



MACQUARIE
University

**FACULTY OF SCIENCE
AND ENGINEERING**

25 January 2019

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From the Dean

SPECIAL EDITION | BEST OF 2018

Happy New Year! I hope you had a relaxing and enjoyable break over the festive season.

As we gear up for the start of a new academic year, I want to remind you of some of the Faculty's highlights from last year.

From the licencing of a Macquarie University discovery that could help tens of millions of people, to the transfer of the Australian Astronomical Observatory research and optical instrumentation capability to join Macquarie, and the launch of our new Engineering facilities—there were many occasions worth celebrating.

In research news, we collected whale snot, investigated adulterated honey, and looked at how the way we interact with our touchscreen devices can be used to track us.

I also want to acknowledge the exceptional service and leadership of Mathematics and Statistics' Rod Yager who was recognised with the Leadership and Citizenship Award at last year's FSE Staff Awards. He has made a significant contribution to his Department, the Faculty and the University.

As 2019 gets underway, I look forward to many more great stories about the Faculty's research, teaching, and engagement with the broader community.

If you want to know more about what's happening across the Faculty, follow our Faculty Twitter account [@MQSciEng](#) and my personal account [@BarbaraMesserle](#). If you've got news to share, please tweet about it and include our Faculty handle so we can see it and retweet. If you're not on Twitter, then email us at fse.execdean@mq.edu.au and we'll share the news.

Regards,

Barbara

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Wild Australian rice could be key to feeding tens of millions of people



A technology 10 years in the making is now set to help tens of millions of people, with the world's largest chemical company BASF licensing the rights to a Macquarie University discovery.

Biological Sciences' Brian Atwell worked with former Macquarie PhD student and post-doc Andrew Scafaro to isolate a gene from a wild Australian rice that renders plants tolerant to very hot days (beyond the mid-30s). This is about three degrees hotter than the optimum for commercial cereal crops.

With conservative estimates predicting an average increase in the Earth's temperature of at least two degrees over the next century, major grain shortages are expected. This innovation will help the world sustain wheat yields through heatwaves and general global warming.

[Find out more](#)

Leading telescope science and technology group moves to Macquarie



In July it was official. Macquarie University had assumed responsibility for the research and optical instrumentation capability of the Australian Astronomical Observatory, a group with 45 years of excellence in astronomy instrumentation.

The new group, known as AAO-Macquarie, has partnered with The University of Sydney, the Australian National University, and Astronomy Australia Limited to form a collaborative national capability for astronomical instrumentation, Australian Astronomical Optics (AAO).

“The consortium will build new optical astronomy instruments for the world’s largest telescopes, create new opportunities for Australian industry, and enhance career pathways for young scientists and engineers,” says Michael Steel, interim director of AAO-Macquarie, and head of Physics and Astronomy at Macquarie.

[Find out more](#)

New beginnings for Australian Proteome Analysis Facility



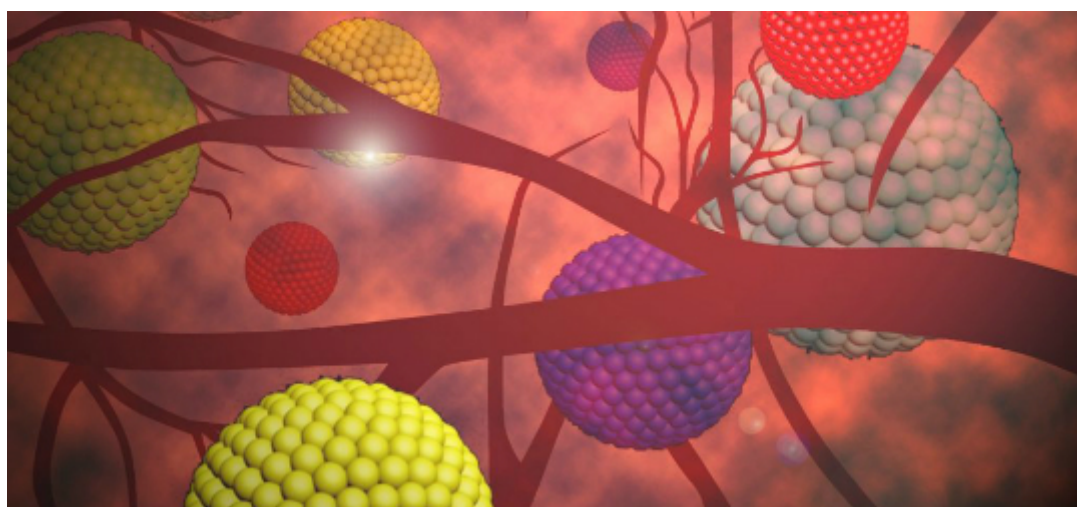
July also saw the newly restructured Australian Proteome Analysis Facility become part of the Department of Molecular Sciences.

“We’re aiming to offer more innovative services and greater opportunities to collaborate within the Faculty and University,” says Molecular Sciences’ Mehdi Mirzaei, who is the Scientific Director of the facility.

“Our current major users on campus are the Faculty of Medicine and Health Sciences and the Department of Molecular Sciences within the Faculty of Science and Engineering, but we would gladly welcome the initiation of new projects and collaborations from all departments across the Faculty.”

[Find out more](#)

New nanoparticles help detect deep-tissue cancers



Researchers have developed a new form of nanoparticle and associated imaging technique that can detect multiple disease biomarkers, including those for breast cancer, found in deep-tissue in the body.

Reported in *Nature Nanotechnology* in August, the research opens up a new avenue in minimally invasive disease diagnosis and will potentially have widespread use both for biomedical research and for clinical applications.

“Specially designed nanoparticles can be placed in biological samples or injected into specific sites of the body and then ‘excited’ by introduced light such as that from a laser or an optical fibre,” says research author Yiqing Lu from the Department of Physics and Astronomy, and the ARC Centre of Excellence for Nanoscale BioPhotonics.

“Disease biomarkers targeted by these nanoparticles then reveal themselves, by emitting their own specific wavelength signatures which are able to be identified and imaged.”

[Find out more](#)

Engineering the future



Minister for Finance, Services and Property Victor Dominello officially opened the School of Engineering's new facilities at 44 Waterloo Road in November.

This expansion of the School is a key part of our vision to attract and grow the best research, be a university where students come to study with passion, and further engage with industry.

"We are preparing students not for only their first job after university but to help them shift and shape their careers," the Vice Chancellor of Macquarie University S. Bruce Dowton said at the launch.

"The location of this facility is right in the heart of the Macquarie Park Innovation District. It is of key importance having a university close to, or in, an innovation district."

[Find out more](#)

Australia's first 'bush university' launched in Arnhem Land



Macquarie University and South-East Arnhem Land communities partnered to establish Australia's first 'bush university' in September at the remote outstation of Wuyagiba, which lies on the western coast of the Gulf of Carpentaria.

The Wuyagiba Regional Study Hub provides opportunities for remote Indigenous students to access university education and creates a means for Elders to sustain high-level Aboriginal knowledge in the region.

A six-week trial of the Study Hub was completed, with the first intake of 25 students from Ngukurr beginning a cross-cultural bridging course to prepare them for tertiary education. Fourteen students graduated in a ceremony in Ngukurr on 15 October. In the last week of the trial, the 14 successful students travelled to Macquarie University to sit alternative entrance interviews with Walanga Muru and other Macquarie University staff.

[Find out more](#)

Tracking through touch



The way we interact with our touchscreen devices can be used to track us, according to a recent study co-authored by the Optus Macquarie University Cyber Security Hub's Dali Kaafar and Hassan Asghar. Hassan presented the paper at the 18th Privacy Enhancing Technologies Symposium in Spain in July.

Touch-based tracking has the potential to track users across multiple devices or identify different people using the same device, the researchers say.

That's because the way we swipe, tap or input keystrokes into our touchscreen devices can be unique enough to identify us.

[Find out more](#)

Whale snot, funny honey and star DNA: more highlights



Researchers are [using drones to collect exhaled vapours from whales' blowholes](#) as a non-invasive way to monitor the mammals' health.

Almost [one in five Australian honey samples has been adulterated](#) with cheaper sugar products, such as corn syrup or sugar cane.

[Car parks could be used as power plants](#) in an electric car future.

A Macquarie PhD student has developed [a method to turn waste coffee grounds into lactic acid](#), which can then be used to produce biodegradable plastics.

Bluetongue lizards [use their tongues as a last-ditch effort to avoid being eaten](#).

Macquarie researchers have [completed chromosome 14 of the synthetic yeast genome](#), or what they're dubbing yeast 2.0.

The ['DNA' of more than 340,000 stars in the Milky Way has been revealed](#), and should help researchers find the siblings of our sun.

And [the shape of a bird's egg](#) is determined by the climate in which they typically breed, and the extent to which their nest protects the egg from the sun.

Award recognises exemplary service



Congratulations to Mathematics and Statistics's Rod Yager who received the Leadership and Citizenship award at last year's FSE Staff Awards.

In nominating Rod, Head of Department Jim Denier says: "Dr Rod Yager is known to many people within the University, through his significant contribution to the work of a wide and diverse range of university committees and working groups."

"For many years, Rod has had the principal responsibility for the undergraduate teaching portfolio within the old department of Mathematics, and has recently been appointed as Director of Teaching within the new Department of Mathematics and Statistics."

Rod has been a key driver behind the progressive development of the mathematical teaching program, an active contributor to the work of the Faculty Learning and Teaching Committee, and a particularly active member of the Academic Standards and Quality committee, says Jim.

"[His] service and leadership to the Department, Faculty and University is exemplary."

Well done Rod!

Connect with us

If you have comments, questions or research news you think might be of interest to the rest of Faculty, I'd love to hear from you. Drop me a line at fse.execdean@mq.edu.au.

Connect with your Faculty online:

- Website: science.mq.edu.au
- Faculty on Twitter: [@MQSciEng](https://twitter.com/MQSciEng)
- Barbara on Twitter: [@BarbaraMesserle](https://twitter.com/BarbaraMesserle)

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Macquarie University NSW 2109 Australia
T: +61 2 9850 7111 / F: +61 2 9850 7433

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