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## From the Dean's office...



This has been a momentous year for the School of Agriculture, Food and Wine. Our research in Plant Sciences is undergoing significant change as we restructure following the termination of commercial barley breeding and the decision by shareholders to wind up ACPFG Pty Ltd. The good news is that barley breeding and cereal genomics will continue to be key research areas for the school.

The School has been active in participating in the launch of the Global Institute for Traditional (Chinese) Medicine with three universities in China, Shanxi University of Traditional Medicine, Jianxi University of Traditional Medicine and Heilongjiang University of Chinese Medicine. Our research will contribute to the cultivation and analysis of medicinal plants.

Congratulations to Matt Gilliam on his promotion to Professor.

As the year draws to a close, I extend my best wishes to the Waite Community, friends and stakeholders for the Christmas holiday break and the New Year.

Professor Mike Keller



Group photo of delegates from the University of Adelaide and partner Chinese Universities at the launch of the Global Institute for Traditional (Chinese) Medicine in China.

## New phase for plant genomics research at Waite campus

The University of Adelaide will gear up its research to improve cereal crop productivity and resilience as a major centre in the field winds down in 2017.

Shareholders of the Australian Centre for Plant Functional Genomics Pty Ltd (ACPGF) voted for a leaner future, following the ending of its core grant support. ACPFG will see out its international research contracts over an extended period prior to wind up, while the University of Adelaide – its largest shareholder – will in parallel enhance its activities in plant genomics research to continue to serve the needs of the grains industry.

“The University of Adelaide is committed to research using the latest biotechnology to improve cereal crops’ ability to grow in challenging conditions, including drought, salinity and nutrient deficiency,” says Professor Mike Brooks, Deputy Vice-Chancellor (Research).

“This research, leading to higher yielding and more salt and drought tolerant crops, will continue at the University’s Waite campus, Australia’s leading research precinct for plant biotechnology, cereal breeding, sustainable agriculture, wine and horticulture and land management.”

ACPGF’s seven shareholders are the Grains Research and Development Corporation, the South Australian Government, Agriculture Victoria Services, and the Universities of Adelaide, Melbourne, Queensland and South Australia.

# New wine label showcases wine research and teaching



The University of Adelaide's new wine label was launched at the Waite Winery by The Hon. David Ridgway, Shadow Minister for Agriculture, Food and Fisheries and University Vice Chancellor Professor Warren Bebbington.

While not a commercial enterprise, the University makes over 400 different wines from sparkling whites through to fortified wines and liqueurs for research and teaching purposes, many of them of high quality.

"The Hickinbotham Roseworthy Wine Science Laboratory at the University of Adelaide's Waite campus was built in 1996 and has been the hub of the University's proud history of teaching, research and collaborative activity in wine science ever since," says Dean of Waite campus, Professor Mike Keller.

"We've been producing premium wines here at the Waite for almost twenty years. This new label provides a clean, polished and professional identity for a quality product made by our winemaking team with the help of students – a product that the University can be very proud of."

Professor Bebbington spoke about the importance of the Waite wine programs to the wine industry. "Wine education started at our Roseworthy campus with the Australia's first oenology qualification in 1936 and, over the years, has produced many of the biggest names in wine-making in the country," he said.

"Today the Waite campus is home to Australia's premier winemaking and wine science programs, which have now trained a generation of this country's best winemakers, viticulturists and wine scientists. These highly-regarded wine programs now attract students from all over the world.

"The collaboration that the University of Adelaide has with our partners at Waite is an important one – both for the University and for the industry."

University chief winemaker Stephen Clarke provided an overview of the wines available under the new label, many of which were available for tasting and enjoyed by the attending guests.

The launch of the new label coincides with the first showing of plans for expansion and refurbishment of the winery with the aim of making it the best facility in the world for students and researchers working in the wine and allied sciences.

"The Hickinbotham Roseworthy Wine Science Laboratory is the cornerstone of our teaching and research around the winemaking process," says Vladimir Jiranek, Professor of Oenology and Director of the ARC Training Centre for Innovative Wine Production.

"When it was opened almost two decades ago it was arguably the best facility of its kind in the world. But at that time it was servicing 20 students and a six tonne vintage.

"Now we have close to 100 students using the winery each year and a vintage of about 120 tonnes. The demands on our winery are intense and the opportunities to develop new approaches and technologies around all aspects of winemaking require an expanded and more sophisticated facility.

"The University of Adelaide is helping the industry meet future challenges and we need to build a winery to match."

The new wine label was developed by the University's Marketing and Communications team.



(Pictured L-R): Mike Keller, Stephen Clarke, Warren Bebbington, Hon. David Ridgway MLC, Vladimir Jiranek

# AFW Research Day 2016



A wide variety of excellent research was on display when some 250 staff and students from across the University of Adelaide's School of Agriculture, Food and Wine came together for their annual Research Day on 2 November.

Held at the Adelaide Pavilion in the South Parklands, the day was a chance to share research highlights, celebrate successes and catch up with colleagues from all the research groups within the School.

The program provided an amazing cross-section of expertise and research disciplines with presentations on topics such as: the importance of dietary fibre to health; salt and water transport in plants; measuring vineyard performance to predict wine quality; behavioural genetics of native bees; and legume farming systems in Myanmar.

Many of the research platforms provided at the Waite presented an overview of their services and the afternoon session featured updates from some of the co-located ARC Research Centres and Hubs.

Invited speakers Dr Fiona Cameron (Australian Research Council) and Professor Mark Hutchinson (ARC Centre of Excellence for Nanoscale Biophotonics) both gave very engaging and informative presentations.

The Research Committee thanks everyone for their participation and support, especially the speakers. Planning for next year's event will need to consider a larger venue!

# Genes identified in defence against powdery mildew in barley

Waite researchers, in collaboration with the Leibniz-Institute of Plant Genetics and Crop Plant Research (IPK) in Germany, have identified two genes which could help protect barley against powdery mildew attack.

The genes, HvGsl6 and HvCslD2, were shown to be associated with accumulation of callose and cellulose respectively. These two polysaccharides play an important role in blocking the penetration of the plant cell wall by the powdery mildew fungus.

Published in two papers in the journal *New Phytologist*, the research showed that by 'silencing' these genes, there was lower accumulation of callose and cellulose in the plant cell walls, and higher susceptibility of barley plants to the fungus. Conversely, over-expressing

HvCslD2 enhanced the resistance in barley.

"Powdery mildew is a significant disease of barley wherever it is grown around the world, and resistance to the fungicide most commonly used to control it has been recently observed," says University of Adelaide Senior Research Scientist Dr Alan Little, with the ARC Centre of Excellence in Plant Cell Walls in the School of Agriculture, Food and Wine.

"If we can develop barley with improved resistance to powdery mildew, it will help barley producers increase yields and maintain high quality."

The two papers can be read online at:

<http://dx.doi.org/10.1111/nph.14065>

<http://dx.doi.org/10.1111/nph.14086>



# Winegrape powdery mildew app goes global

Grape growers and winemakers around the world will be able to easily assess powdery mildew in the field with the help of a mobile application

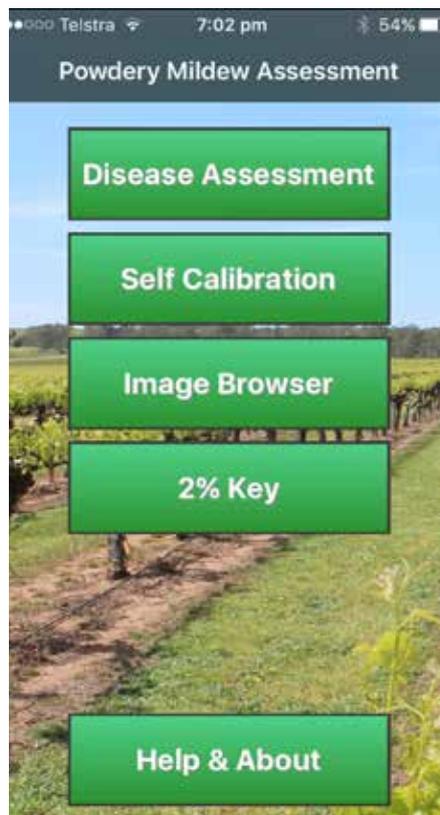
PMapp, which supports decisions about grape quality, has been developed here at the School of Agriculture, Food and Wine in close collaboration with the Australian grape and wine sector, and supported by Wine Australia.

"Powdery mildew is a serious disease that affects grapevines worldwide and can cause off flavours and aromas in wine if it is not controlled," says project leader Professor Eileen Scott.

"It's a costly disease for wine sectors across the world through loss of yield and cost of control and, because of the serious quality issues for wine, there is little tolerance of powdery mildew in the winery. But it's hard to assess – the symptoms can be hard to distinguish from dust or spray residue.

"PMapp is a simple tool that facilitates efficient assessment and recording of the severity and incidence of powdery mildew."

A local version of PMapp was released in Australia in December 2015 and proved its worth for the grape and wine community during the 2016 Australian



vintage. It has now been made available to download outside Australia.

Powdery mildew is assessed in the vineyard as the percentage surface area

of grape bunches affected, which gives a measure of disease severity. PMapp allows the user to visually assess the severity by matching it with computer-generated images.

The app allows assessors to enter disease data quickly in the vineyard, email the results and then analyse the resulting spreadsheet, which records GPS coordinates and other details of the assessment. There is also a suite of online resources to support PMapp. This can be used to train or up-skill wine sector personnel and students to recognise powdery mildew symptoms and estimate disease severity.

Wine Australia's General Manager Research, Development and Extension Dr Liz Waters says that PMapp is a valuable tool for the grape and wine community. "The PMapp and training website developers have taken the findings of this comprehensive research project funded by Wine Australia and produced two useable tools for the wine sector," Dr Waters says.

The PMapp can be downloaded at [Apple's App Store](#) or [Google Play](#). The online resources can be found at [pmapassessment.com.au](http://pmapassessment.com.au).

# Australian Women in Wine Researchers of the Year

Cassandra Collins (left) and Roberta De Bei (right)  
Photo: Matt Gilliam



Congratulations to Waite researchers Dr Roberta De Bei & Dr Cassandra Collins who were named Researchers of the Year in the Australian Women in Wine 2016 Awards.

Roberta is a Postdoctoral Research Fellow in the School of Agriculture, Food and Wine and Cassandra is a Senior Lecturer in Viticulture at the University of Adelaide here at Waite.

Together they have been working on a project to develop innovative techniques

for vineyard management and to unveil the link between canopy size, yield and grape and wine quality.

Through this project they co-developed the VitiCanopy smartphone App, which enables users to measure grapevine canopy architecture and leaf area in the vineyard using only their mobile. This can then be associated with final yield and grape quality.

“VitiCanopy uses the devices’ camera and GPS capability to calculate the size and density of the vine canopy and its location in the vineyard. The aim is to help users monitor their vines and manage the required balance between vegetative growth and fruit production,” Cassandra said of the project.

“The award is an initiative of ‘The Fabulous Ladies wine society’ to (as stated in their website) acknowledge and reward the work of women in the Australian wine community and community leaders who champion equality and fairness for all sexes in the workplace,” Roberta said.

“We were nominated for the “researcher of the year” category because of the contribution we have made towards helping the Australian wine industry

in managing their vineyards using the VitiCanopy App.”

Prizes were awarded in six categories: Winemaker of the Year, Viticulturist of the Year, Owner/ Operator of the Year, Workplace Champion of Change, Researcher of the Year and Cellar Door Person of the Year.

Congratulations to the other finalists in this category – Dr Dimitra Capone and Associate Professor Kerry Wilkinson – who are also based here at Waite.

The development of the app has been supported by Wine Australia, the Waite Research Institute and many producers in the wine industry as part of a wider collaborative project with Dr Sigfredo Fuentes, A/Prof Matthew Gilliam and Prof Stephen Tyerman investigating the relationships between vine balance and wine quality.

The VitiCanopy App is available from the [Apple App Store](#).



## Other recent achievements and awards

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

- > **Professor Diane Mather** graduated from the 2016 Adelaide Women Leadership Development program, one of 12 women to complete the program this year.



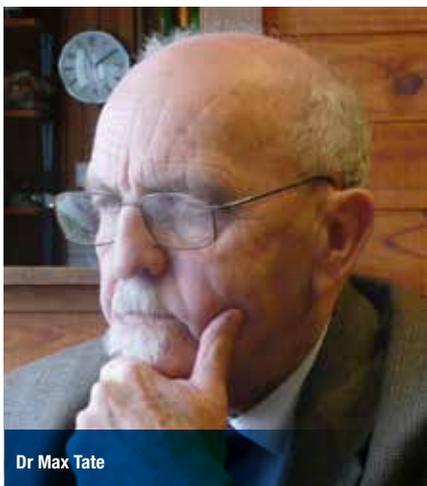
- > **Professor Vladimir Jiraneck**, was appointed a Commissioner for the International Commission on Yeast (ICY), joining Prof Sakkie Pretorius of Macquarie University as representatives for Australia.
- > **Professor Dabing Zhang** has been named in the Thomson Reuters Highly Cited Researchers list for 2016.
- > The Australian Academy of Technology and Engineering (ATSE) has elected **Professor Peter Langridge** among 25 new Fellows for 2016.
- > **Dr David Jeffery** was recently elected as a Fellow of the Royal Australian Chemical Institute.
- > **Dr Olena Kravchuk** is one of the successful recipients of the Barbara Kidman Fellowship for 2017.
- > **Dr Beth Loveys and Dr Karina Riggs** have been awarded Highly Commended in the 2016 Stephen Cole the Elder Award for Excellence in the category of Teaching and Support for Learning.
- > **Associate Professor Matt Gilliam** has been promoted to Professor with effect from 1 January 2017.
- > **Dr Cassandra Collins, Dr David Jeffery, Dr Ron Smernik and Dr Matthew Tucker** have all been promoted to Associate Professor.

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

# Vale Max Tate and Trevor Wicks

October 2016 marked the sad passing of a great character of the Waite – Dr Max Tate, who joined the Waite in 1964 and had a long and productive career as a biochemist.

Max will be remembered for his passion for research, his collegiality, his support



Dr Max Tate

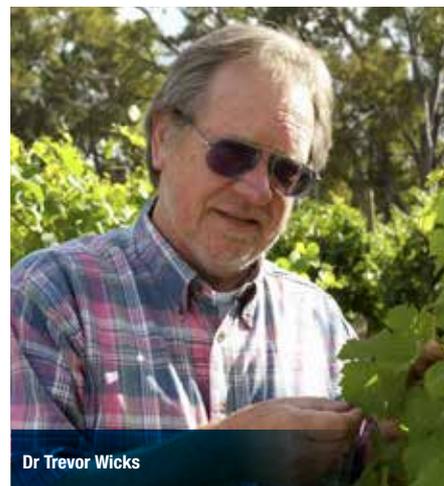
for postgraduate students, and his friendly outgoing personality.

He played a key role in elucidating the role of agrocins in the biology of *Agrobacterium*, and was fearless in his work on neurotoxins in vetch seed.

Dr Trevor Wicks passed away peacefully at home on August 22, 2016. Trevor was a Senior Scientist and plant pathologist with SARDI, where he worked on the diagnosis and management of fungal diseases of horticultural crops and grapevines. He was also an Affiliate Senior Lecturer with the School of Agriculture, Food and Wine, where he co-supervised at least 18 research students and was an advisor to many more.

He was an outstanding and generous mentor to many young scientists. Trevor made an outstanding contribution to knowledge of diseases affecting potatoes, onions, stone fruit and grapes.

He was awarded the Graham Gregory Award for outstanding achievements in horticulture in 1995 and the Reg Miller award in 2009 for his contributions to the Australian onion industry. He worked closely with growers and crop protection companies to improve the management of grapevine diseases.



Dr Trevor Wicks

## ARC Funding for Waite researchers

The following researchers at the Waite will share in nearly \$3 million in funding announced under the Australian Research Council's (ARC) National Competitive Grants Programme. Congratulations to all involved!

### Discovery Projects

- > Prof Robert Fitzpatrick (CSIRO & UoA), Prof Michael McLaughlin (CSIRO & UoA) and collaborators. \$502,000 over three years. This project aims to study the effects of drought on pH and metal speciation in soils, and develop tools to assess current and future risks.
- > A/Prof Matthew Gilliam (UoA & ARC Centre of Excellence in Plant Energy Biology) and collaborators. \$375,000 over three years. This project aims to decipher a mechanism that controls plant gas exchange – the process that emits oxygen, loses water, absorbs carbon dioxide and is essential for plant growth for food, fibre and fuel production.
- > Prof Peter Langridge (UoA) and collaborators. \$571,000 over three years. This project is expected to transform wheat and barley breeding

methods by unlocking the genetic diversity to produce new varieties.

- > Prof Dabing Zhang (UoA & Shanghai Jiao Tong University), Prof Rachel Burton (UoA & ARC Centre of Excellence in Plant Cell Walls) and collaborators. \$513,500 over three years. This project aims to understand the morphological diversity of inflorescence architecture between cereal crop species.

### Discovery Early Career Researcher Award (DECRA)

- > Dr Jayakumar Bose (UoA). \$372,000 over three years. This project aims to discover the genes involved in ion transport in plants that maintain growth and yield irrespective of high soil salinity.

### Linkage Infrastructure, Equipment and Facilities Grant

Prof Stephen Tyerman (UoA & ARC Centre of Excellence in Plant Energy Biology), Prof Maria Makrides (SAHMRI and FoodPlus Research Centre) and collaborators. \$480,000. This project aims to provide high-throughput fluorescence-activated Cell Sorting

(FACS) and cytometric analysis with diverse applications in biological sciences.

ARC research grants are extremely competitive. This year's round comprised funding totalling \$416.6 million across some 989 projects under the following schemes: Discovery; Discovery Indigenous; DECRA; Future Fellowships; and Linkage, Infrastructure, Equipment, and Facilities grants.



DECRA Fellow, Dr. Jayakumar Bose

# Waite Summer Research Scholarships in demand

Most undergraduate students see their summer break as a chance to get away from their studies, but for a select group of students it is an opportunity to get a taste of a research career.

Eighteen University of Adelaide students have been awarded 2016-17 Summer Research Scholarships at Waite. They will each spend six weeks between December 2016 and February 2017 participating in a research project in areas such as viticulture, plant pathology, or plant genetics and breeding.

The purpose of the scholarships is to encourage undergraduate students to consider undertaking postgraduate study at the University of Adelaide leading to a career involving research.

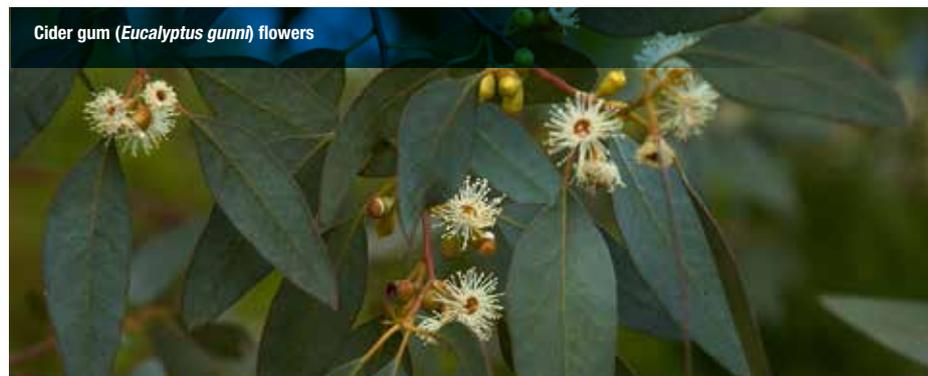
The Scholarships provide a stipend of \$250 per week, provide an opportunity to work with leading researchers here at Waite, enable the students to see what research is really about, and introduce them to potential Honours and Postgraduate supervisors.

This year saw interest in the program at an all-time high with a record 18 scholarships awarded, which is three times the number anticipated. Many students even developed their own projects with supervisors outside the initial projects offered.

The scholarship winners are from across four different undergraduate degree programs.



# Secrets of Indigenous fermentation practices



A new project is investigating the traditional practices of Australian Aboriginal people in producing fermented beverages and foods.

Although referred to in early European texts, little is known about the traditional practices of Australian Aboriginal people in producing fermented beverages and foods. processes involved, the yeasts and bacteria at work, or the chemistry, taste and smell of the plants and finished products.

Led by Prof Vladimir Jiranek, Director of the ARC Training Centre for Innovative Wine Production here at Waite, the research will initially focus on fermentations of cider gum sap (from Tasmania), nectar from Banksia and other native blossoms (from various locations) and quandong roots (from South Australia).

“Although these historic accounts mention such fermentations by Aboriginal people, as far as we know none of these processes have been characterised scientifically,” says Professor Jiranek.

“Preliminary discussions with members of indigenous community groups and historic texts suggest the steeping of nectar-laden flowers such as Banksia or extracts from pandanus nuts in water, which could be then set aside for varying lengths of time. Such materials would undoubtedly ferment to some extent, changing the sensory properties and yielding alcohol, although probably at quite low levels – less than beer.”

“Another product arises from the cider gum, a Eucalypt limited to isolated parts of Tasmania which readily produces a sugar-rich sap that was actively sought out by Aboriginal people as well as the

local fauna.

“Allowing this material to stand for some time would result in a fermented, cider-like beverage, albeit again of modest alcohol content.”

Professor Jiranek says the project represents an opportunity to comprehensively document these and related practices across Australia. The study will improve understanding of the use of native plants and their cultural context.

“There is an important historical and anthropological aspect to the project,” Professor Jiranek says. “Some of these processes are not being practised anymore, but there may at least still be people with living memory of them. We’re keen to record what we can while still possible.”

“The work may also reveal that novel organisms are involved that are unique to Australia, making this an opportunity to identify some new species of yeast and bacteria, perhaps with interesting new properties. We will also characterise the composition of the saps, nectars and various extracts as fermentation substrates while the Australian Bioactive Compounds Centre will determine if bioactive compounds are also present,” he says.

The research group is recruiting Honours and postgraduate students, ahead of the first round of field trips this summer. Those with an interest in research in this field should contact Professor Jiranek directly on 08 8313 6651 or [vladimir.jiranek@adelaide.edu.au](mailto:vladimir.jiranek@adelaide.edu.au) or visit <http://www.adelaide.edu.au/graduatecentre/scholarships/research/opportunities/#fermentation>.

# Breakthrough in salt tolerance in plants

Researchers from the ARC Centre of Excellence in Plant Energy Biology here at Waite, in collaboration with the University's School of Medicine, have discovered that a protein known to control salt balance in animals works the same way in plants.

The research, published in the journal *Plant Cell and Environment*, found that in plants, as in animals, a group of proteins, a type of 'aquaporin', can transport salt ions as well as water.

Aquaporins have long been known to act as pores by transporting water across membranes in plants and animals, and they play critical roles in controlling the water content of cells. But, until now, it was not known they could do the same with sodium ions (salt).

"In animals, aquaporins are extremely important in water filtration in the kidney," says project leader Professor Steve Tyerman. "In plants they can do the same thing – filter the water that goes through the plant. But under certain conditions some aquaporins can also let sodium ions through.

"This may explain a lot of unsolved problems in plant biology, for instance how salt gets into the plants in the first place."

The researchers believe these "double-barrelled" aquaporins may be the elusive proteins that let sodium ions — the toxic component of salt — in and out of plant roots. Since the early 1990s researchers have known that salt enters plant roots in saline conditions via pores in the membrane, but the identity of these pores has remained a mystery. This particular aquaporin is abundant on the surface of roots.

"We discovered that it has similar characteristics to the properties previously identified for the pores responsible for sodium ion transport," says co-lead author Dr Caitlin Byrt, Postdoctoral Fellow in the School of Agriculture, Food and Wine. "This finding opens new possibilities for modifying how plants respond to high salt and low water conditions."

The researchers say that this discovery will help them target ways of blocking the pathway of salt into plants. And

plant breeders may be able to select varieties which have differences in the aquaporin protein.

There are also exciting implications for understanding how plants function. The discovery will help plant scientists dissect the role these "double barreled" aquaporins play in how roots respond to osmotic shock and salt stress, how long distance water transport in plants occurs, and how leaves control the entry of carbon dioxide for photosynthesis.



## Recent Waite Visitors

The Waite has recently hosted the following visitors:

> A delegation from Priority Partner Shanghai Jiao Tong University to discuss plans for a Joint Laboratory for Viticulture and Oenology in Shanghai. Prof Pei Zhou (Dean, School of Agriculture and Biology), Prof Jiang Lu (Director, Center for Viticulture and Enology) and Ms Jolie Liu (Head, International Office) visited a research and teaching vineyard, the winery and wine science labs at the Waite Campus to see first-hand how our research and teaching facilities are designed and organised.



> The Rajasthan Minister for Agriculture and delegation visited in September for an overview of the Waite's agricultural research activity and capability.

> Thirteen members of the Federal Government's Agricultural Industry Advisory Council (AIAC) visited the Waite in October, touring some of our facilities and learning about the world-class research of the Campus Partners. The visit was organised as part of a two-day meeting in Adelaide providing an opportunity for industry input into policies supporting the growth of Australian agriculture.

> A senior delegation from Balitar University in Balitar, Indonesia including the Chancellor and three Vice Chancellors visited in November.

> Visitors from the Agriculture and Biology Departments at the University of Lavras, Brazil met with staff and toured areas of interest at Waite in November.

> A group of farmers from Aapresid - a no till association in Argentina toured the campus and met with Waite researchers in September to discuss comparative farming practices.

> Over 50 International Student Recruitment agents from countries such as China, India, Malaysia and Singapore visited the Waite during The University of Adelaide's Agents Week. The groups heard about the Degree Programs offered in the School of Ag, Food and Wine and toured the campus to view some of our facilities and get a feel for the student experience.

> Several school groups have visited the campus and participated in activities with the Why Waite Program and other campus partners. Some of the schools involved include: Caritas College in Port Augusta, Lameroo Regional Community School, Urrbrae Agricultural High School, Mark Oliphant College and St Columba College.

# Product development experience for Food & Nutrition Science students

Students undertaking the University of Adelaide's Bachelor of Food and Nutrition Science degree have the opportunity to participate in a Food Product Development course in their third-year. This involves taking a product from concept to research and development and consumer testing.

Three of last year's students in this program – Lauren Davis, Veronika Ostrikova and Millie Shinkfield – developed a product called Cultured



Chickpea Hommus. This involved fermenting a chickpea paste using a yoghurt culture and incorporating it into a hommus to create a new depth of flavour when compared to conventional recipes. Cultured hommus is not available in the hugely popular dip market category, creating a unique edge over existing commercial ranges.

The students entered their product in the 2016 Australian Institute of Food Science and Technology (AIFST) Student Product Development Competition, which required products to include at least 30% pulse ingredients. This competition provides a unique opportunity to experience a “real life” new product development project and gain exposure to industry experts, peers and future employers within the food industry.

Lauren, Veronika and Millie were invited to attend the 49th AIFST Conference in Brisbane to present their food product in the competition finals. The School of Ag, Food and Wine sponsored their trip

with \$1,500 towards support for travel, accommodation and expenses.

Congratulations to all three girls – Cultured Chickpea Hommus came second in the competition which was an excellent achievement!

According to the group, the experience was a fantastic insight into the process of new product development, particularly in having to pitch and “sell” a prototype product to industry professionals. Attending the finals at the annual conference provided a great insight into the food manufacturing industry, and there were many opportunities to participate in other conference presentations and networking events.

These students have all now graduated, and are pursuing a variety of paths. Lauren is travelling and working overseas, Veronika has begun work at the SA Pathology Food and Environmental Laboratory, and Millie has just completed her Honours year.

## Annual Postgraduate Symposium

The School's Annual Postgraduate Symposium provides a forum for mid-candidature students to give an update on their research in preparation for the 2016 Annual Review of Progress, and for the Waite community to become familiar with the broad range of our postgraduate research.

Nearly 40 students gave presentations on their projects over two days in September. The program also featured guest speakers Ms Denise Riches (CEO, Hindmarsh Valley Dairy) and Dr Monica Kerr (Director of Career & Research Skills Training, Adelaide University).

Prizes of up to \$200 each were awarded to students in a number of categories. Well done to all the students and congratulations to the following winners.

**James Walter**, The Application of Precision Agricultural Technologies to a Wheat Breeding Program – Crop Science Society of SA prize for best presentation on Agronomy and Broadacre Agriculture.

**Bart Van Gansbeke**, Development of a protocol for in vitro inoculation of barley roots with cereal cyst nematodes – Australian Grains Technology prize for best presentation on Cereal Research.

**Matthew Aubert**, Molecular & Genetic Characterisation of Early Aleurone Development in Barley – ARC Centre of Excellence in Plant Cell Walls prize for best presentation on Plant Cell Wall Biology.

**Laura Wilkinson**, Identification of molecular cues influencing ovule development in barley – ARC Centre of Excellence in Plant Energy Biology prize for best presentation on Plant Cell Physiology.

**Erandi Hewawasam**, A method for analysing free fatty acids from dried blood spots using liquid chromatography tandem mass spectrometry – FOODplus prize for best presentation on Food and Nutrition.

**Lieke van der Hulst**, Impact of smoke exposure on the chemical composition

of grapes – ARC Training Centre for Innovative Wine Production prize for best presentation on Viticulture and Oenology.

**Laura Wilkinson** – Waite Research Institute prize for Best Contribution as a Member of the Audience.

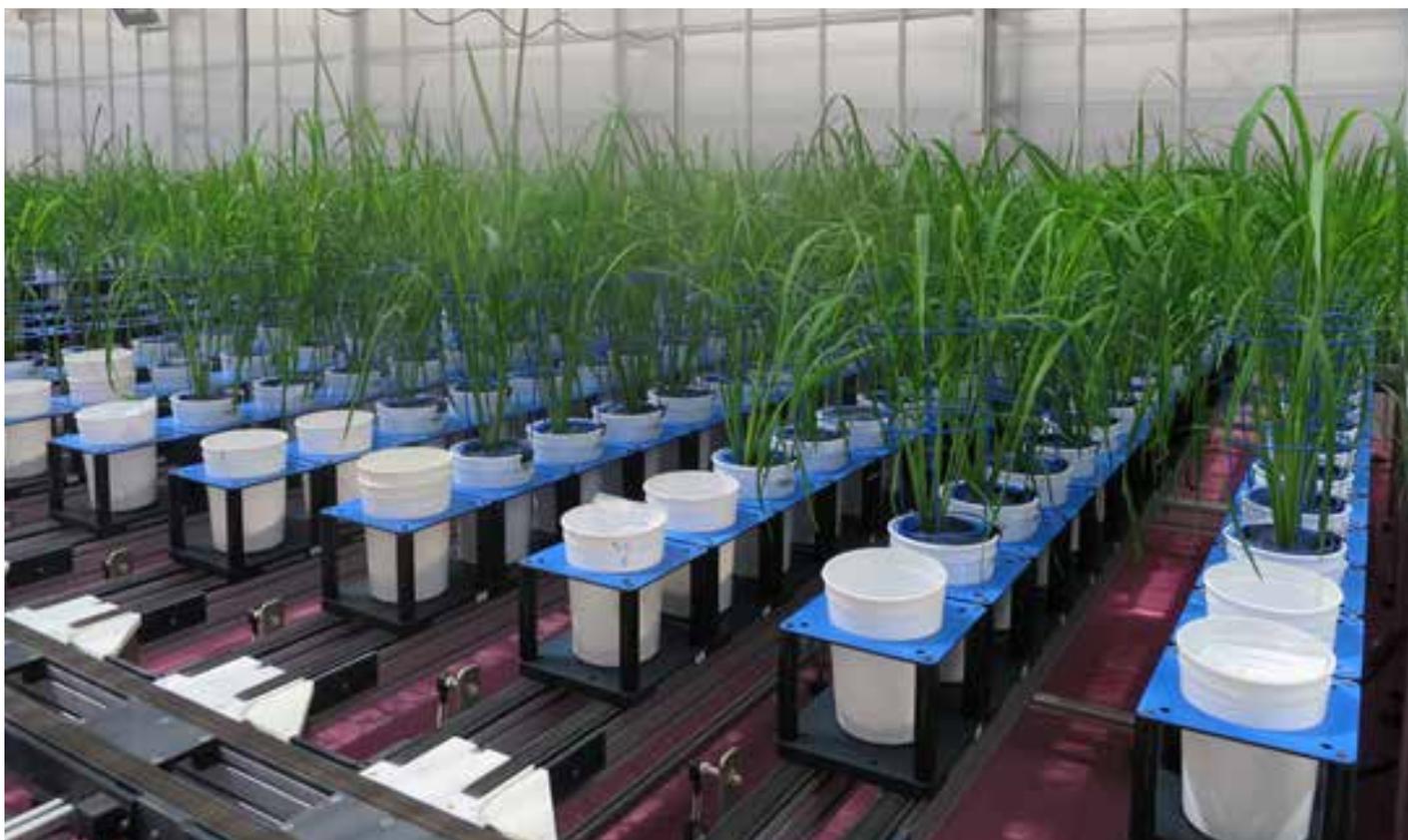
**Brendan Brown**, The What, How and Why of Agricultural Adoption in Africa – AgPOGs prize for Audience Choice.

**James Walter** – The Max Tate prize for Best Overall Presentation.



Prize winners (L-R): Lieke van der Hulst, Laura Wilkinson, Matthew Aubert, Erandi Hewawasam, Brendan Brown, James Walter, Bart van Gansbeke

# Mapping the genetics of salt stress in rice



A team of researchers including from the University of Adelaide have for the first time been able to pinpoint the genetic activity over time when rice is subject to salt stress.

The team from King Abdullah University of Science and Technology (KAUST) and the University of Adelaide's Waite campus say their findings highlight the roles of different genes in the plant's response to salt stress. This should help breeding programs around the world aiming to improve global rice productivity.

Rice is a staple food for over half of the world's population, yet it is also the most salt-sensitive cereal crop.

Published in the journal *Nature Communications*, the study used cutting-edge research infrastructure at the Waite to grow different varieties of rice under moderately saline conditions, monitoring plant growth, shoot development and transpiration (water use).

"Thanks to the unique Plant Accelerator facility at the Waite campus, we could analyse numerous aspects of the growth of multiple plants simultaneously," says project leader Professor Mark Tester at KAUST's Center for Desert Agriculture, who supervised PhD student Nadia Al-

Tamimi, who worked on the project.

The Plant Accelerator is headquarters of the Australian Plant Phenomics Facility and funded under the National Collaborative Infrastructure Strategy (NCRIS). It provides scientists with the facilities to grow thousands of plants in pots on conveyor belts.

Each plant moves automatically to be imaged daily by digital cameras, generating quantitative data on plant growth on a large scale – a pioneering technique called 'high-throughput non-invasive phenotyping'.

"Our unique infrastructure allowed us to screen hundreds of rice plants under controlled conditions. This was key to identifying novel genes contributing to salt tolerance in rice," says Dr Bettina Berger, Scientific Director at The Plant Accelerator.

Some genes, for example those connected with signaling processes, were important to growth in the first two to six days, while other genes became prominent later.

"This is perhaps the most astonishing aspect of this work – we can now obtain genetic details daily, pinpointing exactly

when each locus comes into play in response to salinity," says Professor Tester.

Two diverse sets of rice (indica and aus), with hundreds of rice varieties in each set, were grown under low and high salinity, and photographed daily over 13 days to monitor biomass and shoot development. Transpiration levels (how much water the plants used) were measured by weighing each pot daily.

The researchers found the indica lines fared better than aus, leading the team to uncover significant genetic differences between the varieties. By combining data on relative growth rate, transpiration rate and transpiration use efficiency, the researchers could search for genetic activity related to specific plant traits.

"Providing high-quality research infrastructure, such as The Plant Accelerator, enables scientists in Australia and around the world to study novel aspects of crop tolerance to stress, which often require measurements over time instead of single time points. This study makes the best use of the tools available to plant science," says Dr Berger.

## Ag, Food & Wine students awarded at EpiCSA



School of Ag, Food and Wine postgraduate students Huahan Xie, Na Sai, and Jia Zhou (Master in Plant Biotechnology) and Pastor Jullian Fabres (PhD student) were awarded the Best Student Presentation at the Epigenetics Consortium of South Australia Research Meeting (EpiCSA) in October, for their work on the "Ecogenomics of Barossa Valley Shiraz".

Their work was selected among other 27 presentations presented, which was attended by 145 delegates from South Australia, interstate and overseas.

## Wine Alumni Network Annual Dinner

The Wine Alumni Network hosted the annual dinner in November at the Edinburgh Hotel, Mitcham for all students graduating from the Bachelor, Master and Graduate Diploma in Viticulture & Oenology.

This dinner was a celebration of the students achievements and a chance to network with staff from the School of Agriculture, Food & Wine, plus members of the Wine Alumni Steering Group.

The Wine Alumni Network represents all alumni from wine related degrees at the University of Adelaide and Roseworthy Agricultural College, spanning an 80 year commitment to wine education.

The event was attended by the majority of graduating students, who were treated to speeches from Professors Mike Keller and Vladimir Jiranek, along with what has become a tradition at this event, an after dinner address from Dr Patrick Iland, the Patron of the Wine Alumni Network.

Special thanks to Julie Bauer (Wine Network) and Emily Kemp (UA External Relations) for helping in the organisation.

If you would like to know more about the activities of the Wine Alumni Network, please contact the Convener of the Wine Alumni Network Steering Group, Paul Grbin ([paul.grbin@adelaide.edu.au](mailto:paul.grbin@adelaide.edu.au)).



Patron Patrick Iland addressing the dinner



Yin Liu and A/Prof Paul Grbin

## Poster prizes for Ag, Food & Wine students

Congratulations to School of Agriculture, Food and Wine Honours student Thomas Heddle who won the Student Poster Award at the Australian Entomological Society (AES) (combined with New Zealand Entomological Society) held in Melbourne last month.

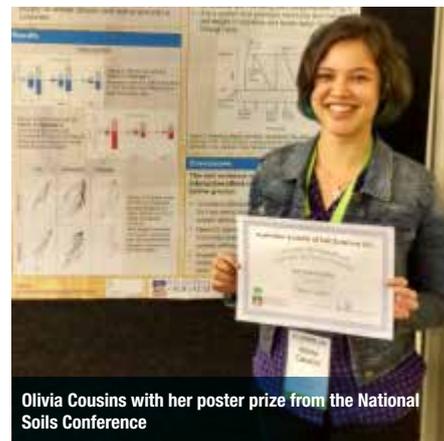


Thomas Heddle accepting his award from Dr Cor Vink, Curator of Natural History at the Canterbury Museum, NZ.

Thomas's project investigated the potential use of known parasitoids in Australia for the biological control of Russian Wheat Aphid, *Diuraphis noxia*, under the supervision of Michael Nash and Maarten Van Helden, in the Plant Protection research group in the School's Department of Agricultural Science and SARDI.

Olivia Cousins, one of the joint Adelaide-Nottingham PhD students, won the student poster prize at the National Soils conference held in New Zealand last week. Olivia's poster, which included co-authors from The University of Adelaide, The University of Nottingham and The Plant Accelerator, was one of approx. 100 posters presented at the conference. The award also includes a cash prize for Olivia.

The aim of Olivia's study was to quantify the impact of different soil moisture regimes and increasing levels of soil nitrogen supply on shoot and root response in wheat plants.



Olivia Cousins with her poster prize from the National Soils Conference