# Research
# Infrastructure

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

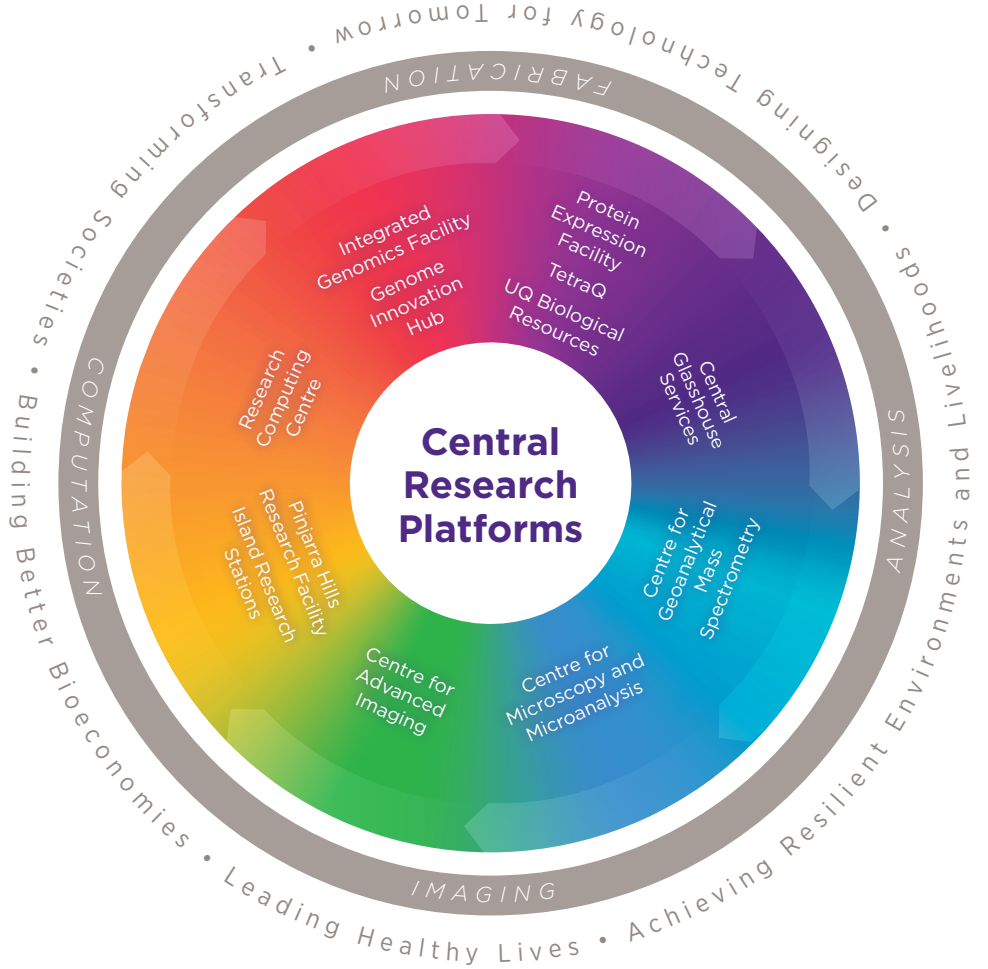
# Advancing research through world-class capabilities

As a research-intensive, Top 50 global university, UQ is renowned for the quality of its research as we search for answers to some of the world's most challenging problems.

Using the advanced equipment, high-performing facilities, and premier training and services available through our multi-million dollar research infrastructure, our researchers deliver some of the most transformative and groundbreaking research outcomes possible, thanks to the infrastructure provided to meet their requirements.

Through numerous initiatives and partnerships with academia, government and industry, we have invested in central research platforms, national collaborative research infrastructure, funding initiatives and other allied services that deliver sustainable advantage to the University, our staff and our researchers. We invite you to join us.

**Professor Joe Shapter**
**Pro-Vice-Chancellor (Research Infrastructure)**



# UQ research infrastructure drives **IMPACT**

Thanks to our exceptional research infrastructure, UQ delivers 100 per cent of its research at world standard or above*, with outcomes that directly impact global society. This is all possible through extensive partnerships with government and industry.

## Building Better Bioeconomies

**By building more environmentally sustainable, economically viable and community-supported biological production systems, UQ research is delivering bioeconomic impact through partnering with industry, government and the community.**

For example, the teams at our **Protein Expression Facility (PEF)** support new vaccine development for both human and animal use. Teams at the **Centre for Geoanalytical Mass Spectrometry** are at the forefront of research into climate change, loss of biodiversity, urbanisation, population growth, and sustainable development of minerals and environmental resources. Our researchers in the **Genome Innovation Hub** are leading the development of new techniques to understand the basis of successful plants and animals, while the **Centre for Microscopy and Microanalysis (CMM)** delves deep into the smallest building blocks of these systems. **Central Glasshouse Services** combines first-class facilities and staff to support plant and soil industry, research and education.

**Combating ecosystem change is essential to secure our environment and promote inclusive and sustainable livelihoods. Through changing technologies, economies and behaviours, UQ research is building a more sustainable future.**

UQ's teams at **Pinjarra Hills Research Facility** and the **Animal Science Precincts** collaborate with academics and industry to create advances in beef cattle production, and novel approaches to cattle and horse health. **Research Computing Centre (RCC)** support staff are undertaking critical work to model the effects of things as diverse as climate change and education for disadvantaged children. Our **Island Research Stations**, in conjunction with the powerful **CMM** microscopes, are crucial for researchers working to conserve coral reefs. A range of resources, including transmission electron microscopes, support civil engineers and material science researchers alike in making great strides in solving issues like rising sea-levels and dwelling solutions for low-lying coastal communities.

## Achieving Resilient Environments and Livelihoods

**70+**
world-class facilities and services

**12**
central research platforms

**$300m+**
in research infrastructure

**14**
national collaborative research facilities

## Designing Technology for Tomorrow

**Secure systems, clean energy and advanced manufacturing all require technological innovation. UQ experts are partnering with industry leaders to design technology solutions for tomorrow.**

State-of-the-art fabrication and characterisation instruments located at the **Australian National Fabrication Facility – Queensland Node** enable researchers to create prototypes and characterise outcomes, elevating research and development to the next level, with better designs, shorter development iteration cycles, and all supported by expert training and advice. **CMM** characterises the tiny structures in these devices and has also used cancer cell data to create a 3D virtual reality tool to explore inside a cell. CMM and **UQ Materials Performance** are continually evaluating new materials, with the support of the **RCC**.

## Transforming Societies

**A peaceful and inclusive future demands justice and equality for all. Most of all, it requires us to give all children a great start through quality education and an end to poverty. UQ researchers are driving social change and informing policy agendas to support future generations.**

The **Centre for Advanced Imaging (CAI)** teams work with the latest medical imaging instruments and spectroscopic techniques for the study of living organisms in health and disease – bringing us one step closer to personalised medicine. **CMM** has portable microscopes that can be placed on loan into Queensland's primary and high schools for 'hands-on' trials by students – directly supporting and contributing to their Science, Technology, Engineering and Mathematics (STEM) education. Applying CMM scanning electron microscope's imaging to charcoal in Australia's earliest known rock art (c. 28,000 years old) also enabled researchers to better understand the world's oldest culture, its early achievements, and how its behaviour affects society today.

## Leading Healthy Lives

**Health and safety are fundamental rights. UQ's medical and allied health research is developing solutions to promote wellbeing for us all, at all ages across the globe.**

Our **Integrated Genomics Facility** teams bring together researchers and clinicians to implement innovative approaches in the study of structural and functional genomics aiding better diagnosis and treatment of diseases like brain and skin cancer, kidney disease and endometriosis. **CAI** is developing new protocols for medical imaging to improve health outcomes for patients. Teams at **PEF** contribute to the local and global surveillance of epidemic-prone infectious diseases and produce large quantities of high-quality proteins to enable modern diagnostic development for combating infectious diseases such as Zika and COVID-19. **TetraQ** is a core capability for assessing the effectiveness of new drugs. Teams within **UQ Biological Resources** provide services for maintaining and evaluating animals' models, such as breeding facilities, laboratories, advanced reproductive and husbandry techniques, and tissue collection for genotyping.

## UQ-led National Collaborative Research Infrastructure Strategy (NCRIS) facilities

### Terrestrial Ecosystem Research Network (TERN)
– Australia's land ecosystem observatory: understanding changes and why they happen in order to protect and manage Australia's environment.

### National Imaging Facility (NIF)
– providing advanced imaging capabilities of humans, animals, plants and materials for neuroscientists, researchers and clinicians, engineers and scientists.

### Other NCRIS facilities involving UQ
- Astronomy Australia
- AuScope
- Australian Research Data Commons (ARDC)
- Microscopy Australia
- Australian National Fabrication Facility – Queensland Node (ANFF–Q)
- Australian Plant Phenomics Facility (APPF)
- Bioplatforms Australia (BPA)
- National Computing Infrastructure (NCI)
- Translating Health Discovery (THD)/ Therapeutics Innovation Australia (TIA)

** 2018 Excellence in Research Australia assessment*

# UQ research infrastructure in action

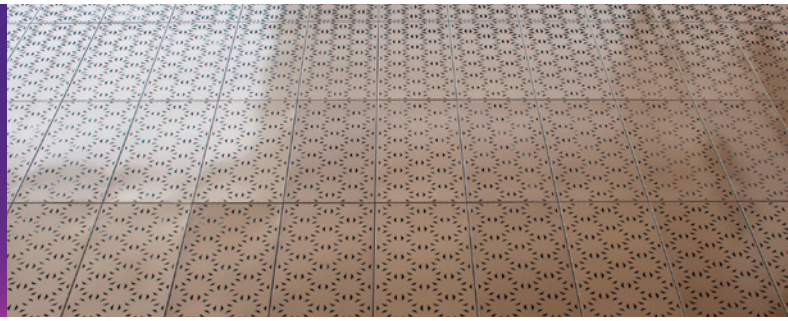
Every day, UQ research infrastructure powers incredible research by our world-class researchers: see how they are making an impact in Australia and across the world.

## Building better bioeconomies

UQ researchers are using UQ's extensive infrastructure facilities to improve the productivity and profitability of agriculture globally. Our scientists improve food production through plant and animal breeding, development of new production and processing techniques, use of innovative approaches to combat pest and diseases, and ensuring sustainability.

## Achieving resilient environments

After the 2017 Grenfell Towers fire in London, UQ research teams applied **UQ Material Performance's** analysis of nearly 2000 samples to develop a novel and comprehensive method for testing and identifying whether aluminium composite panels and other building cladding materials are dangerous or not.

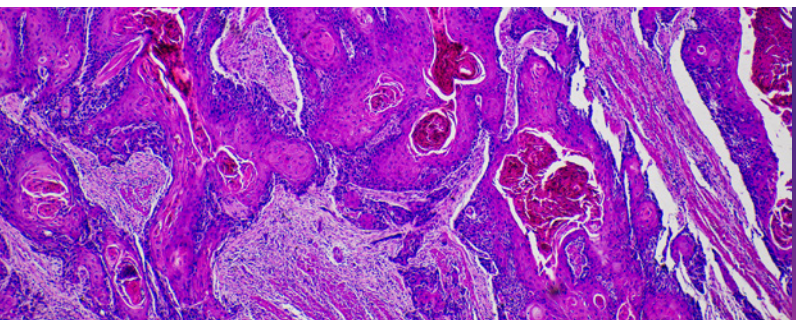


## Designing technology

Thanks to work developed within the **Centre for Microscopy and Microanalysis**, spinifex grass – traditionally used by Indigenous Australians for building materials and weapons – is now a unique source of flexible, high-strength cellulose nanofibre used for making recycled paper, cement and mortar, and condoms and latex gloves.

## Transforming societies

Using the **Research Computing Centre's** high-performance computers and scientific workflow, UQ's School of Economics has developed a model that analyses and assesses the most efficient and effective way of transporting cargo containers inland from the Port of Brisbane – saving time and millions of dollars in the process.



## Leading healthy lives

Combining genomics and advanced imaging of whole tissue slices has placed the **Genome Innovation Hub** at the forefront for developing methods for the study, diagnosis and treatment of brain and skin cancers, kidney disease, endometriosis and other diseases through computer-aided analysis of tissue biopsies.

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

# Partner with us

Whether as a student, researcher, potential research partner or donor, there are many ways you can get involved with UQ research and help us create change.

**research.uq.edu.au/research-infrastructure**