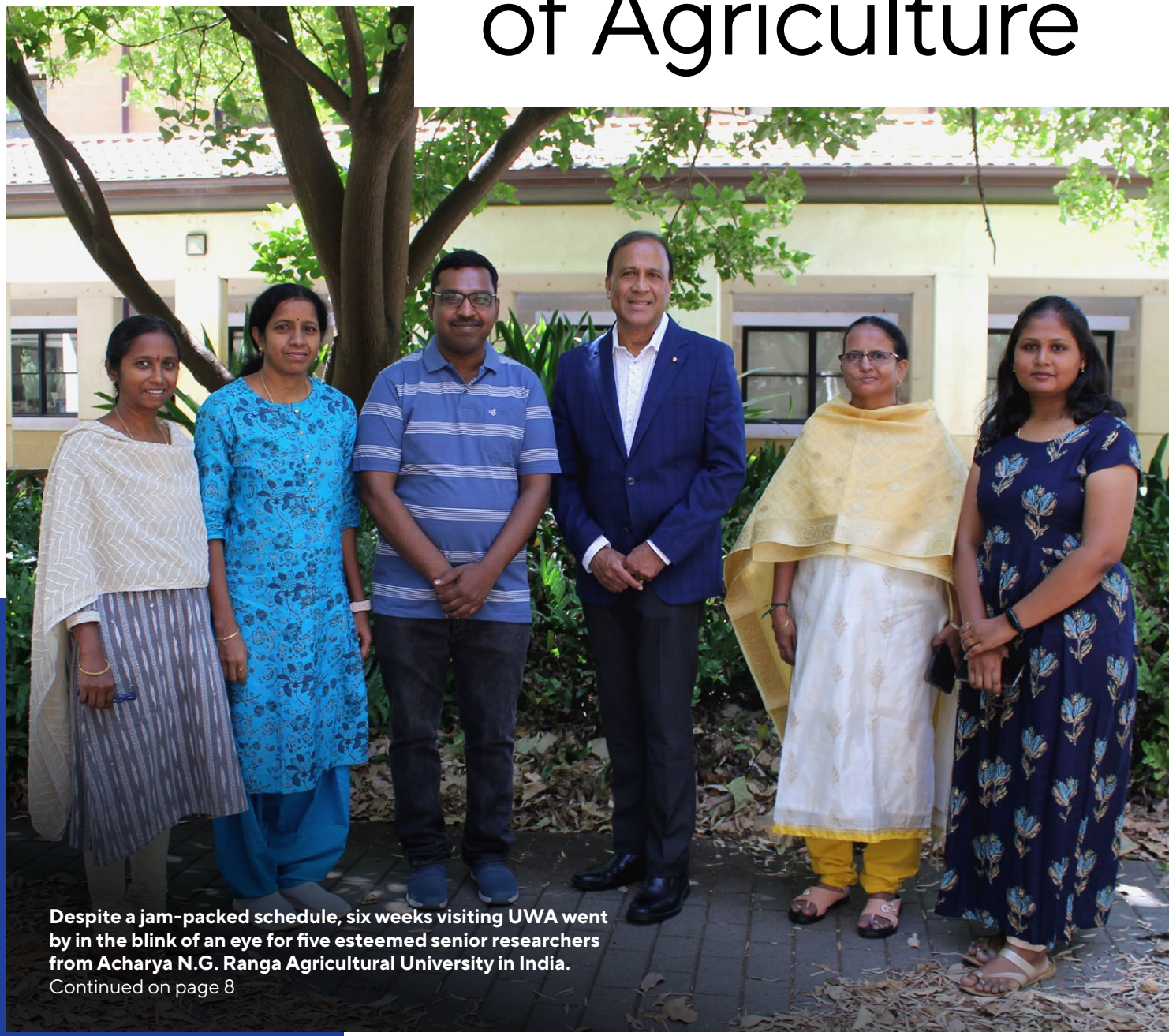
NEWSLETTER 49, APRIL 2023

The UWA Institute of Agriculture



Despite a jam-packed schedule, six weeks visiting UWA went by in the blink of an eye for five esteemed senior researchers from Acharya N.G. Ranga Agricultural University in India.
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THE UNIVERSITY OF WESTERN AUSTRALIA

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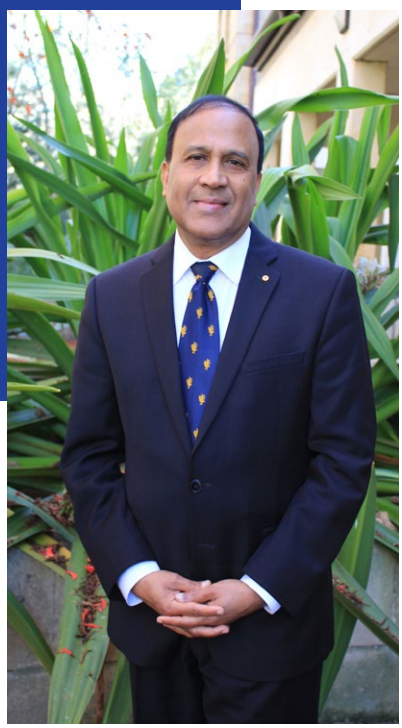


What do we want the future of agriculture in Western Australia to look like?

How do we engage and empower the next generation of farmers, researchers and industry leaders to realise this aspiration?

From the Director

These are the important and pressing questions that our expert speakers will shed new light on at The UWA Institute of Agriculture's 17th annual Industry Forum on 19 July. The Industry Forum has always been our most anticipated annual event, and this year is clearly no exception.

I am especially looking forward to the formal opening, which will be delivered by WA's new Minister for Agriculture and Food, Forestry & Small Business the Hon. Jackie Jarvis MLC – marking her first official visit to The University of Western Australia. It is clear that this year's topic 'Paving the way for the next generation of WA agriculture' has struck a special chord, as there are already limited seats left to book. Register to attend on Eventbrite.

It is pleasing that 2023 is shaping up to be one of our busiest for events in recent years. The Institute has hosted public lectures for visiting professors (pages 4, 12 and 16) and the Mike Carroll Travelling Fellowship presentation evening (page 17). I am eagerly anticipating the Lefroy Fellow Research Seminar led by Dr Kelsey Pool on 5 May, our Postgraduate Showcase on 31 May (page 18), the Alan Sevier Memorial Lecture to be delivered by Massey University Professor Paul Kenyon on 27 September, and the UWA Farm Ridgefield Open Day on 6 October.

Congratulations to all recent award and scholarship recipients from UWA, of which I invite you to read about on pages 2, 5, 11, and 20 of this newsletter. I was humbled and grateful to receive the Sanqin Friendship Award during my recent visit to China (page 19). This prestigious award serves as a recognition of many decades' research collaboration with leading scientists at Northwest A&F University.

I wish to take this opportunity to once again celebrate our Industry Advisory Board chair Dr Terry Enright on receiving the GRDC Seed of Gold award (page 12). Dr Enright's passion and leadership has been invaluable in guiding our Institute to where it is today, and we are privileged to count him among our inner circle.

As WA enters its seeding season, I extend my best wishes to growers across the State for ideal conditions leading to another bumper harvest.

Hackett Professor Kadambot Siddique
AM CitWA FTSE FAIA FNAAS FISPP FAAS FPAS
kadambot.siddique@uwa.edu.au

Scholarship helps Dan delve deeper

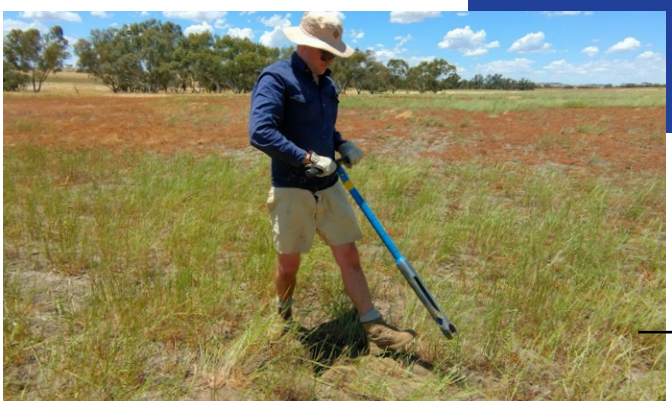
UWA Master's student Dan Kierath is on a mission to investigate the relationship between soil productivity and carbon sequestration across various agricultural land uses in WA.

With support from his supervisors, Associate Professor Matthias Leopold and Professor Nanthi Bolan, Mr Kierath aims to improve the understanding of how farm-level management decisions impact carbon footprint.

"The emissions profile of a WA grainbelt farm presents a very real business risk," he said.

"This risk is amplified when you consider that all of Australia's big four banks and Rabobank are signatories to the Net-Zero Banking Alliance, a UN convened bank group committed to aligning their lending portfolio with net-zero emissions by 2050."

Mr Kierath said he was passionate about finding the best way to minimise this risk for WA farmers.



Dan Kierath conducting soil sampling at UWA Farm Ridgefield.

"A more precise understanding of soil improvement and sequestration opportunities associated with different land use management decisions can support a farming enterprise to be more resilient in the face of forecast changes to the agribusiness industry and climate variability," he said.

Last month, Mr Kierath was one of two recipients to be awarded the 2023 WA Livestock Research Council scholarship.

As part of this scholarship, he will be matched with a farmer mentor, attend a range of industry events, and receive funding to support his research project.

"I'm deeply grateful to have received this scholarship, as it is a great opportunity to contribute to an industry of social importance," he said.

"The mentorship is something that I am looking forward to and hope to leverage to ensure the findings of my research are relevant for the industry."

Dan Kierath
20270837@student.uwa.edu.au

Digging up soil surprises at Ridgefield

Head of SAgE Associate Professor Matthias Leopold and Professor Ofer Dahan during the VMS installation.

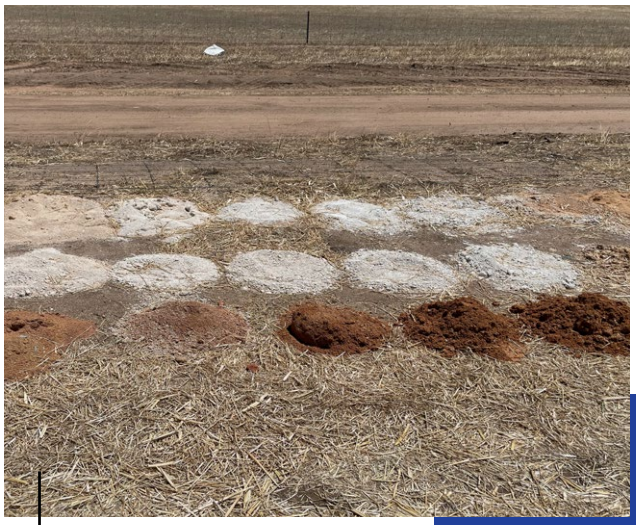
Grey skies at UWA Farm Ridgefield in Pingelly have put Associate Professor Sally Thompson and her research team in an especially sunny mood.

Recent and forecasted rain make for ideal conditions to analyse new data from the Vadose-zone Monitoring System (VMS).

Based on more than 15 years of research led by Sensoil co-founder Professor Ofer Dahan, the state-of-the-art real-time soil sensing device was installed in a cropped field at UWA Farm Ridgefield in January.

The partnership between UWA and Sensoil, with support from TERN and AuScope, is an essential component of the Australian Research Council-funded Critical Zone Observation network.

The VMS automated monitoring infrastructure assists researchers to observe stocks and flows of carbon, water, energy, and mass across the Critical Zone (the vertical span from plant canopies to bedrock).



Piles of soil retrieved during VMS and monitoring well installation.

> "The cereal-pulse-oilseed-pasture rotations at Ridgefield capture a representative and responsible Australian agricultural practice."

School of Engineering Associate Professor Thompson, who co-leads the Water for Food Production research theme at The UWA Institute of Agriculture, said she was delighted to have the Sensoil team from Israel on-hand during the two-day installation.

"We needed a smart and capable driller who was willing to do something a bit unorthodox and have the scientists – particularly Professor Dahan – tell them how to do it," she said.

"The team at B&T Drilling tilted their rig and drilled on an angle to ensure that the soil above the sensors and samplers wasn't disturbed.

"We then filled a sleeve with grout to inflate it against the wall of the bore hole, so that the sensors and water and gas samplers were in close contact with the soil."

When digging at about 1m depth for the installation, the research team unearthed some interesting types of soil.

"We identified red sandy clays of the surface soils, which transition to the white kaolinite of the pallid zone," Professor Thompson said.

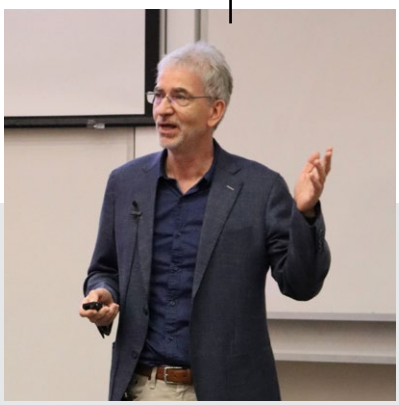
"To our great surprise, we found almost no pallid zone present in the soil dug from one of our three monitoring wells.

"Have we drilled into a paleochannel or another underground formation? We will soon find out."

Associate Professor Sally Thompson
sally.thompson@uwa.edu.au

An example of a vertical farming system, which could one day be used for wheat.

Vertical wheat crops could be farming future



Professor Senthold Asseng delivering his lecture at UWA.

Will we one day be growing wheat in 10-layer indoor vertical farms?

While it may seem far-fetched, Professor of Digital Agriculture Senthold Asseng has shown that wheat grown in indoor vertical structures under optimised growing conditions can result in several hundred times higher yields than in the field.

It could also lead to several harvests per year, use less land, be independent of climate, reuse most water, exclude pests and diseases, and have no nutrient losses to the environment.

Professor Asseng, who is the Director of the World Agricultural Systems Center at the Technical University of Munich in Germany, delivered a special public lecture for The UWA Institute of Agriculture in March.

"It is clear that the world needs to produce more healthy food with less environmental impact, whilst overcoming the challenges of climate change," he told the 120-strong audience.

> "We are in an exciting time in history for food production in terms of science and research."

As food demand continues to increase alongside a growing global population, Dr Asseng emphasised that environmental degradation, high water use, pesticide applications, nutrient pollution and biodiversity loss had rendered many current cropping systems unsustainable.

His lecture explored how automation and controlled-environment food production offered massive productivity gains with reduced environmental impact.

"There is a technological revolution going on in terms of the way food might be produced in the next 20 years," he said.

Dr Asseng said there were many unknowns with this new technology – including the impact of agriculture subsidies, pollution, and the overall quality of the crop.

Given the high energy costs for artificial lighting and capital costs, he said it was unlikely to be economically competitive with current market prices.

"There is still a lot that we do not know: we do not know the limits, or how far we can push it," he said.

"I do not believe this technology will replace all agriculture, but it can be part of our future agriculture, it can take some pressure off."

Watch the full lecture recording on The UWA Institute of Agriculture's YouTube channel.

UWA PhD candidates James O'Connor, Alistair Hockey, Ruby Wiese and George Mercer.

PhD candidates sowing seeds of success

Embarking on a PhD journey may seem like a daunting prospect, but for these four fledgling UWA researchers, the future is bright.

Ruby Wiese recently received the AW Howard Research Fellowship, while James O'Connor, Alistair Hockey and George Mercer are recipients of the AW Howard Memorial Trust's Tim Healey Scholarship.

Currently midway through his project, Mr O'Connor said the scholarship would significantly impact his research journey.

"It will provide me with the necessary financial support to further my research and invest in higher risk, higher reward research outputs in order to further scientific knowledge within the field," he said.

As supervised by Professor Nanthi Bolan, Associate Professor Matthias Leopold, Dr Bede Mickan and Hackett Professor Kadambot Siddique, Mr O'Connor is exploring innovative solutions to recover vital nutrients from food waste to create sustainable fertilisers for agriculture.

"My research involves a thorough comparison of various food waste valorisation products, such as compost, anaerobic digestate and acidified digestate, to determine their agronomic value," he explained.

> "This scholarship gives me confidence that the importance of my project is felt by those who are immersed in the Australian agriculture industry."
>
> **Alistair Hockey**

Mr Hockey is researching the genetic and genomic barriers between chickpea and its close wild relative *Cicer echinospermum* with the supervision of Dr Judith Lichtenzveig, Dr Robert Syme, Dr Janine Croser and Professor Megan Ryan.

"I was first pulled toward plant genetics and genomics as I believed that I could help unpack the mysteries that surround the relationships between closely related species, and how these impact population dynamics and plant function," he said.

"I believe that my research can make a positive impact on food security in rapidly changing environments and in the conservation of an important wild species."

Ms Wiese's PhD is part of a larger AgriFutures-funded project aiming to develop prototype machinery for harvesting subterranean clover seed, and is supervised by Professor Ryan, Associate Professor Andrew Guzzomi, Associate Professor Phillip Nichols and Dr Wesley Moss.

The new design will ideally overcome the inefficiencies and environmental damage problems associated with the current harvest process.

"This Fellowship is particularly meaningful, because AW Howard pioneered the use of sub clover as a sown pasture legume," she said.

"To work on improving the harvesting process of the industry he started, while being supported by this scholarship, is an incredible honour."

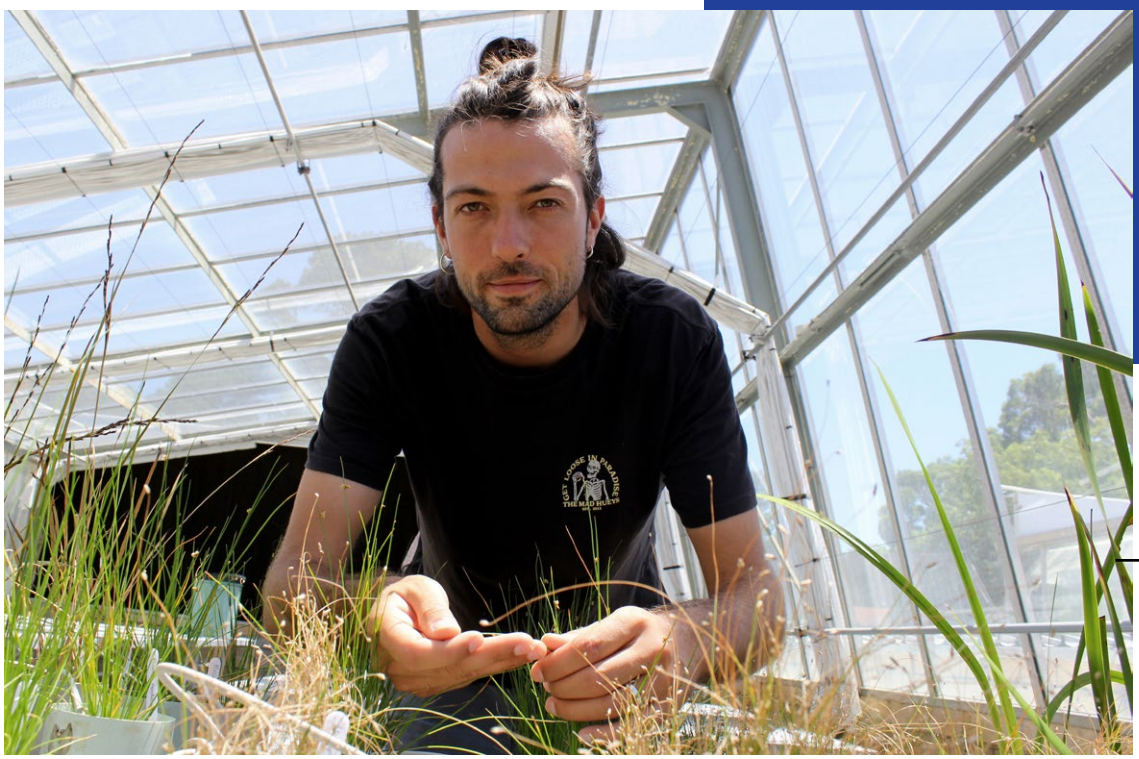
Now 18 months into his PhD within the ARC Training Centre for Transformation of Australia's Biosolids Resource, Mr Mercer said his project dealt with the 'tricky business' of sequestering soil carbon.

"Biosolids (the solid by-product of the wastewater treatment process) come packed with carbon and nutrients that trickle-feed the entire plant-soil system," he said.

"By assessing the biological response of plants and soil microbes to transformed biosolid products, we can help to identify and utilise pathways that are most likely to store carbon in the soil for the long term."

Mr Mercer's PhD supervisors are Dr Mickan, Associate Professor Deirdre Gleeson and Professor Ryan.

Overdue recognition of silicon
a Si-gn of the times



Dr Félix de Tombeur in a UWA glasshouse with a recent experiment into how sedges use Si.

For too long, the benefits of silicon (Si) was overlooked by plant scientists and agronomists.

According to UWA postdoctoral researcher Dr Félix de Tombeur, the world is finally starting to recognise its importance.

Dr de Tombeur said his interest in Si began five years ago, during his PhD in Belgium.

"I was immediately fascinated by this nutrient that is too little considered by plant biologists, even though it provides plenty of benefits to plants," he said.

In a review published in *Plant & Soil,* Dr de Tombeur and his research colleagues compiled knowledge about the biotic factors that govern Si mobility in soil-plant systems and translated their potential benefits in agricultural practices.

Although it is not considered an essential nutrient, Dr de Tombeur said he was pleased Si was being increasingly better understood by plant scientists.

"Its beneficial effects for crops resilience against stress is no longer questioned," he said.

Major crops such as rice, sugarcane, wheat, and maize accumulate Si in their tissues.

After being deposited as hydrated amorphous silica in plant tissues, Si helps mitigate several biotic and abiotic stresses, can be used as a plant structural component, and, eventually, increase crop yield.

The review highlighted a future concern: long-term mineral weathering and leaching has resulted in soils with low plant-available Si concentrations in many areas of the world, particularly in tropical and subtropical regions.

While rock-derived Si fertilisers are being applied to counterbalance these detrimental effects, Dr de Tombeur said this was not a long-term solution.

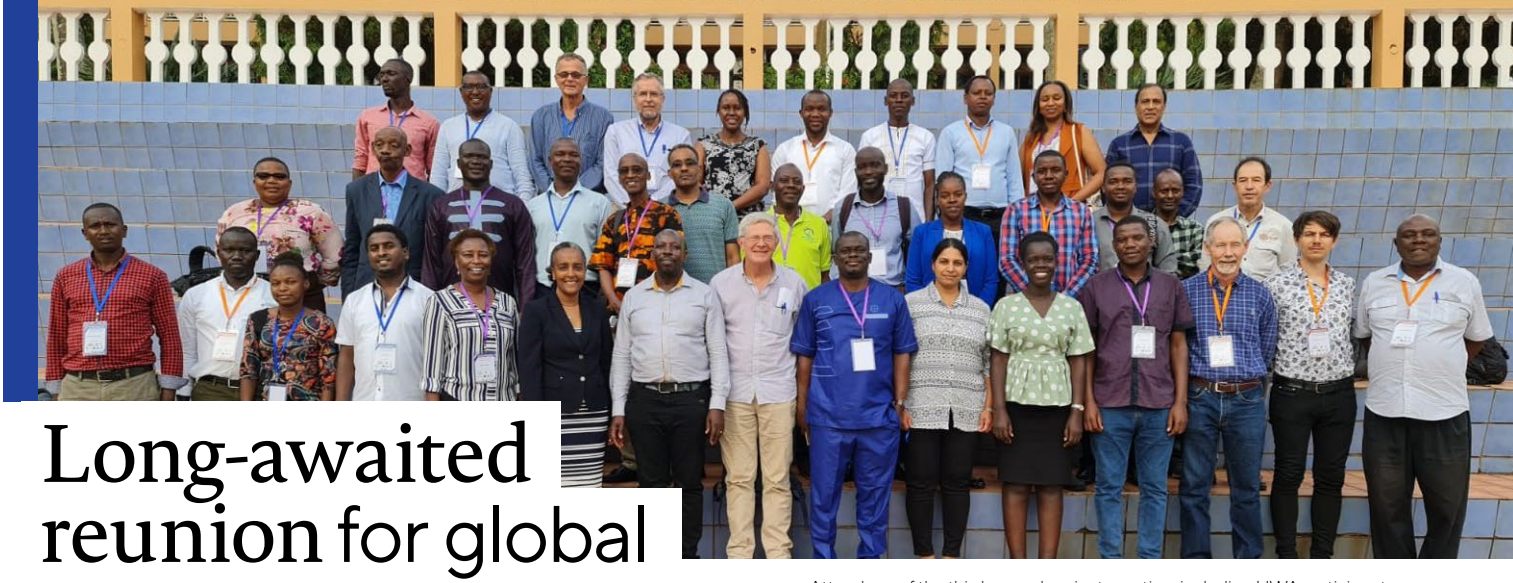
"Although Si fertilisation is increasing worldwide, the time has come to seriously consider biotic factors that can increase Si mobility from soils to plants, and how certain agricultural practices can promote them," he said.

"Harnessing ecological processes that increase soil Si availability by promoting specific agricultural practices may improve the Si status of crops worldwide, while decreasing the need for non-renewable mineral fertilisers."

Splitting his time between Australia and France, Dr de Tombeur is working at UWA alongside Emeritus Professor Hans Lambers and with Dr Cyrille Violle at the Centre d'Écologie Fonctionnelle et Evolutive, Montpellier.

His postdoc is part of the Marie Skłodowska-Curie Fellowship and financed by the European Union.

Dr Félix de Tombeur
felix.detombeur@cefe.cnrs.fr



Long-awaited reunion for global bean breeding team

Attendees of the third-annual project meeting, including UWA participants Hackett Professor Siddique, Professor Cowling, Dr Saradedevi and Alliance Global Breeding Lead for beans Dr Mukankusi.

After three long years of separation due to Covid-19, the rapid cooking bean research team from UWA and six partner countries in East Africa met face-to-face in Uganda.

The third-annual meeting of the Australian Centre for International Agricultural Research (ACIAR) project 'Rapid breeding for reduced cooking time and enhanced nutritional quality in common bean (*Phaseolus vulgaris*)' was held in Kampala, Uganda, in February.

Australian project leader, The UWA Institute of Agriculture Associate Director Professor Wallace Cowling, was joined by UWA Research Associate Dr Renu Saradadevi and Institute Director Hackett Professor Kadambot Siddique for the highly anticipated visit.

The ACIAR-funded project is a partnership between East African bean breeding programs and is supported on the ground by the Alliance of Bioversity International - Centre for Tropical Agriculture (CIAT) through the Pan-Africa Bean Research Alliance.

ACIAR was represented by Research Program Manager for Crops Dr Eric Huttner at the meeting.

Professor Cowling said it was both professionally and personally rewarding to finally meet in-person with more than 35 African and international research colleagues.

"We last met face-to-face in December 2019," he said.

"Throughout the pandemic, we held monthly video conferences with East African bean breeders, and the project progressed well."

Despite the distance and technological limitations of internet communication over the past three years, the project team developed a new method for bean breeding known as BRÍO and published in leading journals.

The annual meeting agenda included two days of intensive training in data base management and data analysis for bean breeders in Uganda, Rwanda, Burundi, Tanzania, Kenya and Ethiopia.

Another day was devoted to a field trip which included visits to the Alliance of Bioversity International-CIAT bean breeding program at Kawanda.

Visitors were introduced to the bean breeding team and researchers under the guidance of Dr Clare Mukankusi, who is the Alliance Global Breeding Lead.

Professor Wallace Cowling
wallace.cowling@uwa.edu.au

Research heard through the grapevine

Picture a great day out in one of WA's world-renowned wine regions.

While most people would envision wine tastings and cheese boards, for the UWA Centre for Water and Spatial Science (CWSS) researchers, it's all about soil probes, drones, and thermal imaging.

Launched in late 2022, the CWSS sits within the UWA School for Agriculture and Environment and unifies 12 water and geospatial science researchers within the university.

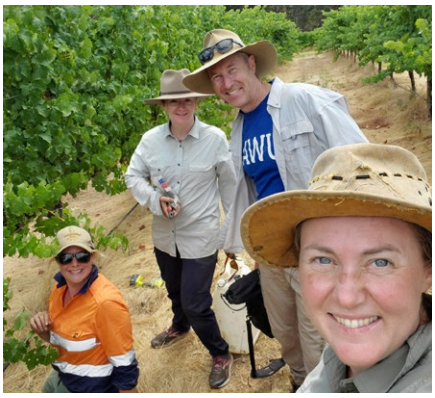
The South-West WA Drought Resilience Adoption and Innovation Hub (SW WA Hub) is led by the Grower Group Alliance through funding from the Australian Government's Future Drought Fund.

The UWA-led vineyard floor management project was initiated through the SW WA Hub and is funded by the Australian Government's Agricultural Innovation Hubs Program with support from UWA.

A team of UWA researchers are using new technologies to monitor vine health and optimise production practices in the Swan Valley, Cape Mentelle, and Plantagenet regions.

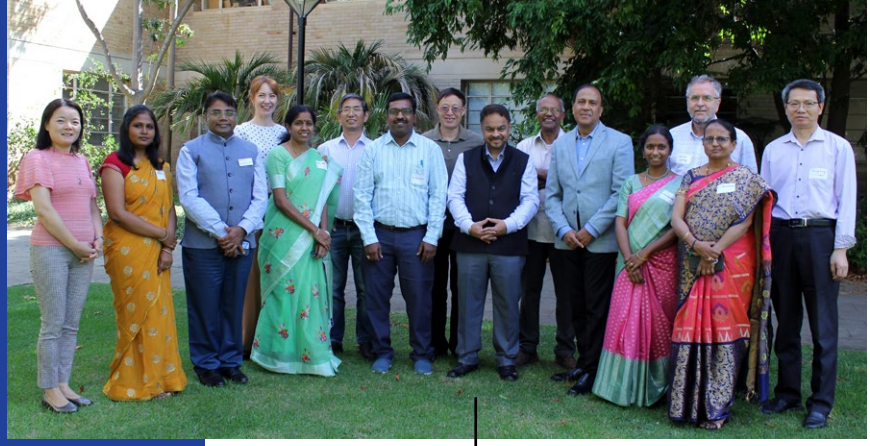
UWA Research Fellow Dr Caitlin Moore said the project aimed to understand the benefits of incorporating cover crops in vineyards, including water management and building soil carbon.

"Through continued investment in research and development, UWA researchers and growers can work together to meet the challenges posed by climate change and other stressors," Dr Moore said.



Dr Caitlin Moore with fellow CWSS members Associate Professor Nik Callow, Dr Bonny Stutsel and Storm Findlay-Cooper.

"Advanced technologies and regular monitoring of vine health and soil quality are crucial for ensuring the long-term sustainability of the wine industry in WA and continuing to contribute to the regions' economy."



The ANGRAU visitors were fondly farewelled during a special morning tea in late March.

Whirlwind trip a wealth of knowledge and experiences

The UWA Institute of Agriculture recently hosted Dr N Anuradha, Assistant Professor Dr V Bhuvaneswari, Dr N Veronica, Associate Professor Venkata Ramana Rao Puram and Dr P Latha from Acharya N.G. Ranga Agricultural University (ANGRAU).

The Institute Director Hackett Professor Kadambot Siddique said he was impressed with the researchers' enthusiasm and achievements while in WA.

"It was wonderful to see that they made the most of their time here and grasped every opportunity we offered them," Professor Siddique said.

This included personalised tours of UWA Farm Ridgefield and UWA Shenton Park Field Station, attending Institute-run events, morning teas, special lectures, and forging new connections and working relationships.

Their visit culminated in a special morning tea attended by the Consul-General of India Amarjeet Singh Takhi, senior UWA researchers, and Murdoch University Professor Rajeev Varshney.

Dr Puram said their training program was meticulously planned and executed.

"Our visit to UWA enlightened us with precise phenotyping and genotyping techniques for crop improvement," he said.

"Further, the implementation of the knowledge acquired for the ANGRAU research program will benefit all the stakeholders of agriculture in the State.

"We are looking forward for future collaboration with The UWA Institute of Agriculture."

The six-week training program was made possible by UWA's strong partnership with ANGRAU.

UWA signed a Memorandum of Understanding with ANGRAU in 2018, which has enabled many students to complete their Master's and PhD studies at UWA.

Canola heat tolerance project enters final stage

Bona fide heat-tolerant canola genotypes identified and validated by UWA's Dr Sheng Chen and his research team will be delivered to Australian plant breeders in 2024.

The UWA Institute of Agriculture Research Fellow Dr Chen has dedicated the past four years to leading the Grains Research and Development Corporation (GRDC) research project.

Next year, the project will culminate in providing heat-tolerant germplasm (genetic material such as seeds or tissues) to plant breeders to help them create more resilient canola crops.

Canola's sensitivity to heat stress is a growing concern, with temperatures expected to rise further in coming decades due to changes in climate.

"In current canola varieties grown in Australia, losses could be as much as 300 kilograms per hectare for every 1°C increase in the average daily temperature at flowering," Dr Chen said.

Using the prototype heat screening facility at the UWA Shenton Park Field Station, the research team screened 323 *Brassica napus genotypes* at both early and late canola seasons over a period of two years.

Dr Chen said they found several lines with good heat tolerance or excellent recovery capability after a heatwave.

"About five per cent of the genotypes showed better heat tolerance than Australian canola cultivars based on the response of the genotypes to heat stress versus control conditions," he said.

"In particular, we discovered eight genotypes with excellent heat tolerance and high seed yield at both early and late seasons.

"These lines are under multi-environmental field trials for validating their heat tolerance and adaptation in different regions of Australia."

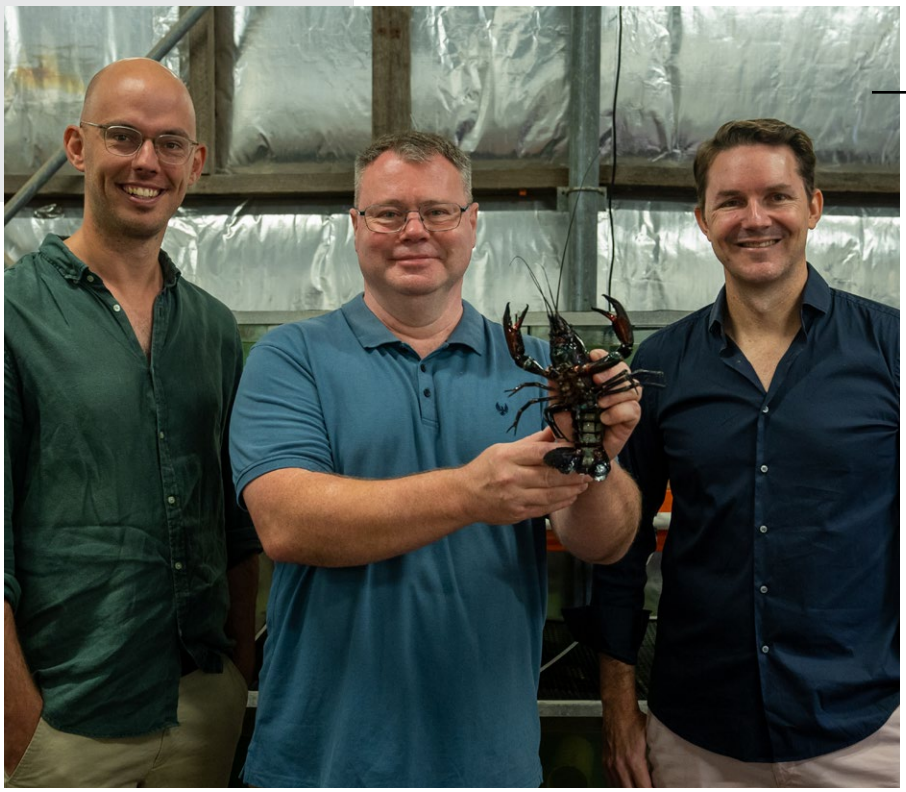
The chosen genotypes are now undergoing two years of validation in field trials at four different sites across Australia.

Dr Chen said they also identified 334 candidate genes possibly related to heat stress tolerance.

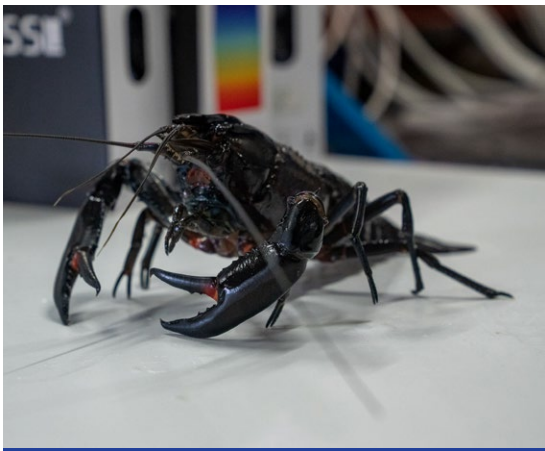
Dr Sheng Chen presenting at the recent UWA Shenton Park Field Station Open Day.

"These genes, once their functions are confirmed by a multi-omics approach, could be used in genomic selection for improving heat stress tolerance in canola breeding programs," he said.

Dr Sheng Chen
Sheng.chen@uwa.edu.au



Aquatic AI co-founders Michael Storey and Andrew Walker, with lab technician Richard Linney holding a marron. Pictures: Jarryd Gardner



Mission to put marron on every menu

The humble WA marron industry may be on the brink of an explosion in production, thanks to an innovative vertical farming system in development at UWA Shenton Park Field Station.

Endemic to the south-west of WA, marron is Australia's largest commercially available freshwater crayfish and the third largest in the world.

With market demand for marron outstripping supply, agri-tech start-up Aquatic AI are working with UWA scientists on a modern and more sustainable way of farming marron.

Co-founder Michael Storey said the vertical farming system resolved issues of labour and land requirements that have historically stunted the marron industry's expansion.

With funding and support from AgriFutures Australia, industry partners across the supply chain, and financial and scientific backing from UWA, Mr Storey said his team were set up for success.

"The marron industry has been identified as having the potential for significant growth," he said.

> "We have a simple mission: to grow more marron and focus on reliability of supply to drive the growth of this industry."

Traditional marron farming in outdoor ponds yields about three or four marron per square metre.

In their trial laboratory, which uses a tank stacking system to optimise its physical footprint, Aquatic AI has already achieved yields of more than 100 marron per square metre.

By using robotics and data analysis, they expect to increase that number to around 1000 marron per square metre.

Aquatic AI have worked directly with researchers from the UWA School of Agriculture and Environment and the UWA Oceans Institute such as Adjunct Associate Professor Craig Lawrence, Dr Belinda Martin, Dr Leah Beesley, and Dr Jen Middleton.

The research team are optimising the nutrition and sale size of the marron to balance flavour, market demands and cost.

Mr Storey said UWA Shenton Park Field Station was fast becoming a hub for agagricultural innovation.

"Having the space to work and the scientific backing of such a prestigious institution as UWA has been incredibly important," he said.

"It's convenient to Perth CBD and great to have neighbours that are working in the ag space, both academically and commercially.

"We are now looking for investment to continue this project and fit out the robotics in our lab, which will move us to commercial scale production."

Valuable visit sealed with a gift

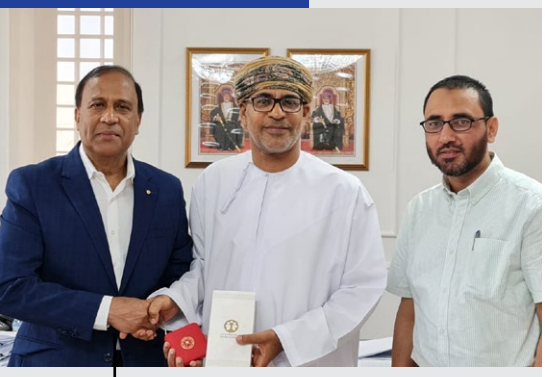
The collaboration between UWA and Sultan Qaboos University (SQU) is stronger than ever following The UWA Institute of Agriculture Director Hackett Professor Kadambot Siddique's recent visit to Oman.

Professor Siddique enjoyed positive discussions with SQU Deputy Vice Chancellor (Academic Affairs and Community Service) Professor Salim Hamoud Al-Harthi and Dean of the College of Agricultural and Marine Sciences Professor Abdulla Al-Sadi.

It was especially valuable to reconnect with The UWA Institute of Agriculture Adjunct Professor, Head of SQU Department of Plant Sciences Associate Professor Muhammad Farooq.

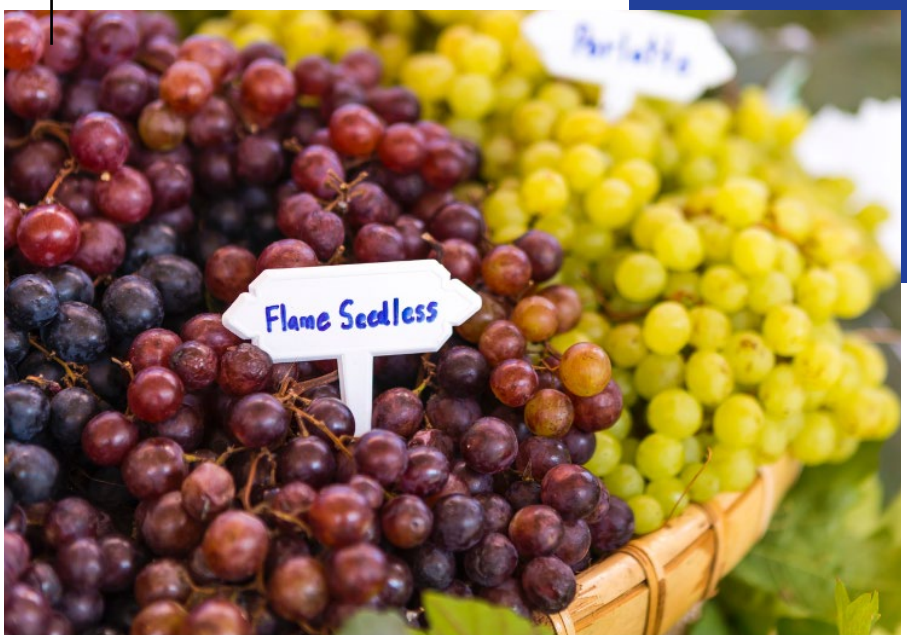
Following these meetings, Professor Siddique delivered a lecture on publishing in scientific journals to postgraduate students and members of the faculty.

The following day, he joined SQU faculty in touring joint project activities at the world-class tissue culture facility and field site on wheat adaptation to dryland environments at the Oman Ministry of Agriculture in the Behala region.



Professor Kadambot Siddique receiving a gift from Professor Salim Hamoud Al-Harthi and Associate Professor Muhammad Farooq.

Flame Seedless table grapes for sale in a market.



UWA ignites Flame Seedless grape research

How does the bud dormancy of Flame Seedless table grapes differ when grown in the mild winter climate of Swan Valley, versus the warmer Carnarvon region?

A UWA research team, led by The UWA Institute of Agriculture research theme leader and DPIRD research scientist Associate Professor Michael Considine, recently conducted a study to uncover the answers.

They investigated the growth and metabolic physiology of the perennating bud of commercially grown Flame Seedless grapes from Mediterranean and subtropical climates in WA, from summer until late winter.

Grapevine (*Vitis vinifera L.*) is the most widely cultivated fruit crop worldwide, contributing substantially to rural economies.

Its production cycle and productivity depend on seasonal cues.

The perennating or 'latent' bud forms over a 12-month period.

By the time fruit are harvested, the bud that sits in the axis of the leaves contains a primordial shoot (including the fruiting initials) which sustains next year's production.

Associate Professor Considine said the influence of the different seasonal conditions on the growth potential and fate of the bud was largely unknown.

"We obtained climate data that showed differences in minimum (night) temperature between the two climates, reflected by differences in calculated chilling units," he said.

"Bud dormancy increased during autumn of both climates; however, the onset and depth of dormancy of buds from the subtropical region were attenuated relative to the Mediterranean environmental conditions."

Stark contrasts were also observed in metabolism.

The respiration of subtropical-grown buds increased more than fivefold during late autumn and winter, while that of Mediterranean-grown buds increased less than twofold.

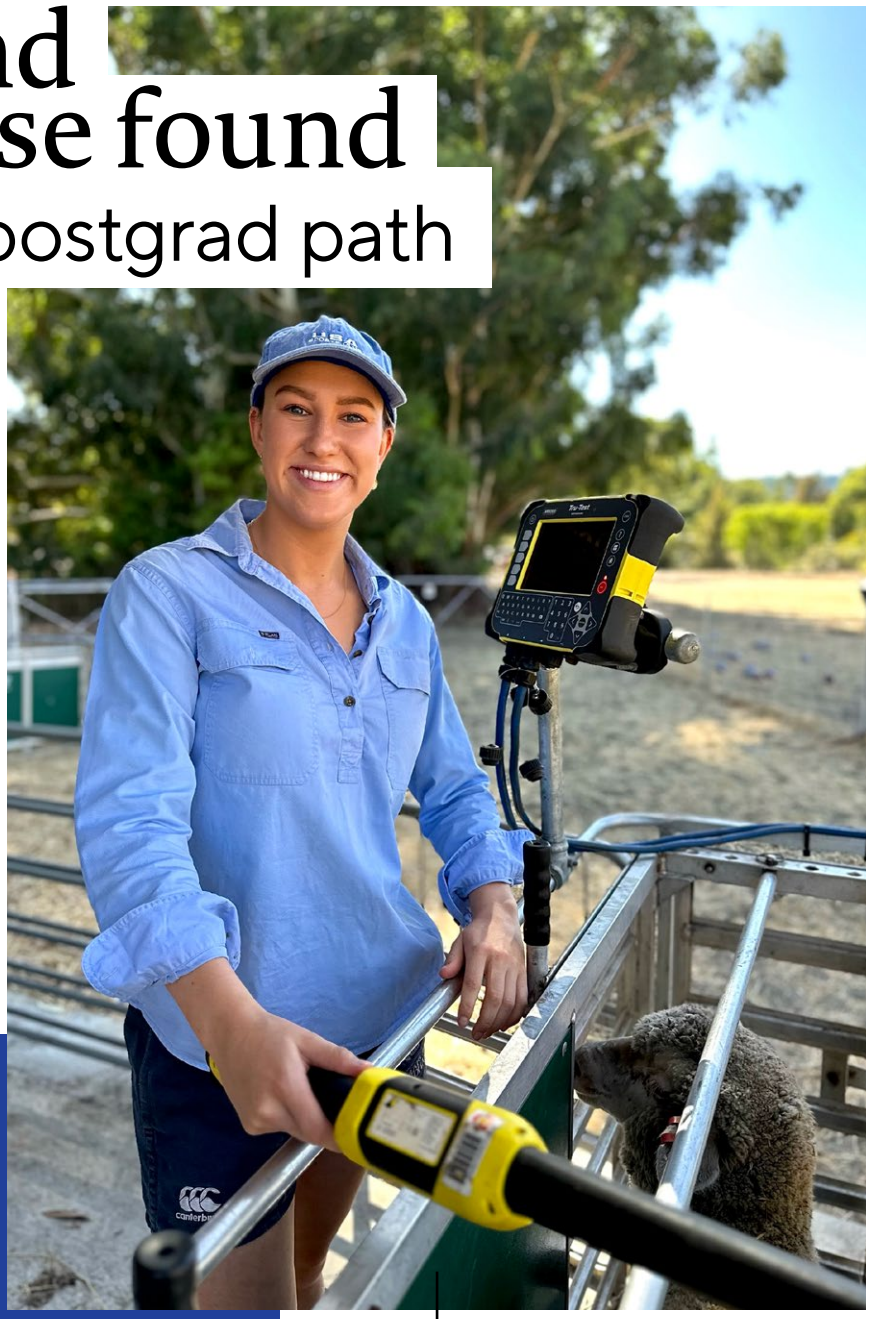
Associate Professor Considine said the data showed pronounced differences in growth and metabolic physiology of commercially grown table grapes.

"This provides a foundation for investigating the influence of differing climate and seasonality on the growth and productivity of table grapes, and how these may be managed through breeding and agronomy," he said.

UWA recently launched a four-year research mission to make table grapes one of the most valuable fruit crops in Northern Australia, read the full article here.

Associate Professor Michael Considine
michael.considine@uwa.edu.au

Passion and purpose found in unplanned postgrad path



2023 Young Professionals in Agriculture Forum Noel Fitzpatrick medallist Georgia Welsh.

Two years ago, if someone had told Georgia Welsh that she would be undertaking a PhD, would have laughed in their face and sworn they were lying.

This disbelief also extends to her latest achievement: being awarded the 2023 Young Professionals in Agriculture Forum Noel Fitzpatrick medal.

Four young scientists profiled their UWA research at the annual forum, hosted by Ag Institute Australia (WA Division) and the Department of Primary Industries and Regional Development.

The medal, honouring former Department of Agriculture Director General Noel Fitzpatrick, was presented to Ms Welsh for her Master's sheep research at UWA.

> "It has been so valuable for industry exposure and to be formally acknowledged as an up-and-coming scientist."

She investigated an algorithm to predict water intake and drinking behaviour in sheep map, using a measured drop in rumen temperature from a rumen temperature logger.

The formula was developed using water temperature and body mass to calculate an effective rumen volume, which could be applied to a thermodynamics equation to predict water intake volume and frequency.

Ms Welsh said she felt honoured and very privileged to receive the medal and be chosen to represent WA at the national Young Professionals in Agriculture Forum later this year.

"I worked extremely hard last year on my project, and it is such a great feeling to be rewarded for my effort," she said.

"Not only is it my greatest professional achievement so far, it has been so valuable for industry exposure and to be formally acknowledged as an up-and-coming scientist."

Ms Welsh decided to pursue a career in higher research thanks to some 'healthy peer pressure' at UWA from Professor Phil Vercoe and her supervisor Associate Professor Dominique Blache.

"It was never my intent to complete a dissertation project, let alone my PhD," she said.

"The goal was simply to learn as much as possible from the coursework units that UWA had to offer.

"What I liked most about the project was that it had the ability to genuinely help farmers and the agricultural sector by increasing knowledge around heat stress and water consumption behaviour."

Ms Welsh said her Master's research was part of a broader heat stress project run by UWA, Murdoch University, and CSIRO.

"My colleagues at UWA are continuing on my investigations into predicting volume of water consumed in a paddock scenario at UWA Farm Ridgefield in Pingelly," she said.

Their work will provide information about the intricate relationship between shade availability, climatic condition, and water intake behaviour.

"The data collected in this project will be used to establish the optimum quantity and quality of water to provide merino ewes during joining, to mitigate the effects of heat stress on reproductive performance."

Getting WA off the herbicide resistance ride

Is Western Australia the 'Disneyland of herbicide resistance'?

While it's unlikely to appear as a new tourism slogan, Professor Steve Shirtliffe said WA had earned this title as it was home to 'almost every resistance possible' during his recent lecture for the Australian Herbicide Resistance Initiative (AHRI).

The lecture, co-hosted by The UWA Institute of Agriculture, explored how we can reduce dependence on herbicides for cropping from a Canadian perspective.

Professor Steve Shirtliffe and Professor Ken Flower outside the Bayliss Lecture Theatre.

"This lecture topic almost triggered, dare I say, an existential crisis in myself because I have been working in this area for decades," Professor Shirtliffe said.

"Broadacre cropping relies heavily on herbicides for weed control because they are highly effective and can be applied rapidly over large areas.

"However, there are increasing challenges, such as herbicide resistance, and a need to use agro-chemicals more effectively to reduce their use."

Although he is also applying new technologies to agronomy – such as unmanned aerial vehicles and drones – Professor Shirtliffe suggested that the humble rotary hoe offered a novel weed control solution.

"We've established that (when it's properly timed early on), you can get quite good weed control, with figures of 60 to 70 percent and up to 80 to 90," he said.

"The rotary hoe has been adopted somewhat in the organic farming community, but not at all in the conventional community.

"I think it's because herbicides are mostly still working, and farmers think they don't need another piece of equipment."

Professor Shirtliffe said fear of failure was one of the reasons farmers were not switching to mechanical weed solutions.

"It's human nature that people don't want to do something different," he said.

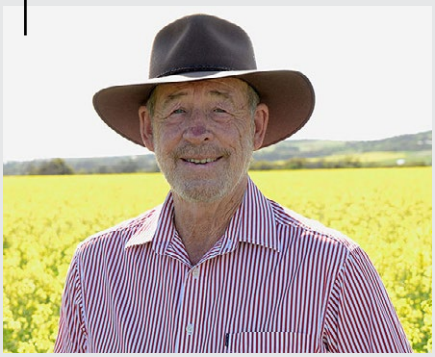
"When a farmer does something different, everyone sees, and if it fails, they look like a fool."

In closing, Professor Shirtliffe told the audience: "Good agronomy is good weed control".

"We have to sell integrated weed management as being a simple system, not a complex system," he said.

Watch the full lecture recording on AHRI's website.

Dr Terry Enright in a canola field. Credit: Grains Australia



Dr Enright worth his weight in gold

The first grower to receive an honorary Doctorate of Science in Agriculture from UWA was recently awarded the Grains Research and Development Corporation (GRDC) Seed of Gold award.

Former Great Southern grain grower and livestock producer Dr Terry Enright is the long-standing chair of The UWA Institute of Agriculture's Industry Advisory Board.

The Seed of Gold recognises the outstanding contribution, dedication, and commitment of individuals to the Australian grains industry.

The Institute Director Hackett Professor Kadambot Siddique said Dr Enright was 'richly deserving' of the prestigious award.

"Terry has dedicated his life to serving WA agriculture and is a dear friend and supporter of The UWA Institute of Agriculture," Professor Siddique said.

Dr Enright became the seventh person to receive the coveted award when GRDC chair John Woods presented it to him at the GRDC Grains Research Update in February.

In addition to conducting a successful farming enterprise, Mr Enright has served as chair of Grains Australia Limited, GRDC, the Australian Livestock Export Corporation (LiveCorp), and the Australian Export Grains Innovation Centre.

"We would be hard placed to find a more deserving recipient for GRDC's most prestigious award than Terry," Mr Woods told the audience.

Dr Enright said one of the many highlights of his career was working with a cross section of high-calibre grains researchers and leaders.

"One person can only do so much, and it's through the collaborative efforts of many individuals in the grains industry that we've achieved such significant gains," he said.

UWA research draws crowds at annual update

The newly launched Farm to Port Project was front-and-centre of The UWA Institute of Agriculture's information stall at the Grains Research and Development Corporation (GRDC) Grains Research Update in February.

With guidance from her supervisors Hackett Professor Kadambot Siddique and Associate Professor Doina Olaru, UWA PhD candidate Garima is leading the project to develop an optimisation model to improve the agri-food supply chain and benefit growers across Australia.

Growers are invited to complete an online questionnaire to share their experiences and perceptions of grain supply chains and related uncertainties in southwest WA.

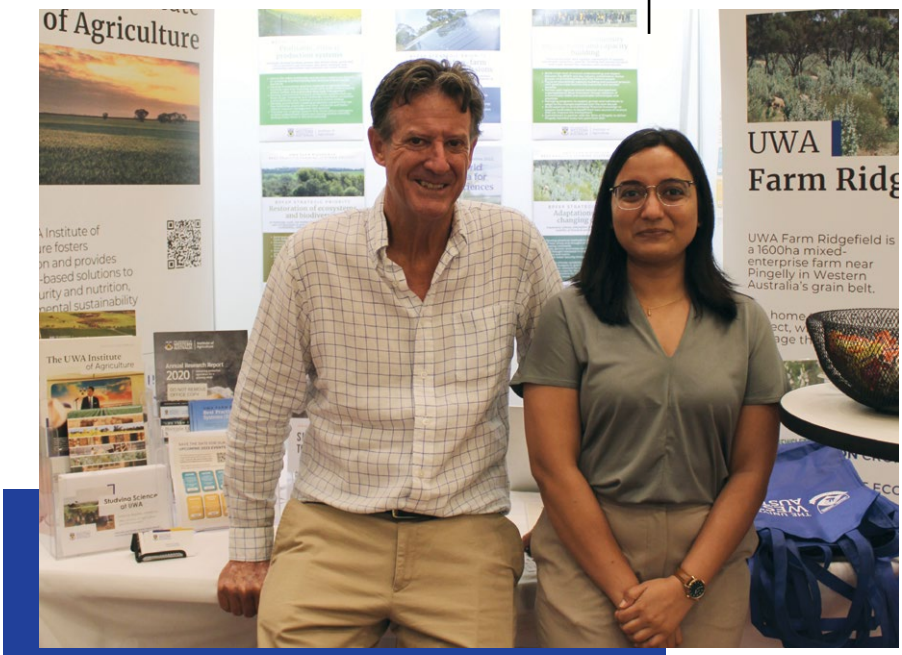
The Farm to Port Project was among many fascinating UWA research projects on show at the annual two-day GRDC Grains Research Update.

The UWA-based Australian Herbicide Resistance Initiative was well-represented with multiple talks delivered by their researchers, including new Director Professor Ken Flower.

Associate Professor Louise Barton presented a 10-year perspective on her research into nitrous oxide emissions from cropping soils in the WA grainbelt, and Professor Ross Kingwell shared his thoughts on the grain export supply chain challenges from his perspective as chief economist at the Australian Export Grains Innovation Centre.

On the second day, the Institute Research Fellow Dr Sheng Chen delivered a talk on the progress he has made towards the discovery of genes for heat stress tolerance in a diverse canola population (read more on page 8).

UWA students Hera Nyugen and Michael Young then explored their postgraduate research findings as part of the new researchers' snapshots segment.



Garima with Catalina Farms owner and the Institute's Industry Advisory Board member Rod Birch.

Perth Modern students conducting their experiment.

Hands-on insight into studying science at UWA

A group of Perth Modern School students didn't need a crystal ball to get a glimpse of their possible futures at UWA in December.

UWA hosted the school's entire Year 10 cohort of 120 students for an immersive two-day tour of the Crawley campus.

In addition to learning about courses and pathways, the group participated in a student ambassador Q&A panel and explored their future study and career choices.

A highlight was participating in STEM academic activities, which were designed to challenge them and give an insight into the university experience across a broad range of disciplines.

The UWA School of Agriculture and Environment activities were hosted by soil scientist Professor Nanthi Bolan.

Professor Bolan introduced students to the concepts of phytoremediation and phytomining using hyperaccumulator plants.

The session culminated in a hands-on lab activity to detect the presence of nickel in various plant and soil samples.

Produce on display stalls at Phnom Penh Central Market in Cambodia.

Fresh insights into vegetable marketing

Understanding the importance of agribusiness marketing was a life-changing experience for Cambodians who recently participated in an intensive training course conducted by The UWA Institute of Agriculture Honorary Research Fellow Dr Peter Batt.

In an innovative arrangement with the Ministry of Industry, Science, Technology and Innovation (MISTI) and funded by the Crawford Fund WA Committee, Dr Batt travelled to Svay Rieng in Cambodia to deliver the four-day training on fresh vegetable marketing.

Agri-food innovation, food processing, food science and food safety have been identified by the Government of Cambodia as priority areas for rural development.

The 20 course participants included technical staff from three provincial departments of Industry, Science, Technology and Innovation, members of an organic vegetable cooperative known as SAK and small business owners

Translation was provided by the MISTI Deputy Director General Dr Yorn Try.

While most had some prior understanding of marketing, Dr Batt said that the course reinforced their understanding of markets and marketing while also imparting practical knowledge.

"We explored the marketing concept, business-to-business marketing, product quality, pricing strategies, distribution and logistics, and the role of collaborative marketing groups in linking smallholder farmers to markets," he said.

"In discussing the role of market intermediaries, we were able to breakdown some long-term misconceptions about their role.

"Most participants gained a much greater understanding of the need to work constructively with middlemen and to build enduring long-term relationships. Another key outcome was emphasising the importance of keeping accurate records of all production costs."

On the third day of the workshop, participants visited the SAK community – a cooperative engaged in the production and marketing of organic vegetables to retailers in Phnom Penh.

Dr Peter Batt
peter.batt@uwa.edu.au

Visit fortifies UWA-NU partnership

Seven Nagoya University (NU) postgraduate students completed one-week study tour with UWA academics and external partners including CBH Group, InterGrain and Australian Export Grains Innovation Centre, DPIRD Katanning Animal Research Facility, and UWA Farm Ridgefield in February.

The UWA Senior Deputy Vice Chancellor Professor Tim Colmer and The UWA Institute of Agriculture Director Hackett Professor Kadambot Siddique welcomed NU special guests to UWA's Crawley campus, including Professor Mikio Nakazono, Professor Mitsutaka Taniguchi and Dr Han Wang.

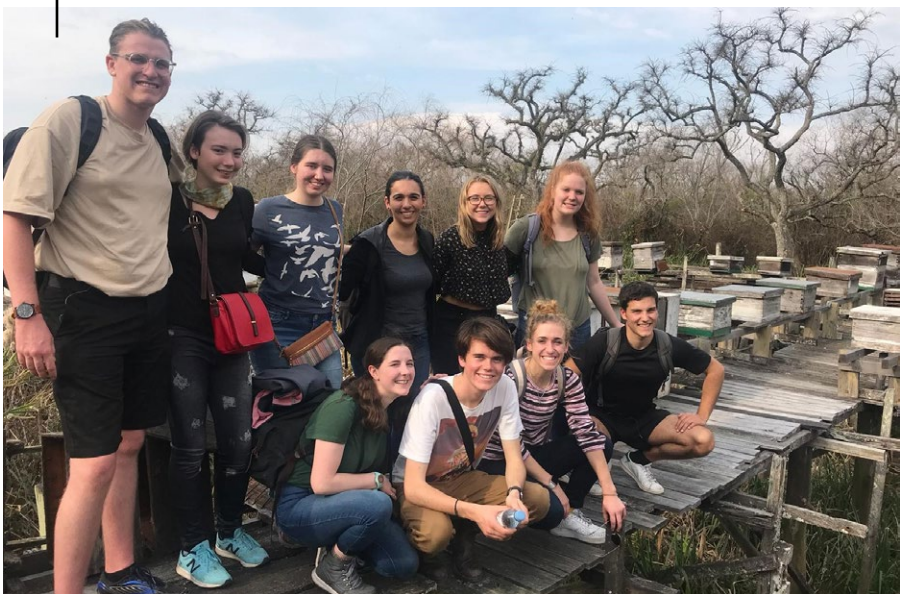
UWA and Nagoya University leaders and students at Thurling Green.

Professor Siddique was joined by fellow UWA leaders including Global Engagement Pro Vice Chancellor Jennifer Howell, Head of the School of Biological Sciences Associate Professor Patrick Finnegan, Head of the UWA School of Agriculture and Environment Associate Professor Matthias Leopold, Head of the School of Molecular Sciences Professor Paul Low, Head of the School of Human Sciences Professor Michael Rosenberg and Dr Nicolas Taylor.

The group discussed past achievements and future area of collaboration between two world class universities.

UWA commenced its joint PhD in agriculture and related disciplines with NU in 2020, with the first cohort of joint UWA-NU PhD candidates successfully graduating in 2022.

UWA students learning about beekeeping in Argentina.



Miranda Slaven assisting a Nottingham University PhD student harvest sugar beet.

Expanding horizons
for 47 UWA scholarship recipients

A six-year scholarship program that recipients described as 'the most rewarding and immersive experience' of their time at university wrapped up in December 2022.

Funded by the State Government, the Science and Agribusiness Connect Tertiary Program provided 47 UWA students the opportunity to develop their skills and knowledge of agricultural science outside the classroom.

The scholarships enabled students to conduct research projects in regional WA, gain valuable work experience with regional agribusiness, or travel overseas and expand their horizons on international exchange.

"It has opened my eyes up to a completely different side of agriculture and showed me the diverse job opportunities in regional WA."

UWA program coordinator Associate Professor Louise Barton said the scholarship recipients applied their tertiary studies to real-world issues.

"Importantly, they learned how their skills and interests could contribute to the development and enhancement of the future of WA's agricultural industry," Associate Professor Barton said.

"Many of the students who received these scholarships have gone onto bigger and better things, including working as agronomists in regional WA or perusing their interests in agricultural research.

"I'm proud of every one of them."

Seventeen research project students worked alongside regional agribusiness partners to improve understanding of a variety of issues facing WA's primary producers.

"I think the contacts I have made and the skills and experience I have gained through this program will make me an attractive candidate for future employers."

This included developing a rapid test for detecting herbicide-resistant ryegrass, and determining the effect of crop and pasture residue incorporation on soil organic carbon accumulation.

Zed Briginshaw inspecting cotton crops in the Ord River Irrigtaion Area, Kununurra, WA.

Agribusiness Connect scholarships increased the awareness of opportunities in agriculture to a broader range of students.

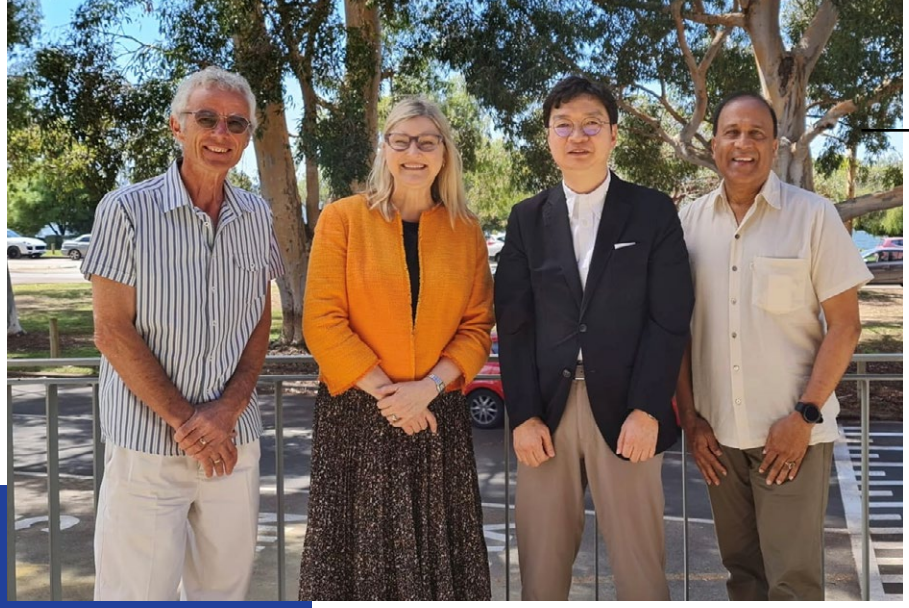
Work placement scholarships were awarded to fifteen students studying a variety of subjects including agricultural science, agricultural economics, botany, conservation biology, genetics, and natural resource management.

"This allowed me to experience new cultures, teaching styles and experiences giving me an extremely well-rounded student experience."

Associate Professor Barton said a further 15 students participated in international agricultural short courses in Argentina, England, Denmark and Japan.

"For example, four recipients improved their knowledge of the development of Argentinian agricultural production systems, while another has gained practical skills in identifying diseases in agricultural and horticultural crops," she said.

Associate Professor Louise Barton
louise.barton@uwa.edu.au



Dr Peter Batt, Professor Anna Nowak, Professor Masayoshi Shigyo and Professor Kadambot Siddique at The University Club of WA.

Research exchange ripe for the picking

The UWA Institute of Agriculture warmly welcomed Yamaguchi University (YU) plant geneticist Professor Masayoshi Shigyo to UWA's Crawley campus in early March.

Hackett Professor Kadambot Siddique, UWA Deputy Vice Chancellor (Research) Professor Anna Nowak, Honorary Research Fellow Peter Batt and Professor Shigyo discussed potential avenues for research exchange between their two universities over lunch.

Professor Shigyo then delivered a public lecture on his multidisciplinary vegetable crop research to about 40 people at the UWA Agriculture Lecture Theatre.

Having engaged in genetic and breeding research for more than three decades, he recently turned his attention to searching for vegetable genetics resources in various parts of Asia.

Professor Shigyo's research team has laid the foundations for growing vegetables in plant factories and developed new plant cultivation methods using purple, red, and blue LEDs.

Fresh crop of talent for Soil Science Australia

It's an especially exciting time to be working in soil science, says newly minted Soil Science Australia (SSA) WA branch president George Mercer.

"The post-pandemic challenges surrounding food security, fertiliser supply, carbon markets and sustainable agriculture all demand innovative solutions that will have impacts on the management of soil," the UWA PhD candidate said.

Mr Mercer said the SSA WA committee fondly recognised the four-year contribution of former president, DPIRD research scientist Henry Smolinski.

UWA's Dr Hira Shaukat joined the SSA WA as early career representative and Zahra Nizbat as PhD student representative.

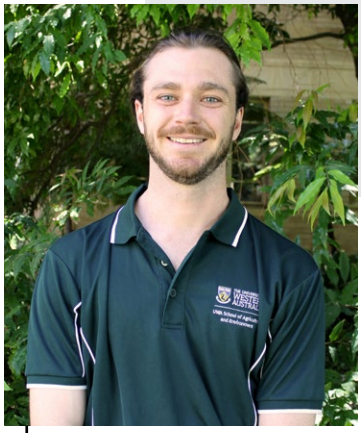
The committee also welcomed South-West WA Regional Soil Coordinator Jenni Clausen and UWA Master of Philosophy student Prasanthi Sooriyakumar.

At the AGM in January, SSA WA reflected on its achievements for 2022, including the Annual Boodja Lecture delivered by National Soils Advocate the Hon Penelope Wensley AC and the World Soil Day conference on 5 December at the State Library of Western Australia.

Members of the committee at its AGM in January.

SSA WA partnered up with SoilsWest to deliver the sold-out event, which spanned a range of topics including First Nation's knowledge, nutrient management, measuring on-farm natural capital, and terroir for viticulture.

UWA's Dr Bede Mickan and Mr Mercer presented their latest research achievements and discussed the challenges and opportunities for nutrient recovery and soil carbon stabilisation from human-derived waste resources.



SSA WA branch president George Mercer.

William Thomas, Professor Jacqui Batley, Professor Kadambot Siddique, Mukesh Choudhary, Coco Divola, Marie-Louise Carroll, Helen Carroll, Michael Young and Professor Phil Vercoe.

Two decades, 27 Fellows, immeasurable impact

To mark 20 years since the Mike Carroll Travelling Fellowship was established, a video featuring interviews with past and present students was premiered to guests at the 2023 presentation evening in February.

To date, 27 postgraduate students from UWA have benefitted from the Fellowship since the first recipient was awarded in 2003.

UWA guests and friends of the Carroll family attended the special event at The University Club of WA to hear from three of the most-recent Fellowship recipients.

The UWA Institute of Agriculture Director Hackett Professor Kadambot Siddique welcomed attendees and premiered the video, which led to student introductions by the late Dr Carroll's wife Helen and daughter Marie-Louise.

Currently three years into his PhD in Agricultural Economics, Michael Young has spent his postgraduate studies developing a new farm analysis tool to optimise farm management in the face of increased climate variability.

For his Fellowship, he travelled to New Zealand to learn and experience farming outside of his studies and own experiences growing up on a farm in Kojonup.

The second presenter was PhD student Mukesh Choudhary – a researcher from the ICAR-Indian Institute of Maize Research in India researching heat stress tolerance in wheat.

He outlined how he used his Mike Carroll Travelling Fellowship to visit the Plant Breeding Institute, Narrabri and The University of New England in New South Wales.

The final speaker was PhD candidate William Thomas from UWA's Batley Lab, who travelled to Canada to undertake research related to identifying new sources of disease resistance in canola.

To date, 27 postgraduate students from UWA have benefitted from the Fellowship since the first recipient was awarded in 2003.

Editors forecast flood of journal contributions

A decade since it first launched, the World Water Policy Journal has doubled its publication output from two to four issues per year.

Founded by The UWA Institute of Agriculture adjunct professors Susana Neto and Jeff Camkin, the journal provides a platform for the world's emerging water leaders and thinkers.

With the continued support from The Policy Studies Organization and Wiley, co-editor in chief Professor Neto said the journal would now publish quarterly – two general and two special issues per year based on critical regional or thematic water issues.

"World Water Policy Journal is devoted to encouraging and disseminating new thinking about water policy, practice, and the learning that supports them," she said.

Professor Camkin said climate change and its impact on water was one of the great global challenges of our times.

"We look forward to further contributions to World Water Policy from UWA colleagues and collaborators all around the world and welcome your ideas for potential special issues of the journal," he said.

World Water Policy Journal co-editors, professors Susana Neto and Jeff Camkin.

Next generation of UWA's top agricultural scientists on show

Postgraduate Showcase presenters Junrey Amas, Marcela Del Carmen Vieira, Bablu Hira Mandal, Sylvester A Obeng-Darko, Samalka Wijeweera, Doraid Alkhishaybi and Mukesh Choudhary.

Are you curious about the economic impact of dung beetles in Australia?

What about ways to identify disease resistance in canola, enhance stress and salt tolerance in wheat, find factors that influence DHA in honey, alleviate glyphosate damage to crops, or boost reproduction performance of rams?

These innovative research topics will be explored at The UWA Institute of Agriculture's 2023 Postgraduate Showcase on Wednesday, 31 May at UWA Bayliss Lecture Theatre.

"Unravelling the unknown in science to apply it in the context of clean, green and ethical livestock production excites me about my research."

Doraid Alkhishaybi

Seven outstanding postgraduate students from across three schools – Junrey Amas, Marcela Del Carmen Vieira, Bablu Hira Mandal, Sylvester A Obeng-Darko, Samalka Wijeweera, Doraid Alkhishaybi and Mukesh Choudhary – will present their research achievements in agriculture and related areas.

Department of Primary Industries and Regional Development (DPIRD) Director General Heather Brayford will deliver a special address ahead of the afternoon tea break.

The two sessions will be chaired by the Head of the UWA School of Agriculture and Environment Associate Professor Matthias Leopold and UWA Business School Professor Sharon Purchase.

The Institute Director Hackett Professor Kadambot Siddique said this year marked the 17th annual Postgraduate Showcase.

"I am proud to report that 122 early-career researchers have presented at this event since its inception in 2007," Professor Siddique said.

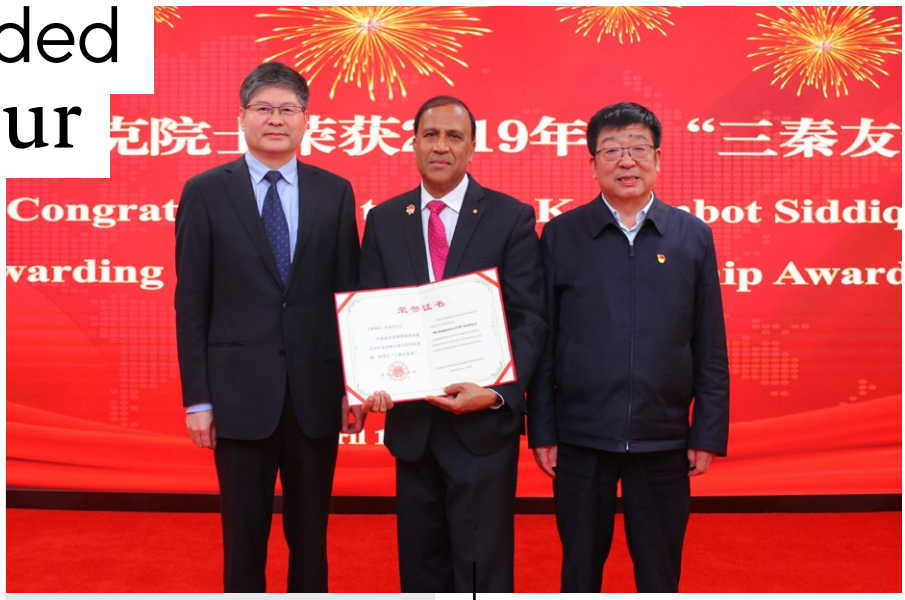
"I am using genomics to accelerate the development of sustainable genetic solutions to combat the threats facing crop production, including the proliferation of plant diseases."

Junrey Amas

"This showcase is an important opportunity for our postgraduate students to enlighten and engage with farmers, scientists, academics and the wider agricultural community."

Notable former presenters include the UWA Centre for Agricultural Economics and Development Deputy Director Dr Fiona Dempster, West Midlands Group executive officer Dr Nathan Craig, and InterGrain Business and Research Development Manager Dr Dini Ganesalingam.

Director awarded highest honour in China



NWAFU President Professor Wu Put, Professor Kadambot Siddique, and Shi Gaoling – the Deputy Secretary and Executive Vice Mayor of Yangling.

The highest honour that the Shaanxi Provincial Government in China bestows upon foreign experts was awarded to The UWA Institute of Agriculture Director Hackett Professor Kadambot Siddique last month.

Professor Siddique said he was immensely humbled and honoured to receive the Sanqin Friendship Award for his outstanding contribution to the economic construction and society development of Shaanxi Province.

The award was presented by Shi Gaoling, the Deputy Secretary and Executive Vice Mayor of Yangling, during a special ceremony at Northwest A&F University (NWAFU).

Professor Siddique is an Honorary Professor at NWAFU and is serving as the leading scientist of its Innovation Talent Project of Modern Water-saving Agriculture Technology for Arid Areas.

Over the past five years, their research collaborations have targeted sustainable agricultural development goals to achieve significant economic, social, and ecological benefits.

Professor Siddique and NWAFU scientists have jointly published more than 100 academic papers and assisted in supervising more than 20 postgraduate students.

During his visit, Professor Siddique spent quality time with a group of talented postgraduate students within the Institute of Water Saving Agriculture in Arid Areas of China at NWAFU.

"It has been my pleasure to help these students, who are part of my collaborator Professor Hao Feng's group, with their research and publications," he said.

Visitors to IOA

Name of visitor	Visitor's organisation & country	Host details	Date of visit
Dr N Veronica	ANGRAU, India	The UWA Institute of Agriculture	14 February – 29 March
Dr Venkata Ramana Rao Puram	ANGRAU, India	The UWA Institute of Agriculture	14 February – 29 March
Dr V Bhuvaneswari	ANGRAU, India	The UWA Institute of Agriculture	14 February – 29 March
Dr P Latha	ANGRAU, India	The UWA Institute of Agriculture	14 February – 29 March
Dr N Anurhada	ANGRAU, India	The UWA Institute of Agriculture	14 February – 29 March
Prof Mikio Nakazono	Nagoya University, Japan	UWA SDVC Prof Tim Colmer and H/Prof Kadambot Siddique	16 February
Prof Mitsutaka Taniguchi	Nagoya University, Japan	UWA SDVC Prof Tim Colmer and H/Prof Kadambot Siddique	16 February
Dr Han Wang	Nagoya University, Japan	UWA SDVC Prof Tim Colmer and H/Prof Kadambot Siddique	16 February
Prof Steve Shirtliffe	University of Saskatchewan, Canada	Australian Herbicide Resistance Initiative	7 March
Prof Masayoshi Shigyo	Yamaguchi University, Japan	The UWA Institute of Agriculture	8 March
Prof Senthold Asseng	Technical University of Munich, Germany	The UWA Institute of Agriculture	13 March
The Hon. Consul Amarjeet Singh Takhi	Consulate-General of India, Perth	The UWA Institute of Agriculture	27 March
Dr Todd Gaines	Colorado State University, USA	Australian Herbicide Resistance Initiative	30 March

Awards and industry recognition

Name	Award
H/Prof Kadambot Siddique	Sanqin Friendship Award, Shaanxi Provincial Government
Dr Terry Enright	GRDC Seed of Gold award
Ruby Wiese	AW Howard Research Fellowship
James O'Connor	AW Howard Memorial Trust Tim Healey Scholarship
Alistair Hockey	AW Howard Memorial Trust Tim Healey Scholarship
George Mercer	AW Howard Memorial Trust Tim Healey Scholarship
H/Prof Kadambot Siddique	Top 100 Best Plant Science and Agronomy Scientist – Research.com
E/Prof Hans Lambers	Top 100 Best Plant Science and Agronomy Scientist – Research.com
Prof Nanthi Bolan	Top 100 Best Plant Science and Agronomy Scientist – Research.com
Ad/Prof Neil Turner	Top 100 Best Plant Science and Agronomy Scientist – Research.com
E/ Prof Rana Munns	Top 100 Best Plant Science and Agronomy Scientist – Research.com
H/Prof Kadambot Siddique	Wiley Top Cited Article 2021-2022
Prof Nanthi Bolan	Wiley Top Cited Article 2021-2022
Assoc/Prof Parwinder Kaur	WA Women's Hall of Fame - STEM
Adj/Prof Ashwani Pareek	Fellowship for the Indian National Science Academy, India
Adj/Prof Ashwani Pareek	R N Tandon Memorial Lecture award from the National Academy of Sciences, India
Elliott Fourie	Westpac Future Leaders Scholarship
Georgia Welsh	Noel Fitzpatrick Medal – Young Professionals in Agriculture Forum
Dan Kierath	2023 WA Livestock Research Council scholarship
Garima	South-West WA Drought Resilience Adoption and Innovation Hub bursary
Jane Brownlee	South-West WA Drought Resilience Adoption and Innovation Hub bursary
Emanuel Gomez	South-West WA Drought Resilience Adoption and Innovation Hub bursary
Dan Kierath	South-West WA Drought Resilience Adoption and Innovation Hub bursary

New postgraduate research students (PhD)

Student name	Topic	School	Supervisors	Funding body
Linda Lindongi	The role of arbuscular mycorrhizal fungi in soil amended by organic waste resources	UWA School of Agriculture and Environment	Dr Sasha Jenkins E/Prof Lynette Abbott	Australian Award Scholarship
Elliott Fourie	RNA-targeting CRISPR systems for gene regulation in plants	School of Molecular Sciences	Prof Ryan Lister Prof Ian Small Dr Adil Khan	Westpac Future Leaders Scholarship Jean Rogerson Postgraduate Scholarship
Huyen Pham	Water and phosphorus efficiency in wheat	UWA School of Agriculture and Environment	H/Prof Kadambot Siddique Dr Jairo Palta Dr Jiayin Pang	Ministry of Education and Training, Vietnam Int. Cooperation Dept
Chuangwei Fang	Phosphorus use efficiency in chickpea	UWA School of Agriculture and Environment	E/Prof Hans Lambers H/Prof Kadambot Siddique Dr Jiayin Pang	ARC Linkage Project
Xiaolong Feng	Phosphorus remobilisation in chickpea	School of Biological Sciences	E/Prof Hans Lambers H/Prof Kadambot Siddique Prof Megan Ryan Assoc/Prof Peta Clode Dr Jiayin Pang	ARC Linkage Project
Huaikang Jing	Seed phosphorus in chickpea	School of Biological Sciences	E/Prof Hans Lambers H/Prof Kadambot Siddique Prof Megan Ryan Assoc/Prof Peta Clode Dr Jiayin Pang	ARC Linkage Project

Research grants

Title	Funding period	Funding body	Investigators
Differential solidification of steel slag to create a fertiliser co-product	2023-2026	ARC Linkage Project	Prof Tom Honeyands Prof Nanthi Bolan
Accelerated integration of physiology-based wheat traits within a commercial breeding programme	2023 – 2026	GRDC	Dr Nic Taylor Prof Harvey Millar
Intensification of northern cattle production in WA enabled by feed products from irrigated cropping	2023-2026	CRC for Developing Northern Australia	Prof Phil Vercoe Assoc Prof Dominique Blache Prof Shane Maloney
Determining the impacts of grazing oestrogenic clovers on cattle fertility	2022-2025	DPIRD	Prof Phil Vercoe Dr Tim Watts Jessica Shilling Dr Kevin Foster Assoc Prof Dominique Blache
Building an advanced genomics platform for Australian horticulture	2022-2027	Horticulture Innovation Australia Ltd Ex Murdoch	Assoc Prof Parwinder Kaur
Innovation in crop weed control	2022-2023	GRDC	Dr Michael Walsh Dr Andrew Guzzomi
Agricultural Innovations for Communities – Intensified and Diverse Farming Systems for Timor-Leste (AI-Com 2)	2022-2027	Australian Centre for International Agricultural Research ACIAR	Assoc Prof Louise Barton E/Prof William Erskine Assoc Prof Matthias Leopold Prof Nanthi Bolan Assoc Prof James Fogarty Assoc Prof Fay Rola-Rubzen
Building new technologies for sustainable and profitable sub clover seed harvesting	2022-2025	AgriFutures Australia	Dr Andrew Guzzomi Assoc Prof Phillip Nichols Prof Megan Ryan Wesley Moss Ruby Wiese Dr Joanne Wisdom

UWA IOA 2023 Publications

Peer Reviewed Journals

Previously unreported

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UPCOMING EVENTS

Lefroy Fellow Research Seminar: Livestock systems as sentinels for mammalian infertility

Friday, 5 May 2023
UWA Bayliss Lecture Theatre

Postgraduate Showcase: Frontiers in Agriculture

Wednesday, 31 May 2023
UWA Bayliss Lecture Theatre

Industry Forum: Paving the way for the next generation of WA agriculture

Wednesday, 19 July 2023
The University Club of WA

Alan Sevier Memorial Lecture

Thursday, 27 September 2023
UWA Bayliss Lecture Theatre

UWA Farm Ridgefield Open Day: Best Practice Farming Systems

Friday, 6 October 2023
UWA Farm Ridgefield, West Pingelly

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Editor: Rosanna Candler
rosanna.candler@uwa.edu.au
The UWA Institute of Agriculture
+61 8 6488 4717 | ioa.uwa.edu.au
The University of Western Australia M082
Perth WA 6009 Australia

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