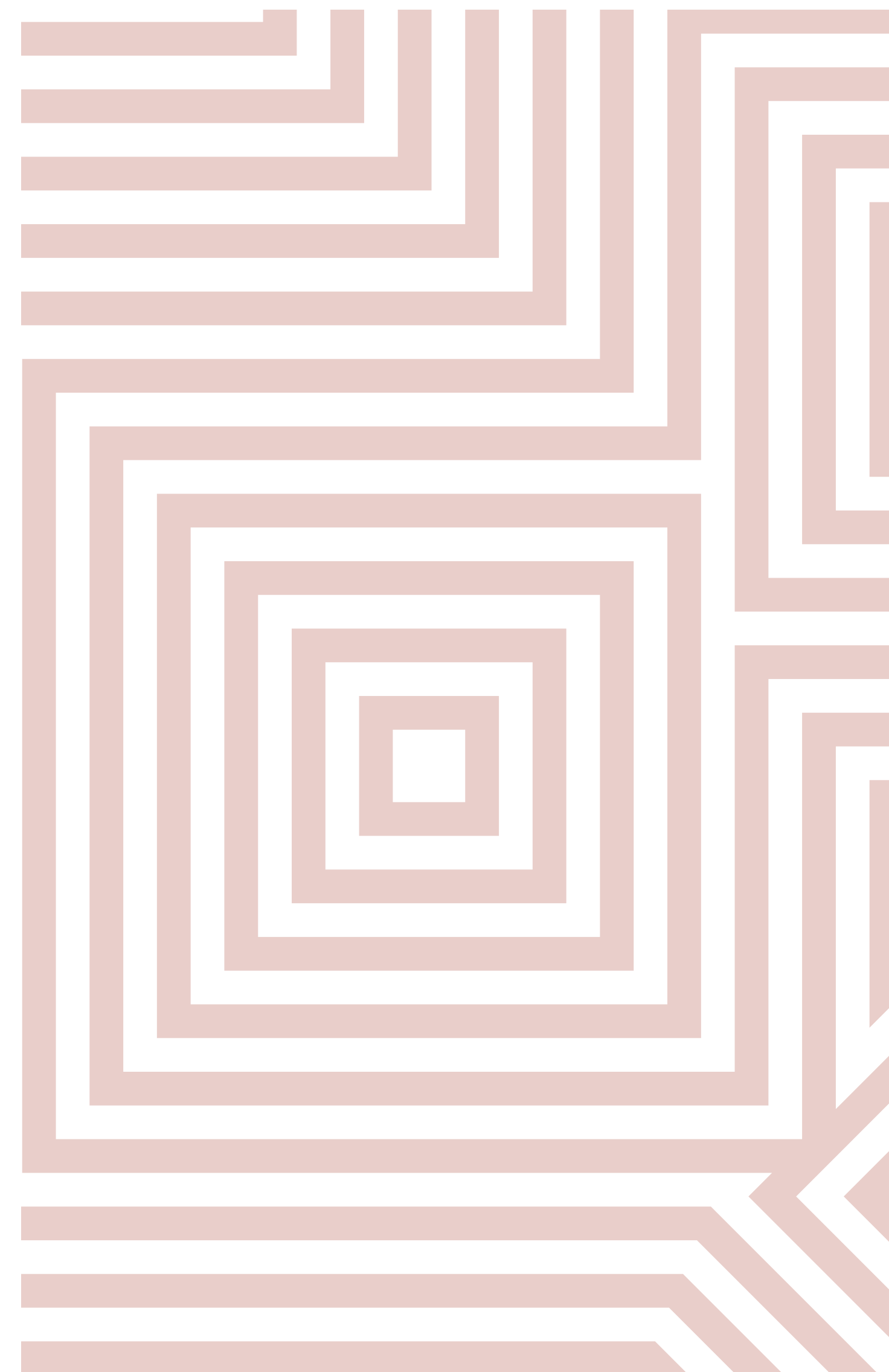
Dr Eamonn Wooster  
Postdoctoral Research Fellow  
Gulbali Institute

Two of Charles Sturt’s outstanding early-career researchers have secured competitive project funding through the Australian Research Council’s Discovery Early Career Researcher Award (DECRA) scheme. Congratulations to Dr Maree Martinussen from the Higher Education Equity Research Unit (HEERU) and Dr Eamonn Wooster from the Gulbali Institute on this remarkable achievement.

Their projects demonstrate the depth, capability and real-world impact of Charles Sturt research, each aligned with our mission to address pressing challenges facing regional communities.

- Dr Maree Martinussen will investigate how universities can better support students who have experienced trauma, with the goal of reducing social class inequalities and fostering more inclusive learning environments.
- Dr Eamonn Wooster will explore how animal intelligence can help restore threatened mammal populations, identifying the cognitive traits that enhance survival in predator-rich environments and addressing Australia’s escalating extinction crisis.

These prestigious awards recognise not only the excellence of Dr Martinussen’s and Dr Wooster’s research, but also the strength of Charles Sturt’s research culture and the supportive mentorship that underpins it. We wish them every success as they advance their projects and continue to grow as the next generation of research leaders.



## Charles Sturt researchers leading the way

Charles Sturt has a range of advanced facilities that provide a unique environment for interdisciplinary collaboration and cutting-edge research and development to support and validate our research outcomes

## Celebrating international recognition for Professor Lihong Zheng at the 2025 Asian Innovation Excellence Awards

Charles Sturt University is proud to congratulate Professor Lihong Zheng, who has been internationally recognised at the Asian Innovation Excellence Awards 2025. Under her leadership, the Data Science & Engineering Research Unit (DSERU) received the award for Australia Learning & Development Innovation of the Year – Education, acknowledging DSERU's outstanding contribution to research translation, sustainability and digital innovation.

Held at Marina Bay Sands in Singapore, the awards celebrated organisations across the Asia-Pacific region delivering measurable impact through innovative research and technology.

Professor Zheng's leadership has positioned DSERU as a hub for applied data science, using artificial intelligence and digital technologies to address challenges in agriculture, health and education. Her team's pioneering platforms – including SCATES for cybersecurity and TRAKKA for environmental monitoring – along with collaborative projects in water governance, regional planning and digital transformation, are generating real benefits for communities and industry partners.

This international recognition underscores Professor Zheng's outstanding contribution to data-driven innovation and the expanding impact of Charles Sturt researchers in shaping the future of applied science in Australia and beyond.



(Left to right) Mr Simon Hyett, Contributing Editor of the Asian Business Review magazine, with Charles Sturt's Professor Lihong Zheng, Professor Graham Brown and Professor Anna Shillabeer



## Join us in shaping the future of regional NSW

We extend a clarion call for research excellence – a call to academics, government, industry, community partners and philanthropists to collaborate with us in reimagining a vibrant, resilient and prosperous future for regional NSW.

At Charles Sturt University, our research tackles real-world challenges – from sustainable agriculture and climate resilience to rural health and digital transformation.

But we can't do it alone.

Partner with us. Invest in bold ideas. Support regional innovation.

Together, we can create lasting impact – from the regions, for the world.

Every gift, large or small, helps shape and enhance the Charles Sturt community. We thank our generous supporters and invite you to consider investing in [Research at Charles Sturt University](#).

To explore partnerships or learn more, visit the [Advancement Office](#).