

## News

# Statistics investment to underpin grains research advances

**UOW researchers win funding to help farmers meet climate, environmental and economic challenges.**

**19 January 2018**

The Grains Research and Development Corporation (GRDC) has announced a major new investment aimed at strengthening and enhancing national and regional grains research outcomes.

The GRDC has launched phase three of its Statistics for the Australian Grains Industry (SAGI) program which will involve the creation of four nodes across Australia to deliver an unprecedented level of high quality statistical science to underpin the scientific rigour of hundreds of research projects.

The National node will be based at the University of Wollongong (UOW) led by Dr Ky Mathews from the School of Mathematics and Applied Statistics.

The GRDC also has a parallel statistics investment at UOW worth \$1.6 million over three years. This project will be led by long-time collaborator with the GRDC, Professor Brian Cullis, who is the director of the Centre for Bioinformatics and Biometrics within UOW's National Institute for Applied Statistics Research (NIASRA).

GRDC Managing Director Dr Steve Jefferies says the SAGI-3 investment of \$18 million over the next five years will be essential in supporting rapid advances in crop varieties, agronomic knowledge and farming practices – ultimately contributing to enduring profitability for Australian grain growers.

“This significant investment will increase the national grains industry’s capacity in the area of biometrics – the application of statistics to biological data – which is incredibly important in ensuring that grains research is statistically sound and credible, as well as speeding up research outcomes for the benefit of growers,” Dr Jefferies said.

“Statistical science is an unsung hero of improvements in the grains industry. Through the GRDC’s statistical investments over the past 15 years, statistical science has played a critical role in the breeding of better grain varieties and more efficient research development and extension (RD&E) targeting grower priorities.

“Importantly, the GRDC’s long-term investment in SAGI has created enduring capacity in world-class biometricians in Australia and this generation of mid-career statisticians will continue to benefit the grains industry as they grow into our next crop of statistical leaders.

“The industry outcomes generated from the SAGI investment will be a massive step forward for the Australian grains industry as it strives to provide our growers with the tools they need to remain profitable in the face of climate, environmental and economic challenges,” Dr Jefferies said.

Each of the regional SAGI Nodes (North, South, and West) will provide support for trial design and data analysis for projects relevant to their regions – these are projects developed as part of GRDC’s Grower and Applied R&D business groups.

The regional nodes will also be responsible for providing statistical training and support for regional agronomists, providing training, mentoring and statistical research collaborative support to researchers, and training a new generation of highly-skilled biometricians.

The western node will be based at Curtin University, managed by the Curtin and GRDC-supported Centre for Crop and Disease Management and Curtin’s Department of Mathematics and Statistics; the southern node will be led by the University of Adelaide, with co-investment from the University and the South Australian Research and Development Institute; and the northern node will be led by the Queensland Department of Agriculture and Fisheries.

The National node at UOW will carry out the same support and collaborative activities as its regional counterparts but will do so for GRDC’s high-value long-term Genetic and Enabling Technologies business group projects.

These projects include the National Variety Trials system, publicly-funded plant breeding programs and those which aim to solve industry important issues such as late maturity alpha-amylase in wheat and blackleg in canola.

Importantly, the National node will also oversee the National Quality Assurance System for Biometrics in the Grains Industry (NQASBGI) which will ensure the quality of statistics provided by all SAGI nodes and will also form a comprehensive resource for all statisticians in the SAGI-3 projects.

SAGI National project leader Dr Mathews, former lead statistician at The International Wheat and Maize Improvement Centre (CIMMYT), says that recent advances in statistical methodology have provided plant breeders with a cost-effective way of improving the accuracy of their breeding programs.

“Producing a new variety of wheat, for example, takes about eight years from the time the original cross is made to the time a variety is ready for release to the grower,” Dr Mathews said.

“Effectively, we’re improving the speed and accuracy of selection and therefore the rate of genetic gain. The real benefit of using best practice statistical methods is that it’s a low cost for a big gain.”

The project led by Professor Cullis will develop cutting-edge statistical software that is essential for plant breeding programs.

Professor Cullis says the genomic revolution has been a game changer for plant breeding because of the complexity and the size of the data being generated “but the power of our software hasn’t kept up with these changes”.

“Essentially, this project is about improving the algorithms we use to make them more efficient so we can add more data and get it analysed in real time for the plant breeders,” he said.



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Phone: **1300 367 869**  
International: **+61 2 4221 3218**  
Switchboard: **+61 2 4221 3555**



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