WAITE RESEARCH INSTITUTE

adelaide.edu.au/wri
WELCOME.
The University of Adelaide’s institutes are globally recognised for their research quality and extensive connections with industry, government and the wider community.

Named after Peter Waite – visionary pastoralist, philanthropist and a founding member of the modern Australian agricultural industry – the Waite Research Institute is internationally recognised for its world-class research, development, commercialisation and education activities in Agriculture, Food and Wine.

Agriculture and society face unprecedented challenges in the form of rapid climate change, land degradation, population growth and food security. The mission of the Waite Research Institute (WRI) is to stimulate new activity and collaborations across the spectrum of agricultural research to provide solutions to secure a sustainable future for Australian and global agriculture.

The University of Adelaide’s WRI members have diverse expertise in agribusiness, animal and plant sciences, crop and pasture science, economics, engineering, entomology, food technology, geography, pests and disease, social sciences and soils across the University of Adelaide’s campuses at North Terrace, Roseworthy and Waite. These campuses are also home to co-located industry partners and other research organisations (from local start-ups to international organisations) that add to the critical mass needed to perform transformational research.

The research activities of the WRI span domain-specific locally based projects, to large-scale internationally focused interdisciplinary work. Research is both applied and developed for impact, and cutting-edge fundamental work that will drive the innovations of the future.

Australian agriculture has always embraced science – our mission is to future-proof agriculture, and the WRI is our vehicle for driving innovation in this sector at this critical time for our planet.

Professor Peter Rathjen
Vice-Chancellor and President
The University of Adelaide
Our efforts in informing and supporting these sectors and their policymakers continue to provide benefit both to local consumers and communities worldwide.

Meeting global challenges

The WRI’s broad vision is to drive the innovation to secure a sustainable future for Agriculture - by creating high-quality, nutritious and climate-resilient products. We do this not in isolation, but in close partnership with the agriculture, food and wine sectors.

To achieve our goals, we invest in outstanding researchers across multiple scientific disciplines; and we provide them with advanced facilities to support both new strategic initiatives and established strengths.

We also put a strong emphasis on helping early-career researchers develop professionally and as leaders, through our Research Leadership Development program.
## WRI AT A GLANCE

### ERA Ranking

5 well above world standard:
- Plant biology
- Agricultural and Veterinary Sciences
- Horticultural production
- Crop and pasture science

### HIGH Engagement and Impact outcomes

- Agricultural and Veterinary Sciences

### 260+ members

### $30M+ research funding (2019)

### 70%

- of Australia’s research capability in wine and grape science based at Waite precinct

### 16

- co-located groups/centres/organisations

### 06

- new Australian almond varieties released since 2016

### 17

- new barley, faba bean, durum wheat and bread wheat varieties released since 2014

### 450+

- peer-reviewed journal articles annually

### 12

- patents filed since 2014

### 18%

- of all research outputs co-authored with research end-users (ERA 2018 assessment)

### 16

- scientific disciplines represented

### 60

- Research Leadership Development program graduates since 2011
In a climate of limited natural resources, higher energy costs, and increasing urbanisation and environmental degradation, the WRI’s work in supporting global food security and agricultural sustainability is critically important.

Our research is firmly focused on industry partnership and interdisciplinary exchange, enabling significant and productive ongoing interaction between external stakeholders and University of Adelaide researchers.

Research priorities
The WRI supports diverse research that delivers tangible outcomes and real-world impact. Our priority areas include:

- Research with impact in sustainable intensification of agriculture in a changing climate
- Building large-scale initiatives across disciplines
- Enhancing excellence through researcher development
- Connecting researchers with industry
Research capabilities

The institute has a longstanding reputation for delivering outcomes that directly impact the Australian and global agricultural industries. We have successfully established new, higher-yielding varieties of barley, durum wheat, oats, pulses, bread wheat and grapevine rootstocks, with increased resistance to pests, diseases, droughts and soil salinity.

We also have internationally recognised expertise in:

- agribusiness and consumer research
- agricultural science
- agronomy
- cereal bioinformatics
- controlled environment and field phenotyping
- crop abiotic stress tolerance, genomics and nutrition
- fertiliser design and development
- glycomics
- herbicide resistance
- ion transport
- livestock breeding and production
- plant breeding
- plant reproductive technologies
- sensory science
- soil biology
- wine and grape science
THE WRI IS DEDICATED TO DRIVING RESEARCH THAT ADDRESSES THE SUSTAINABLE INTENSIFICATION OF AGRICULTURE TO REDUCE AND REVERSE CARBON EMISSIONS IN AGRICULTURAL INDUSTRIES, AND THE SUSTAINABLE USE OF WATER IN DRYLAND AGRICULTURAL SYSTEMS.

Professor Matthew Gilliham
Waite Research Institute
Professor Matthew Gilliham

Matthew was appointed as Director of the WRI in June 2019. Professor Gilliham has a track record of translating his fundamental discoveries to benefit agriculture. His work in improving salinity tolerance of crops is now used in breeding programs for wheat, grapevine and soybean.

With a PhD in Plant Science from the University of Cambridge, he has over 20 years experience in crop plant nutrition with a focus on drought and salinity tolerance, stress signalling and membrane transport. He is a Web of Science Highly Cited researcher, with publications in Science and Nature series journals, as well as top discipline specific journals. He has had national and international roles for the Australian Society of Plant Scientists and European based Society of Experimental Biology; he is also an Editor of the leading international plant journal Plant Physiology.

He is a Program Leader in the national ARC Centre of Excellence in Plant Energy Biology, a Chief Investigator in the ARC Training Centre for Innovative Wine Production, a former ARC Future Fellow, and was previously Deputy Head (Research) for the School of Agriculture, Food and Wine. In 2018, he led the University’s Excellence in Research Australia exercise for Agricultural and Plant Sciences where the University scored top marks – well-above world average.

In 2019, Professor Gilliham was appointed to the South Australian Premier’s Science and Innovation Council, which provides advice to the State Government on supporting the strategic priorities and major advances in science and technology to drive the State’s growth agenda.
Revegetation strategies to support native pollinators

Humans rely on insects such as bees, flies and butterflies to pollinate many of our crops, including canola, lucerne, almonds, berries, melons, apples and pears. But in Australia and around the world, pollinating insects are struggling to survive where these crops are farmed.

A big part of the problem is the widespread clearing of native vegetation in crop growing areas. The practice has left native pollinators with nutritional deficiencies and a lack of nesting opportunities. So, to help halt the trend, the WRI is participating in collaborative research to identify best-practice native revegetation strategies in and around crops. Strategies are being tailored to distinct regions and their specific crops and pollinators.

Although initially focusing on the Australian context, the process will provide a valuable model for similar efforts internationally. This work, funded through the Australian Rural Research and Development for Profit program, is being led by the University of Adelaide’s School of Agriculture, Food and Wine, and also involves South Australian industry and environment partners.
Advanced training centre strengthening Australian wine

The University of Adelaide, through the WRI, hosts and leads an important training centre to enhance innovation and global competitiveness in the Australian wine industry.

The ARC Training Centre for Innovative Wine Production (TCIWP), commenced in 2018. Tackling modern and age-old challenges in wine production, the centre’s multidisciplinary research team investigates aspects of viticultural management, oenology, wine chemistry and sensory science, and winery process optimisation. The Centre’s primary aims are to increase industry sustainability, reliability and profitability, while also providing additional research training opportunities and innovation capacity.

The Industrial Transformation Training Centre (ITTC) brings together diverse, multidisciplinary research expertise and facilities—along with commercial insight from 12 industry partners—to advance knowledge and techniques in flavour and alcohol-content management. Several key TCIWP findings are already promising to generate new processes and products.

The TCIWP is funded by the Australian Research Council.
Cereal gain: driving Australian producers' competitive advantage

University of Adelaide plant breeding has led to the release of 17 new cereal crop varieties, which together produced $4.6 billion worth of grain from 2011 to 2016. Barley varieties combining high yields with superior quality supported national grains industry profitability, and provided new options for domestic and international grain and malt buyers. Durum (pasta) wheat varieties combining adaptation with premium quality production of this high-value crop, enabled the durum and pasta industries to thrive in southern Australia. Upstream ‘pre-breeding’ research also generated new materials and technologies (DNA markers and statistical methods) for application in commercial breeding programs, improving the cereal breeding industry’s genetic gain and efficiency.
Durum wheat for better pasta

The durum wheat industry contributes in excess of $100 million to South Australia’s economy. Through our work in Durum Breeding Australia, the WRI works closely with significant industry stakeholders, including San Remo Macaroni Company Pty. Ltd. and the Southern Australia Durum Growers Association.

The industry’s growth and success has been underpinned by these excellent working relationships, and has led to the development of resilient new durum wheat varieties to satisfy growing markets for high-quality pasta, couscous and other food products.

Breeding superior almonds

After the United States, Australia is the second-largest producer of almonds worldwide—and the WRI is working to help local farmers maintain that strong market position. The Institute’s Australian almond breeding program is continually developing new almond varieties to cater to changing, and challenging, environmental conditions.

Since 2013, six new varieties have been released—Maxima, Capella, Rhea, Carina, Mira and Vela. Each variety’s yield beats the previous benchmark, Nonpareil, by at least 10 per cent. Four are self-fertile so are not reliant on bees and other insects for pollination.

Omega-3 eggs

WRI-supported research underpins an exciting—and very healthy—commercial collaboration between the University of Adelaide and South Australian egg producer Solar Eggs.

The institute’s work revealed two key findings. One, flaxseed oil contains high levels of a short-chain omega-3 fatty acid. Two, when chickens’ diets contain the oil, their eggs are enriched with a long-chain omega-3 polyunsaturated fatty acid.

Solar Eggs is now using this knowledge to produce eggs with five times the omega-3 of regular eggs, and the enhanced product was launched in Drakes Foodland supermarkets in August 2018.

Premium gluten-free baked goods

Gluten-free bread products are often considered inferior to regular bread in texture and taste. But the University of Adelaide has partnered with Riviera Bakery to change this, using WRI research.

The collaboration has produced a range of gluten-free breads with quality and consumer acceptance comparable to that of regular bread. The new recipes even feature enhanced nutritional qualities for health and wellbeing. Five recipes were developed and trialled, and two are now available for purchase in supermarkets under Riviera’s ‘Swiss Natural’ brand.

Reducing potato waste

The WRI is collaborating with Potatoes SA to help farmers turn their waste into value-added products. One project is using discarded peel and pulp to create premium South Australian vodka. Another is using a long-shelf-life puree made from surplus potatoes to develop a range of nutritionally rich food products.

Both promise both commercial and environmental benefits.
HOW WE CAN HELP

At the WRI we’re highly experienced in building Australia’s capability and competitiveness in agriculture, food and wine through collaboration.

In partnership with government and industry, we regularly tackle significant, global issues. We identify and understand market opportunities, both domestically and internationally; and we help partners translate our findings into high-value new products and services with real commercial impact.

If you’re ready to take that path, don’t hesitate.

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