



Australian
National
University

Agrifood
Innovation
Institute

2024

HIGHLIGHTS

ACKNOWLEDGEMENT

The Australian National University (ANU) acknowledges, celebrates and pays our respects to the Ngunnawal and Ngambri people of the Canberra region and to all First Nations peoples of Australia on whose traditional lands we meet and work, and whose cultures are among the oldest continuing cultures in human history.

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ABOUT US



2024 marks the first year of the Agrifood Innovation Institute (AFII). Formerly known as the Centre for Entrepreneurial Agri-Technology, AFII aims to accelerate transformative innovation to future-proof the Australian agrifood system by connecting ANU with industry, government agencies, non-governmental organisations and entrepreneurs.

By connecting the agrifood sector with the University's significant research capability and infrastructure, we enable our world-class researchers to collaborate on projects which tackle complex agrifood challenges.

We build interdisciplinary teams, harnessing the University's research excellence in science, technology, engineering and mathematics, as well as the humanities, arts and social sciences. In doing so, we help to translate research into real-world impact, while helping to build the capability industry needs for the future through education and training programs.

We operate a vibrant Agrifood Hub, which is home to a community of innovative and award-winning businesses with global reach. This provides a connection point between the University and Canberra's thriving innovation community.

This report provides a snapshot of the ANU Agrifood Innovation Institute, showcasing a selection of initiatives that address the Institute's strategic goals, which are:

- 1. Connection:** Develop and harness the diverse knowledge, expertise and infrastructure of the University to build communities that transform agrifood systems for a more sustainable future
- 2. Collaboration:** Build interdisciplinary and transdisciplinary projects that attract external funding to address complex agrifood challenges
- 3. Capability:** Develop and support skills and capacity of students, researchers and innovators to provide a future-ready agrifood workforce
- 4. Innovation:** Promote cultural change and process innovation at the University to accelerate agrifood research translation and commercialisation.



[Visit our website](#)

FROM THE CHAIR

I continue to be energised by the talent, ingenuity and commitment of the researchers, students and businesses in the AFII community.

As the national university, with world-class researchers across a range of areas relevant to agriculture, ANU is a reservoir of talent and deep technical expertise.

ANU is not an agricultural university – and that’s its strength. This is important, because the challenges facing agriculture require a broader perspective, from experts with diverse skills including in engineering, computer science, law, policy and regulation.

That’s where ANU, through AFII, works with the agrifood sector to tackle complex, long-term and interdisciplinary challenges.

In 2024, this meant working with our industry partners on projects in climate change, future crops, bioeconomy, agri-energy and remote sensing. But there’s more to do, and in 2025 we are taking steps to support the bigger and more ambitious change Australian agriculture needs to thrive.

I extend my deep appreciation to members of the AFII board. We demonstrate the power of interdisciplinary capability by combining STEM and HASS expertise, with board members from academia, agribusiness and technology commercialisation. Our deliberations are deep, strategic and future-focused, and I thank the board for their willingness to contribute to AFII’s success.

I am deeply grateful to the talented and committed AFII team, led by Professor Owen Atkin, who go above and beyond in their commitment to the Institute, its member businesses and stakeholders.

The year ahead is shaping up to be our best yet, as we continue on our mission to translate fundamental research to build a more resilient food and fibre system.



Victoria Taylor

Chair, Agrifood Innovation Institute Board

[Follow Victoria on LinkedIn](#)



FROM THE DIRECTOR

It gives me great pride to reflect on what AFII and the wider ANU community achieved in 2024.

With the challenges facing agriculture ever-present, now more than ever, universities have a responsibility to work with industry and government to tackle the complex, and in many ways existential, threats to our agrifood systems.

In Australia, the current policy and financial environment presents both a challenge and an opportunity for universities. We must prove the value and impact of our research by continuing to invest in initiatives that proactively leverage our fundamental research capabilities to deal with complex societal, environmental and industrial challenges.

This is where AFII has been making critical connections, supporting multidisciplinary teams of world-class researchers from ANU to deliver solutions to some of the more intractable problems in the agrifood sector.

I have been particularly pleased by the progress AFII's Strategic Investment Program has made in attracting researchers from across ANU to bring their diverse intellect and expertise to tackle industry challenges. In 2024 alone, AFII awarded support to projects across four ANU colleges for research projects on topics including using value chain modelling to improve the sustainability of dairy and beef production systems, harnessing analytics to drive the grains sector's profitability and global competitiveness, uncovering effects of Indigenous cultural burning on soil and native plants for cattle grazing improvements, and identifying barriers and opportunities in repurposing waste streams from bioengineered processes.

Alongside this, we have supported ANU researchers and students to work with their peers at CSIRO on high-impact industry projects relating to harvesting valuable nutrient resources from wastewater and using remote sensing to provide farmers with better data on land surface temperatures and soil moisture.

Looking forward, we remain focused on building on our successes in developing and supporting multidisciplinary projects to meet the agrifood sector's need for interdisciplinary collaboration in projects that integrate diverse disciplines, knowledge and techniques to solve complex problems beyond the scope of a single discipline.

A sincere thank you to everyone who contributed to the success of AFII in 2024. To our Board, who have given so generously of their time and insights, ANU staff and students who have brought an admirable level of energy, enthusiasm and expertise to projects, our Hub members, whose success is inspiring, our industry partners and the wider Canberra innovation community, thank you.

We look forward to continuing to connect, collaborate and innovate with you in 2025.

Professor Owen Atkin
Director, Agrifood Innovation Institute

[Follow Owen on LinkedIn](#)

Strategic Investment Program

A BETTER WAY TO TREAT PARASITES IN LIVESTOCK



Professor Alex Maier never imagined himself working in agriculture.

An award-winning molecular parasitologist, most of Professor Maier’s work to date has focused on parasitic diseases affecting people.

But funding and support he’s received through AFII’s Strategic Investment Program (SIP) has enabled the malaria researcher to translate his knowledge and experience to tackle parasites which affect livestock.

The SIP offers funding and support to ANU researchers for projects focused on solving agricultural challenges.

“We have devised a platform that allows us to deliver anti-parasitic drugs more efficiently into parasites using cholesterol molecules both as a delivery mechanism and a Trojan horse,” Professor Maier says.

“By administering the drugs this way we can use a lower dose, making it cheaper and more effective, and less toxic for the animal.”

The prevention, treatment and knock-on effects of parasitic infections in animals costs Australian agriculture hundreds of millions of dollars each year.

While there are a number of drugs which are efficient, effective against many parasites and have low toxicity, a heavy reliance on their use has led to a level of drug resistance.

And concerns about this drug resistance extend beyond agriculture.

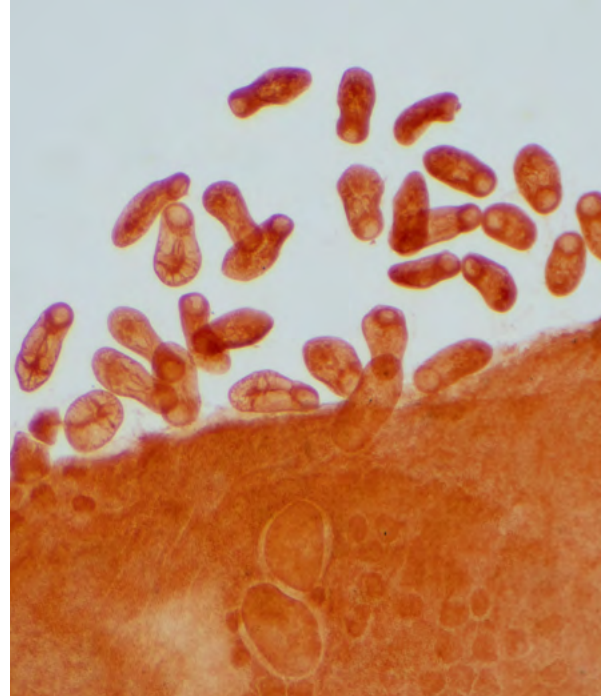


“For treating parasites, we use the same drugs for animals and people. Once a parasite becomes resistant to a drug in animals, it’s only a matter of time before this resistance appears in humans,” he says.

Each parasite that Professor Maier and his team can deliver a solution for could potentially save the industry billions of dollars.

Over the course of the project, the team has developed a platform technology which can be used to deliver different types of anti-parasitic medication for different animals including pigs, sheep and cattle.

As well as solving a significant agricultural challenge, Professor Maier says working on the project has changed the way he approaches his other research.



“While I’ve always been quite focused on the application of my research, this work has made me more focused in other projects. It’s also made me more open to exploring ideas,” he says.

“I would encourage everyone who just remotely thinks about going down the path of industry-focused research to have a conversation with AFII.

“The Strategic Investment Program is outcome-driven and is focused on getting the best out of each project. It’s not just funding, it’s support for taking something from research to industry application.”

Funding to progress this technology further remains a challenge, but by working with AFII, Professor Maier is hopeful he and his team can soon take the next step to conducting trials of the technology in live animals.



In 2024 AFII awarded \$101,480 to six projects across ANU focused on a wide range of issues facing Australian agriculture including investigating the impact of Indigenous cultural burning on the productivity of cattle grazing; the circular economy challenges of ag biotech; multidisciplinary analytics for the grains industry; and optimising yeast strains for efficient production of animal-free dairy proteins.

Agrifood Collaboration Program

ANU AND CSIRO COMBINE FORCES TO HARVEST CRITICAL NUTRIENTS FROM WASTEWATER

The way plants extract nutrients and adapt to the presence of toxic molecules in soil is the inspiration behind a project which could have far-reaching benefits for industries including fish farming, municipal wastewater management and mining.

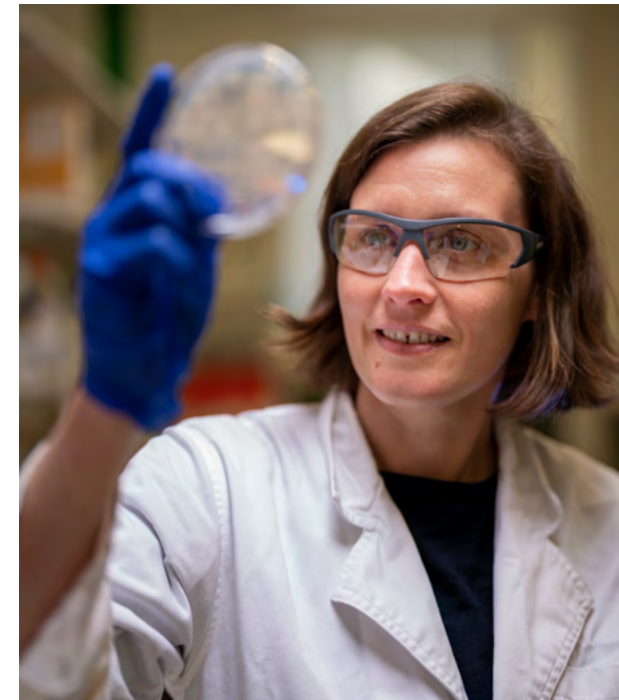
A team of researchers from ANU and Australia's national science agency, CSIRO, is working to develop technology that harvests valuable nutrient resources from wastewater with support from the ANU-CSIRO Agrifood Collaboration Program which is administered by AFII.

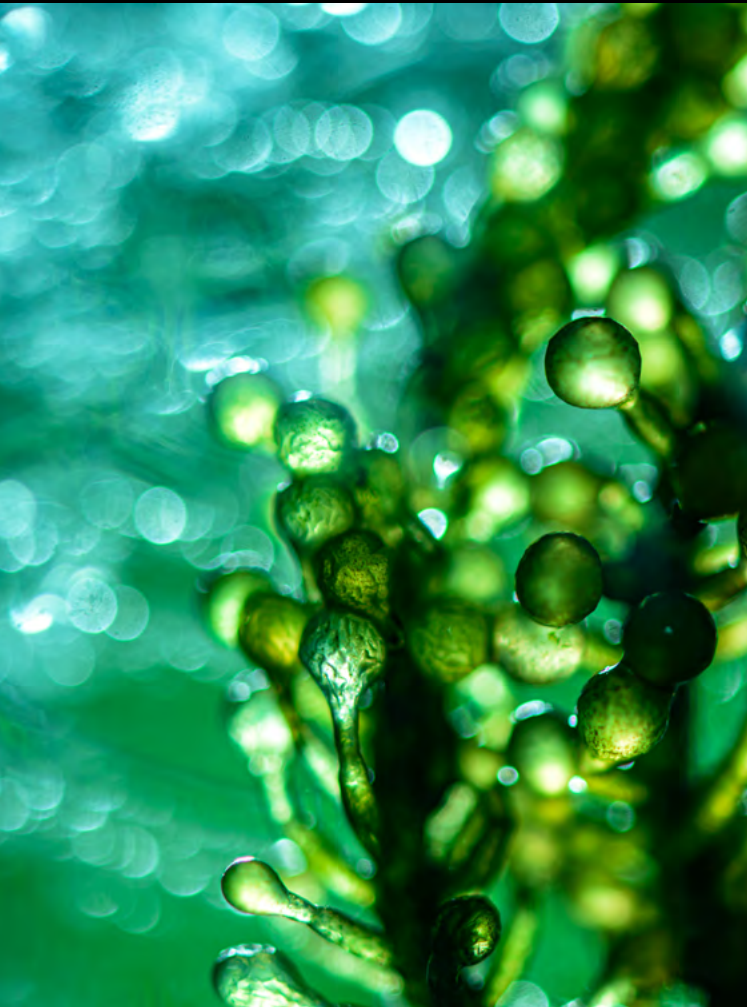
The program enables cross-institutional multi-disciplinary research to build a project that leverages the participants' diverse skills to fast-track a solution to an industry challenge.

The team brings together ANU plant biologists with CSIRO circular economy experts and membrane technologists to develop a plant-inspired innovative technology that will enable the reclamation of nutrients such as ammonia from industrial wastewater so that this resource can then be used as a safe and economically viable circular fertiliser.

The project is addressing a growing need to secure reliable access to clean water and essential nutrients – including nitrogen, phosphorous and potassium – to sustain and grow Australia's agrifood sector in the face of climate change and geopolitical challenges.

ANU plant scientist Professor Caitlin Byrt says there is demand across a range of industries for this technology.





“We’ve been working closely with aquaculture industry colleagues in Tasmania and municipal wastewater authorities to understand the challenges they face and how we can tailor a solution for them,” Professor Byrt says.

“These industries and services have to manage extraordinary volumes of liquid that are incredibly nutrient rich, and any expansion of their operations will require implementation of ways to manage additional wastewater.

“The technology we are developing takes inspiration from the membrane separation mechanisms which evolved in nature to achieve selective separation of valuable nutrients, elements and water from complex liquid wastes.”

As well as addressing a critical industry challenge, Professor Byrt says the project is personally and professionally rewarding.

“This project is a great opportunity to take fundamental research from both institutions and apply it to meet a critical industry need,” she says.

“I’ve found working with a team of people whose expertise and experience is different to mine has opened my eyes to other ways of working and brought a greater creativity to everything I do.

“While there have been challenges along the way, this is a superb learning experience, and we need to find ways of supporting more projects like this in Australia because these multi-institutional and multi-disciplinary opportunities are far too rare.”

You can learn more about the project in the Australian Water Association’s [Water e-Journal](#).

This project is funded through a joint investment by ANU and CSIRO as part of a renewed push to combine their world-leading expertise and resources to solve some of the challenges facing the world today and into the future.

Its success so far provides a model for future interdisciplinary projects which harness the strengths of researchers from both institutions in a way that delivers better outcomes for industry.



Digital Agriculture Scholarship

SATELLITE DATA IMPROVES PRODUCTIVITY AND ENVIRONMENTAL OUTCOMES ON FARM

As the world's climate changes, there is a growing need to equip farmers with the tools and technology to more effectively manage their land.

Supported by a Digital Agriculture Supplementary Scholarship, which AFII administers, Fenner School of Environment and Society PhD Yi Yu conducted research investigating the synergetic use of multi-platform remote sensing to better characterise agricultural drought through the analysis of land surface temperature and soil moisture.

The CSIRO-funded supplementary scholarship supports ANU PhD students to conduct research in the field of information science

relevant to agriculture as part of a collaborative ANU-CSIRO project.

The scholarship is one way that AFII works to build research expertise across disciplines, and along the research translation pathway through industry engagement.

Yi says having access to researchers and infrastructure from both institutions was hugely beneficial and helped him to “think differently” about how he approached his research.

“Working with ANU and CSIRO gave me access to different perspectives – both deep technical expertise and practical advice on engaging with industry,” Yi says.

“Here at ANU, I worked with experienced researchers from earth and environmental sciences.

“At CSIRO I had access to their computational infrastructure, including their supercomputer, which made our continental-scale simulations possible. That was really cool.”

Remote sensing techniques involve sending signals from satellites to the ground which then reflect, providing unique opportunities to analyse the level of soil moisture and land surface temperature. They provide data over a larger surface area than traditional in-situ measurements, which typically use fixed probes and flux towers.

Yi’s research was about exploring methods to improve the resolution and accuracy of soil moisture and land surface temperature measurements made by remote sensing, over large areas of land. This information could be used by farmers in a number of ways, including to optimise irrigation and fertiliser application,

enhance crop productivity and improve environmental outcomes.

Having finished his PhD at ANU, Yi will continue his agricultural research as a postdoc at the University of Sydney but hopes to continue to collaborate with ANU and CSIRO.

“I have secured an industry-focused postdoc position in the Precision Agriculture Lab at the University of Sydney, jointly funded by the GRDC and NSW DPI,” he says.

“It will allow me to continue with some of the remote sensing research I did in my PhD, but is more industry-aligned, with a focus on farm-level optimal water management and translation of sciences into real-world cases.”

To be sustainable into the future the agricultural sector will increasingly require people with the skills to provide technology-driven solutions to some of the complex challenges facing the industry. To date, the Digital Agriculture Supplementary Scholarship program has supported nine ANU PhD scholars with a total of \$240,000 funding. In addition to this, one PhD scholar will begin their research in 2025 with the support of a full scholarship and a top up, worth \$51,000 a year.



Crawford School policy project

ANU STUDENTS MAKE THE CASE FOR CLEAR REGULATION OF BIOSTIMULANTS

What is a biostimulant? Whether you're a plant scientist, producer, chemical company or regulator you might have a view on the answer to this question. The problem facing the Australian agrifood industry is that there's no one agreed definition of what a biostimulant is, and therefore it's impossible to regulate their use.

AFII Deputy Director Alison Bentley says the lack of clarity around the definition and rules for the use of biostimulants in arable cropping is a significant barrier to their adoption and use in Australia.

"There are many benefits for Australian agriculture in the large-scale adoption of biostimulants by farmers, including improved productivity and a reduction in the use of chemicals on food crops," Associate Professor Bentley says.

"At the moment it is tricky for companies to sell biostimulant products in Australia without the certainty of clear regulation, meaning there is not the same range of products here that you can get overseas."

In light of this, Associate Professor Bentley engaged a team of Masters students from the Crawford School of Public Policy to investigate global regulation of biostimulants and how this could be applied in an Australian context.





The students, who had background experience in agriculture, brought their policy skills to the project, which allowed them to apply their knowledge to a real-world problem.

At the end of the project the students produced a report which drew on case studies from Europe and North America to propose a definition for biostimulants in the Australian context. It also included recommendations for the introduction of a governance framework around the sale and use of biostimulants for Australian arable cropping.

While conventional chemical labelling focuses on a product's ingredients, given the wide range

of substances which can achieve a biostimulant effect, the students recommended labelling based on what a product does.

Associate Professor Bentley says the project was valuable for AFII and the students and could provide an important piece of the puzzle for industry looking to make the case for government action in this space.

“An important part of the project was facilitating connections between the Crawford policy team and key industry players. It helped the students to understand the nuances of issues facing agriculture and produce realistic recommendations,” she says.

“For Australian agriculture to continue to grow and thrive we need bright policy minds from places like the ANU Crawford School.”

Industry-focused projects harness the diverse knowledge and expertise of ANU students and researchers for the benefit of the agrifood sector. By providing opportunities for students to gain real-world experience working on challenges facing the sector, AFII is helping to build a future-ready workforce.

Agrifood Hub member

THE CANBERRA START-UP PREVENTING SPOILT MILK



The dairy industry is worth close to one trillion dollars globally, providing 12 per cent of human dietary protein, half of human dietary calcium and containing many other key nutrients.

But with \$150 billion worth of dairy wasted each year before it gets to the consumer its contribution to greenhouse gas emissions is unnecessarily high – a plight Canberra business PPB Technology says is largely avoidable with a technology it has developed and manufactured right here in Australia.

PPB Technology founder Stephen Trowell says the business' technology was initially developed to address the rare, but catastrophic, problem of mass spoilage of UHT milk, but they've since adapted their test to address a much more common problem.

“The more subtle and insidious problem for dairy producers is the erosion of shelf life,” Stephen says.



“In some cases, overseas producers are struggling to get two months of shelf life for their UHT milk and the product is going off before it even hits the shelves.

“The reason for this is the presence of something called biofilms – where bacteria bind to surfaces of equipment in the milk supply chain and become resistant to normal methods of cleaning.

“When biofilms are present in the supply chain they erode the shelf life of milk in a way that will not show up using traditional methods of testing.

“Our new AprX test reveals the presence of biofilms, enabling producers to rectify the problem at the source, avoiding wastage and saving money.”

The test enables producers to conduct testing themselves and produce laboratory quality results within minutes.

An Agrifood Hub member since 2019, PPB Technology had a breakthrough year in 2024 with its first sale of its CYBERTONGUE device into Europe, winning an ACT Chief Minister’s Promising Exporter Award, increasing the size of its team and expanding its customer base in Australia, New Zealand and globally.

Despite its emerging success overseas, Stephen says the heart of the business is firmly in Canberra.

“Thanks to the Canberra Innovation Network, and the ACT Government’s clear, explicit and ongoing commitment to innovation in the city, Canberra’s innovation community is very strong. For a city of its size, it’s magnificent,” he says.

“Being a member of the Agrifood Hub is fantastic. The Hub is a great place to meet with potential customers. It provides facilities and benefits which are not readily available to an

organisation of our size, including access to high-quality ANU students.

“And with part of our team based at CSIRO, we’re within walking distance to them and to the lab infrastructure we need. It’s the perfect spot for us to be right now.”

The Agrifood Hub provides businesses with a unique opportunity to base themselves at the University with access to its world-leading infrastructure and expertise. Hub members play an active role in the university community, including by supporting student interns and as guest lecturers into various courses. Their presence supports the development of an entrepreneurial culture and showcases the opportunity for non-traditional pathways to a career in agriculture.



Community engagement

AFII STEM SUPERSTAR

ALISON BENTLEY



AFII Deputy Director Alison Bentley has always been fascinated by the natural world and how plants respond to their environment.

While studying agriculture at high school, she attended an outreach event at Sydney University where she got to extract plant DNA.

It was then she realised that science had many practical applications, including to improve crops and enhance food security.

It was this interest that led her to studying agriculture at university before working across the world in crop breeding and international development.

She now leads a lab in the ANU Research School of Biology with a focus on genetics and plant breeding.

Her research aims to understand the fundamental plant processes that can be used as an engine-room to drive agricultural productivity and build climate resilience for a more food secure future.

In addition to her work to develop and deliver future-ready crops, Alison is designing and implementing new interdisciplinary approaches to train the next-generation and address complex agricultural challenges.

Understanding the value diversity brings to organisations and the individuals within them, Alison is passionate about supporting more women and girls to choose careers in science, and in agriculture specifically.



“There’s a strong narrative about empowering women in agriculture, but you can’t be what you can’t see and in crop science women are significantly underrepresented in leadership positions,” Associate Professor Bentley says.

Even as more women are being employed in the sector, Alison says the practical reality for those women is that their workplaces are often not fit for purpose.

“While I was working in international development, I was surprised to find many field stations in different parts of the world had no female toilets,” she says.

“At one organisation, I initiated a review of toilet facilities at field stations in Mexico and parts of Africa.

“In most places there were no female toilets and the facilities that were there were not always clean or fit-for-purpose, and many did not accommodate for menstrual hygiene.

“As a result of that review there’s one more breeding station with safe, clean, accessible, fully functional and dedicated toilet facilities, and hopefully more to come.”



As a 2025 Superstar of STEM, Alison says she’s excited for the opportunity to show young women that studying STEM opens doors to many careers from biology to computing to agriculture.

“Agriculture, in particular, is a career path that integrates all the STEM disciplines and by working in agriculture you have the opportunity for great social impact.”

To build a workforce capable of meeting future challenges, agriculture will need to attract the best and brightest students and researchers. Alison Bentley’s participation in the Superstars of STEM program is just one way we are committed to nurturing a diverse cohort of future agriculture leaders.





Chief Scientist Cathy Foley toured Australian Plant Phenomics Network and Plant Synbio NCRIS facilities, meeting staff and students from AFII and the ARC Training Centre for Future Crops Development

Our year IN PHOTOS



We hosted a seminar with the Director-General and Deputy Director-General of the FAO and heard about the history of the FAO, challenges facing global agriculture now, and the importance of the next generation of agricultural scientists



We welcomed Special Representative for Australian Agriculture Su McCluskey to AFII



We supported five high-performing ANU students to attend evokeAG to explore the latest in agritech, innovation, and sustainability



We hosted a delegation of Indonesian food exporters who were in Australia as part of a course designed to strengthen the export competitiveness of Indonesia's coconut and spice sectors



Janet Salisbury from the Women's Climate Congress and Lauren DuFall from the ARC Training Centre for Future Crops Development spoke at a networking event marking International Women's Day



Director of the Stockholm Resilience Centre Line Gordon presented on the importance of interdisciplinary collaboration for building a resilient food system



We sponsored Australia's key food security event, the Crawford Fund Conference, which focused on partnerships, consultation and collaboration for codesigning and delivering high-quality agricultural research for development projects and capacity building programs



We hosted CBRIN's First Wednesday Connect event at our Agrifood Hub, hearing from innovators and entrepreneurs including hub member Pablo Larraondo from Haizea Analytics



AFII Director Owen Atkin, Dirk van der Kley from the National Security College and PPB Technology founder Stephen Trowell appeared before a hearing of the Parliamentary Inquiry into Food and Beverage Manufacturing in Australia to highlight the need for investment in R&D to address complex agrifood challenges and create bio-manufacturing jobs



AFII Director Owen Atkin and Board Chair Victoria Taylor travelled to Singapore for International Agri-Food Week



We brought together researchers with a wide range of disciplinary perspectives for a seminar looking at new ways to accelerate crop development



We continued to support a GRDC-funded project to develop heat tolerant crops



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