



THE UNIVERSITY
of ADELAIDE



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From the Dean's office...



The School of Agriculture, Food and Wine embraces excellence in everything we do, from our innovation in teaching and building the careers of promising young people to research and development that advances understanding and supports our primary industries.

This is exemplified in the stories found in this newsletter.

You can read about the work of young scientist Stephanie Watts-Williams on zinc nutrition in crops and the accomplishments of Jennifer Gardner over her long career as curator of the Waite Arboretum.

You can also find out about how a visiting wine maker Zhang Jing enhanced our oenology program.

There's much more to read. I hope you enjoy this edition.

Professor Mike Keller



Delegates (including Mike Keller, front left) at the International AgroInformatics Alliance Conference, University of Minnesota, March 2017

Staff appointment changes

Professor Matthew Gilliam has been appointed Deputy Head of School Research in the School of Agriculture, Food and Wine. Matt is an ARC Future Fellow and Chief Investigator in the ARC Centre of Excellence in Plant Energy Biology (Adelaide node).



Professor Diane Mather, who previously served as Deputy Head of School Research, is now leading the School's very important Science for Plant Breeding initiative.



Dr Delphine Fleury has been appointed Director of the Australian Research Council (ARC) Research Hub for Wheat in a Hot and Dry Climate here at Waite, taking over from previous Director, Dr Sigrid Heuer.



Planting native vegetation for productive crops



Native blue-banded bee pollinating lucerne.
Photo: K. Hogendoorn

The University of Adelaide, working with South Australian industry groups, is helping farmers and growers design native plantings to support bee and other insect populations needed to pollinate their crops and orchards.

This is the first such project in Australia – expected to be a win-win for both growers and biodiversity, with enhanced productivity through improved pollination and increased biodiversity through revegetation with native plants.

“We know that crop pollination can be improved by revegetation on or around farms that supports pollinators. It’s a strategy used in major horticultural regions in Europe and the US, but not yet in Australia,” says project co-leader Dr Katja Hogendoorn, from the School of Agriculture, Food and Wine.

Crops such as lucerne, almonds, apples and cherries rely on insect pollinators to pollinate their flowers to produce seeds, nuts or fruit. Canola yield and quality can also be improved with good pollination services.

“Like humans, bees need a varied diet and this means pollen and nectar from a range of flowers. Crops provide one-sided nutrition and when they finish flowering, there is often very little alternative food around for pollinators. We are looking to improve the landscape to secure pollinator populations and their crop pollination services,” Dr Hogendoorn says.

Researchers are mapping the activity of honeybees and native pollinators in areas of revegetation and native vegetation around different crops in South Australia. They will create a short-list of the most useful pollinating species and identify the plants used by the pollinators as sources of pollen and

nectar. This will allow strategic choices in revegetation with a selection of the plants that benefit crop pollinators.

“An important outcome from the project will be planting guides and a web-based tool which will enable users to map vegetation plantings around their crops that will provide the best habitat for pollinators in order to maximise productivity gains,” says project co-leader Professor Andrew Lowe, Chair of Plant Conservation Biology in the University’s Environment Institute. “This project is a great example of how the University is using innovative thinking to improve productivity and sustainability in cropping and food.”

Project partners include Lucerne Australia, Apple and Pear Growers of SA, Trees for Life, O’Connor NRM, Primary Industries and Regions SA (PIRSA), Department of Environment, Water and Natural Resources; Almond Board of Australia, Native Vegetation Council, Greening Australia, South Australian Apiarist Association, various NRM boards and Rural Industries Research and Development Corporation.

The University of Adelaide will further collaborate with the University of Sydney to assess local densities of wild honey bees in pollination dependent crops and with the University of New England and ANU to understand the economic value of individual crop pollinating species for different crops.

This project is supported through funding from the Australian Government Department of Agriculture and Water Resources as part of its Rural R&D for Profit Programme. The total value of the project is \$9M, of which \$4.5M is allocated to activities in South Australia.



Native furrow bee pollinating canola.
Photo: M. Edwards

Science meets Parliament



By Dr Jayakumar Bose, DECRA Fellow

Science Meets Parliament is an annual event of Science and Technology Australia. It brings 200 of Australia’s leading scientists and technologists to Canberra to stimulate and inform parliamentarians of how science contributes to society and public policy. The event also provides participants with an insight into political, policy, media and parliamentary processes.

This year I had the opportunity to be a part of Science Meets Parliament which was held on March 21 and 22. The event enabled me to get to know the views of some of Australia’s most influential and passionate parliamentarians, science advisors, STEM professionals and media personalities.

Day one was about professional development, building connections and collaborations. It included useful advice on how to turn science into news, how science is used to shape public policy, how to convince a parliamentarian without focusing on money/funding, and how to pitch my science. I felt optimistic after hearing about the commitment of both the government and opposition to science and technology in Australia.

On day two, I met Honorable Senators Chris Back and Chris Ketter face-to-face in their parliamentary offices. I was really impressed by the way they listened and engaged with me about how to grow crops in salty soils. I was also inspired by the speeches and parliamentary forum. The glowing endorsement of curiosity driven research by Professor Alan Mackay-Sim, Australian of the Year, particularly resonated with me.

The University of Adelaide External Relations branch also hosted a breakfast event which allowed us to interact, promote science and build connections with our local parliamentarians and alumni.

I would like to thank Australian Society of Plant Scientists for giving me this opportunity to represent plant scientists at this event.

Waite study visit by Northwest Agriculture and Forestry University delegation



A/Prof Chris Preston describes some of the School's weed science research to the NWAUFU students

For the third year, the School of Agriculture Food and Wine hosted a delegation of students from the Northwest Agriculture and Forestry University (NWAUFU) in the Shaanxi Province, China.

The study program, initiated by Mike Keller as a way to strengthen our ties with our Chinese partners, was coordinated by Ben Pike, Technical Service Manager.

The group of 21 students in their sophomore year are studying a mixture

of Viticulture and Oenology, Agriculture, Horticulture and Agribusiness. They were accompanied by two academics.

After a week of intensive English studies in the University's English Language Centre, Grenfell St, the group then spent three weeks with our School.

The first week was focused on Viticulture, Oenology and Sensory studies culminating in a tour to the Adelaide Hills for vineyard and cellar door visits at Nepenthe and Howard Vineyard.

Week two focused on other Agriculture and Biotechnology disciplines where the group were given some insight into our grain breeding programs, almond breeding and Plant Cell Walls, Cell Biology and Crop Protection programs. They also visited Peats soils and The Food Forest, Gawler at the end of the week.

The highlight of the trip for the students was a visit to Kangaroo Island in the last week. Along with some sightseeing,

the students learned about bee keeping, dairy production, eucalypt oil production, viticulture, aquaculture and apple growing for cider and the challenges these enterprises face in the unique island environment.

They stayed at the Flinders-Baudin Research Station, Flinders Chase National Park for two nights. The students were also given the challenge of devising their own menus, then purchasing and preparing their own meals for two nights and two days.



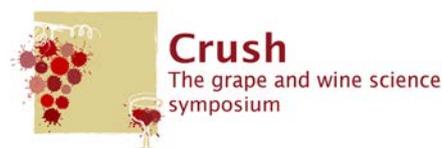
Eleven of the NWAUFU delegation joined Prof. Mike Keller on a 34km bike ride from the city to Henley Beach and back.

Coming up at Waite....save the date!

This year's Peter Waite Day event will be held from 3-6pm on Friday 12 May in the gardens adjacent Urrbrae House.

The WRI invites you to attend this annual campus community-building event, which is a great opportunity to meet and network with people working at the other Waite organisations. Complimentary drinks, finger food, games and prizes will be in the mix, so come along, socialise and have some fun!

Please RSVP to Lisa Dansie by Friday 5 May at lisa.dansie@adelaide.edu.au for catering purposes and also to register a team for the bocce tournament. The Peter Waite Bocce Trophy, currently held by the Fertiliser Mafia team from the AFW Soils group, will be up for grabs again!



The 2017 Crush symposium will be held on 13 & 14 November at the Plant Research Centre.

Crush is an opportunity for researchers, technical staff, academics and students to share the latest knowledge in grape and wine science in Australia.

Hosted at the Waite Campus, the event offers a unique opportunity for developing potential industry and research collaborations, and also networking.

For more information about the event and sponsorship, or to register Expressions of Interest to present, please visit www.thewaite.org/waite-partners/wine-innovation-cluster/wic-crush/

The inaugural 'Waite in the Spotlight' was held in July 2016 and was a shared Waite Campus event featuring TEDx-style talks celebrating the diversity of research at the Waite and exploring how microbes can transform the future of Agriculture.

Waite in the Spotlight will be back in 2017 and is proposed for Friday 29th September. The theme of the event and speakers from across the campus are currently being confirmed.

Keep an eye on the Waite website and weekly alert for announcements and more details as they are finalised!

You can view videos of last year's talks at www.thewaite.org/waite-in-the-spotlight-2016/



Retirement for Dr Jennifer Gardner after invaluable career



Dr Jennifer Gardner OAM retired in February after more than 30 years of invaluable contribution to the Waite Historic Precinct in her position as Curator of the Waite Arboretum, creative developer of the Urrbrae House Gardens, custodian of the Waite Conservation Reserve and advocate for the natural environment.

Jennifer has been Curator of the Waite Arboretum since 1986 – the longest serving curator and one of only two women to occupy the position so far.

During her tenure, she has committed herself to promoting and developing Peter Waite's vision that part of his bequest be used for a "park or garden for the recreation and enjoyment of the public".

Jennifer has had a connection to the Waite and Waite Arboretum from a very young age. Her mother took in boarders from the Waite Institute including microbiology graduate, Coralie Potter.

From early childhood, Jennifer was interested in detail and classifying things. When she had to undertake a year 7 project at Linden Park Primary School, Jennifer chose to do a project on the Waite. She visited each department of the Institute and was impressed by how people generously gave their time to share their knowledge about the projects they were working on and still has the project book she put together.

From the outset, Jennifer's approach to the management of the Waite Arboretum was to pursue the best future for the Waite Arboretum. She has overseen what can be called the 'third phase' of the Arboretum's development – as a working collection of trees and a place for the enjoyment of the public. She has

focused on improving the aesthetics of and public access to the Arboretum while working collaboratively with the wider community to build support for the Arboretum. Today, the Waite Arboretum is home to over 2,300 specimens.

Jennifer has also had responsibility for the Urrbrae House Gardens and Waite Conservation Reserve. Enlisting the help of many volunteers, she has overseen the transformation of the beautiful gardens since 1992 and been fundamental to the ongoing development and remediation of the Waite Conservation Reserve.

Together with former Urrbrae House curator Yvonne Routledge, Jennifer was also instrumental in seeing the house opened up to the public for the first time in 1991.

She established the Friends of the Waite Arboretum in 1994 and the Friends of the Waite Conservation Reserve in 1997 and was instrumental in founding TREENET (Trees & Roadway Experimental & Education Network) over 20 years ago.

From everyone here at the Waite, we congratulate Jennifer on her outstanding career and wish her well in retirement.

Recent achievements and awards

Congratulations to the following School of Ag, Food and Wine people whose achievements have been recognised:

- > **Dr Jennifer Gardner** was awarded a Medal (OAM) of the Order of Australia for service to conservation and the environment in the 2017 Australia Day Honours.
- > **Dr Caitlin Byrt** is the recipient of the Grains Research and Development Corporation Award at the 2017 Science and Innovation Awards for Young People in Agriculture, Fisheries and Forestry.
- > University of Adelaide Wine Alumna and PhD student **Mary Retallack** was recognised in the 2017 Businesswomen's Hall of Fame honours list.
- > **Dr Jayakumar Bose** was awarded the Daniel Walker Medal in the 2016 Faculty of Sciences Awards.
- > PhD student **Joanne Gambetta** is the recipient of the KP Barley Prize, awarded at the 2016 Faculty of Sciences Awards.
- > Honours student **Sacha Clifton** is a joint winner of the 2017 David Murray Scholarship.
- > **Dr Therese McBeath**, CSIRO research scientist and AFW Affiliate Lecturer has been presented with the Grains Research and Development Corporation (GRDC) Southern Region 2017 Emerging Leader Award.
- > **Colin Rivers** was awarded best poster (Australian) at the Joint NZ Society of Soil Science and Soil

Science Australia Conference in Queenstown NZ in December 2016.

Well done to all these members of the School for their well deserved recognition of outstanding academic and research performance.



Getting to the root of plant zinc health



Dr Stephanie Watts-Williams at the Australian Plant Phenomics Facility's Adelaide node, The Plant Accelerator

Sunlight and water are two obvious requirements essential for healthy plant growth, but did you know that zinc is also a vital ingredient?

Zinc is a critical nutrient in hundreds of enzyme systems which are necessary for normal plant function. Zinc is also critical for human health – in fact, zinc is involved in more body functions than any other mineral.

Plants get zinc from the soil via their root systems. This uptake of nutrients is enhanced in many plants by mycorrhizal fungi which colonise the roots, creating a vast connection between the plant roots and the soil around them.

Mycorrhizal fungi effectively increase the surface area of the roots, collecting nutrients from the soil beyond the reach of plant roots alone, and transfer these nutrients back to the plant.

Scientist Dr Stephanie Watts-Williams wants to find out how mycorrhizal fungi can improve the zinc nutrition of plants, and subsequently impact on human health – particularly in countries where zinc malnutrition is a serious issue.

“I am working with *Medicago truncatula*, which is an important pasture legume in Australia and a good study species as it grows quickly and is easy to work with,” Stephanie said. She is currently utilising the Plant Accelerator here at Waite to conduct experiments looking at the effect of different zinc concentrations in soil on plant growth and zinc levels.

“Initially, I’m aiming to uncover genes and transporters that are responsible

for moving zinc into the plant from fungi that colonise the roots of *Medicago*. I can then use this information to see if it can also be applied in an important crop species such as barley.”

Stephanie’s research has potential implications for food production and human health. “The mycorrhizal symbiosis will be more efficient and effective at taking up nutrients into the plant, so farmers could apply less fertiliser while achieving the same nutrient concentrations and yield in the crops,” she said.

“Australian soils are old, weathered and quite depleted of nutrients, especially in regions where our cereal crops tend to be intensively grown. This means that any way we can improve efficiency of nutrient uptake from the soil should be of benefit to farmers in terms of more nutritious crops and/or reduced need for fertilisers.”

“Looking beyond our own backyard, increasing the concentration of zinc and other nutrients in the edible parts of plants (known as biofortification) could have a real positive impact on the lives of people in developing countries”.

Stephanie started at the Waite in 2016 where she is a Ramsay Fellow with the School of Agriculture Food and Wine and the ARC Centre of Excellence in Plant Energy Biology.

Originally from Melbourne where she completed her undergraduate, Honours and PhD studies, Stephanie spent 18 months at the Boyce Thompson Institute

for Plant Research at Cornell University, New York before moving to Adelaide.

“I’m enjoying the community environment at Waite. I was worried that coming from such a large University such as Cornell, that I would be frustrated with the isolation of working in Adelaide, but this hasn’t been the case and Waite campus has an enormous wealth of resources and researchers,” Stephanie says.

“For example, I’ve found I can source my *Medicago* and barley seeds easily because of the Australian Pastures Genebank located in my own building, and the barley breeding group located on campus. The Plant Accelerator is an amazing resource that I have already tapped into, and I’m looking forward to seeing the results from my experiment there.”

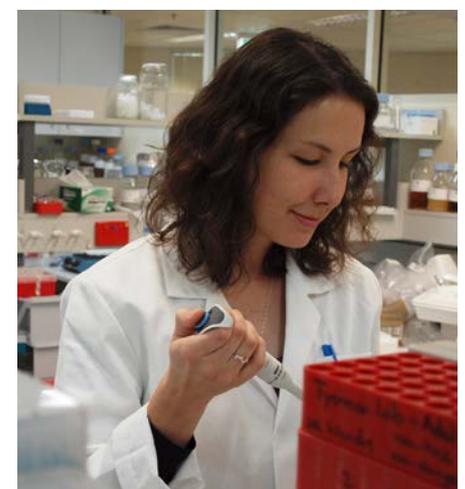
The Ramsay Fellowship was established by the University of Adelaide in 2008 with a bequest by the Ramsay family, founders of Kiwi Shoe Polish Company.

The four-year Ramsay Fellowships are offered annually to help advance scientific research and to encourage young Australian scientists working overseas to return home without disadvantaging their careers.

Outside of the lab, Stephanie enjoys playing Pokemon Go and Playstation, reading comic books and building superhero themed Lego sets!

You can find read more about Stephanie’s research at: <https://mycorrhizalresearch.com/>

Or find her on Twitter: [@myco_research](https://twitter.com/myco_research)



Field trials for oat varieties

Oat varieties that have grown well in saline/sodic soils in a growth room and greenhouse screening study will now be tested under field conditions.

The project has attracted just under \$250,000 funding over 2 years and 8 months from the South Australian Grain Industry Trust Fund (SAGIT).

Researcher Dr Graham Lyons said the project aims to demonstrate which commercially available Australian oat varieties are relatively saline/sodic tolerant, and which overseas-bred varieties could be used by breeders to further improve the current tolerant Australian varieties.

"The identification of oats that will grow better in harsh conditions will have real on-farm impacts," he said. "Farmers will be able to better utilise some marginal lands, resulting in higher incomes for farmers in these areas".

Sodic soils are common in Australian cropping areas and secondary salinity is often present in these soils. Yield losses of around 50% are common.

"Farmers will be able to grow our recommended tolerant varieties on saline/sodic paddocks and expect to obtain higher yield than by growing non-tolerant varieties.

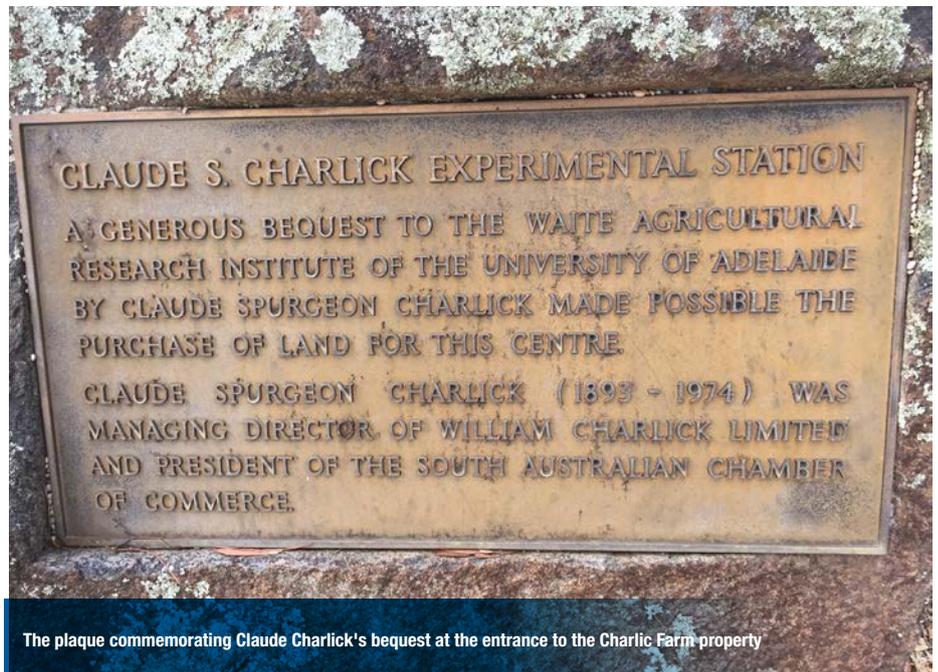
"We expect, given our findings to date, that our most tolerant oats will yield at least as highly as the most tolerant barley varieties on these soils."

Collaborators on the project include Yusuf Genc, John Harris, Dr Pamela Zwer and the SARDI oat breeding group here at Waite.



Yusuf Genc & Graham Lyons with oats in the glasshouse

Charlick Farm: support for plant breeding research



The plaque commemorating Claude Charlick's bequest at the entrance to the Charlick Farm property

Claude Spurgeon Charlick came from a well-known South Australian family of grain merchants and flour millers, and had been Managing Director of William Charlick Ltd from 1923 to 1966.

Charlick bequeathed \$100,000 to the University of Adelaide for agricultural research. When the bequest became available in 1978, the funds were used to purchase farming land on which agronomic experimental work could be undertaken.

After initially considering buying land at Roseworthy, the 112 hectare Sandergrove property near Strathalbyn was purchased for \$112,000.

The property became the Charlick Experiment Station in recognition of Charlick's gift. Further support for the Station came from Charlick's family.

Graham Keane, Claude Charlick's nephew and manager of William Charlick Ltd, assisted in the establishment of the memorial station by forming a small company, Spurgeon Nominees, which for a period of time gave the Waite Agricultural Research Institute access to additional funding to develop the property.

The farm was established specifically for research activities. Since its development in the late 1979, the main

research focus has been plant breeding and especially barley breeding.

The other main user of the property is the faba bean breeding program. There has been some use by SARDI pea and vetch breeding as well as small and intermittent use by agronomists, ACPFG and other researchers in the School of Agriculture, Food and Wine.

The farm is seen as a key site for both the barley and faba bean programs as much early generation selection is done at the site.

Charlick's isolation from the major faba bean growing regions of the Lower North means that it is an important area for disease assessment and artificial inoculation of plots.

More recently the University has been looking to this site for development of a joint drone lab with Lian Pin Koh from the School of Biological Sciences.

A master course on the use of drones for ecology and agriculture is also under early development. It will involve theoretical and practical courses, including CASA certification which will be delivered by bringing in a CASA certified training company.

Visiting International Winemaker lends expertise to Waite students

Chinese winemaker Zhang Jing recently spent a month at the Waite as the 2017 Visiting Winemaker, lending her experience and insight to the School's viticulture and oenology students. Jing is winemaker and co-owner of high-altitude winery Chateau Helan Qingxue in northwestern China's Ningxia region.

The Crawford family established the Walter, Carew and Richard Reynell Fellowship in 1975 to honour the contribution of the Reynells to Australian winemaking and to perpetuate the memory of two sons tragically lost through two World Wars.

The Fellowship underpins the Visiting Winemaker program at the University of Adelaide. A winemaker of high standing and typically from outside of Australia

spends up to four weeks working with the University's oenology and viticulture students.

Jing studied in China and the Rhone Valley, France and has worked with winemakers in Australia and South Africa. The Helan Qingxue (meaning *sunshine and snow on Helan mountains*) winery opened in 2005 and cultivates Merlot, Cabernet Sauvignon, Chardonnay and a local grape called Cabernet Gernischt.

In 2011, Qingxue Vineyard won the International Trophy at the Decanter World Wine Awards for its Jia Bei Lan Grand Reserve 2009 (2009 Cabernet), which is the highest award ever won by a Chinese winery.



Visiting Winemaker Zhang Jing

During her time at Waite, Jing helped the students with vintage and ferments, gave seminars, and held two wine tastings for students and staff. The first tasting covered wines (including ice wine) from the Ningxia wine region in China the second her own wine from Chateau Helan Qingxue.

Recent Waite Visitors



His Excellency Mr Mohamed Khairat (pictured right) talks with Dr Trevor Garnett at The Plant Accelerator. Photo: Jo Pitman

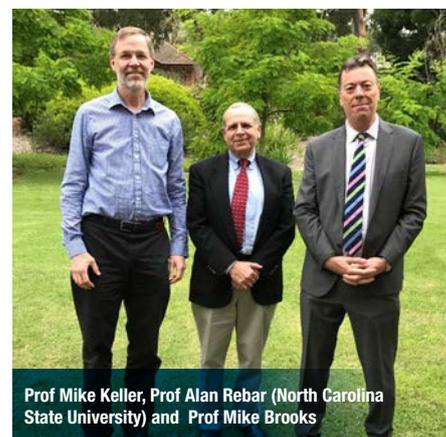
The Waite has recently hosted the following visitors:

- > His Excellency Mr Mohamed Khairat, Ambassador of The Arab Republic of Egypt visited the Waite in January to investigate opportunities for research collaborations.
- > Mr Abdul Qadeer Jawad, Deputy Agriculture Minister from the Islamic Republic of Afghanistan, visited in December for an overview of the Waite's agricultural research activity and capability.

- > Mr Noel Campbell and Mr Robert Ferguson, Australian Ambassadors to Argentina and Chile toured the Waite and met with researchers from across the Campus partners.
- > Professor Alan Rebar, Vice Chancellor for Research, Innovation and Economic Development at North Carolina State University toured the Campus and met with Mike Keller and Mike Brooks in February.
- > Thirty students and faculty on a study summer school from California Polytechnic State University (CalPoly) enjoyed a tour of the Waite and wine tasting in January.
- > A delegation from Plant Food Research (NZ) visited the Waite in March to learn about research activities and services offered.
- > A delegation from the European-based Accreditation Council for Entrepreneurial and Engaged Universities toured the campus to talk to staff and view examples of community and industry engagement.
- > Eight IP professionals from Shandong, China, hosted by the Department of State Development toured the Waite in December.
- > Dr Hillary Agaba, Director of Research, National Forestry Resources Research

Institute, Uganda and 2017 ACIAR John Dillon Fellow visited the Waite in March, hosted by Ian Nuberg.

- > Roslyn Jettner and Larisa Cato from the Australian Export Grains Innovation Centre presented a South East Asia Market Intelligence Forum on Wheat Quality on March 5th. The forum, hosted by PIRSA and the University of Adelaide, was attended by growers and researchers and was followed by a campus tour.
- > Sixteen participants from several UK Universities visited the Waite and met with AFW staff as part of a Wesley Leadership Development workshop on Strategic Change in Higher Education.



Prof Mike Keller, Prof Alan Rebar (North Carolina State University) and Prof Mike Brooks

South Aussie with Cosi

A film crew visited the Waite late last year to film a segment for the popular Channel 9 program *South Aussie with Cosi*.

The segment is scheduled to go to air on Friday 28th April at 8pm on Channel 9. It will highlight the Waite as one of SA's best kept secrets, the history of the campus, the type of research that happens here and why it is important.

Note the date, grab some popcorn and make sure you are watching! Mike Keller, Kerry Wilkinson, Jason Able, Bianca Kyriacou, Lynette Zeitz and Laura Wilkinson all feature in the segment.



Waite for Us! rides again

The Waite campus was well represented in the 157 km BUPA Challenge, part of the Tour Down Under in January. Six riders took to the road at Norwood following the same Stage Four course through the Adelaide Hills as the

professional peloton. Riders pictured below in the Waite for Us team included: Peter Crisp (SARDI), Simon Robinson (CSIRO), Chris Ford, Kenton Porker, Hanru Wang and Mike Keller (University of Adelaide).



Science Experience comes to Waite

Over seventy students plus teachers visited the Waite in December 2016 as part of the ConocoPhillips Science Experience hosted by the University of Adelaide.

The program gives year 9 and 10 high school students from across the state the opportunity to spend 3 days engaging in hands-on activities and events at the University's North Terrace and Waite campuses.

They get a glimpse of University life, participate in lab experiments, hear from senior lecturers and research staff, and find out about the undergraduate degree programs available after high school.

At Waite, the visiting students carried out soil and plant science experiments, explored a virtual reality plant cell, toured

the Plant Accelerator, investigated the function of plant cell walls and performed DNA extractions.

Activities were run by staff from the Why Waite program, the ARC Centres of Excellence in Plant Cell Walls and Plant Energy Biology, the School of Agriculture, Food and Wine, and the Waite Research Institute.

It was fantastic to welcome such engaged and interested students into some of the research and teaching facilities here at Waite. Hopefully some of them will return as undergraduates in a few years time!

The Science Experience program is also supported by Rotary, Young Scientists Australia (SA Chapter) and the Australian Science Teachers Association.

