

# AUSTRALIAN TECHNOLOGY NETWORK OF UNIVERSITIES

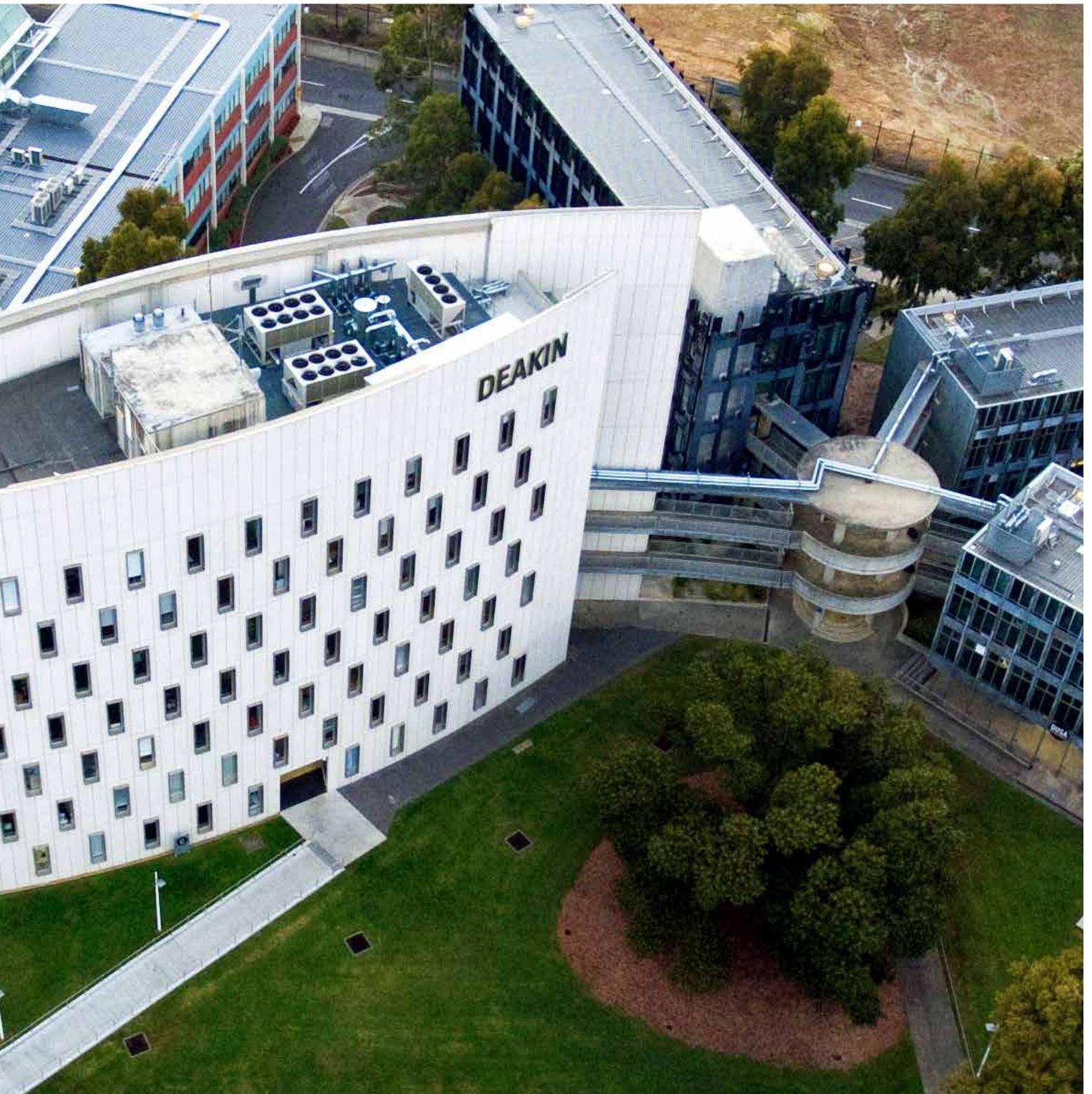


As one of Australia's largest universities, Deakin has strong global linkages, world-class research and, most importantly, an educational portfolio that blends the best of campus and digital delivery into a highly supportive and personalised student experience.

Our graduates are smart, collaborative and entrepreneurial. We give our students opportunities to develop a global mindset through our partnerships with universities and organisations around the world.

No matter where you are in Australia or the world, whether you seek a commercial, academic, or community partnership, we invite you to collaborate with us. Let's see what we can achieve together.





# GreyScan

## Long term collaboration creates new sensing technology to protect against domestic terror threat and detect biohazards

- **Multi-disciplinary collaboration delivers breakthrough technology to solve anti-terrorism, health and environmental challenges**
- **Long-term university-industry partnership creates new high-value jobs**
- **Local industry applications and global export potential**

Fertiliser and other inorganic compounds used in homemade bombs or improvised explosive devices (IEDs) are now the most common terrorist device and the greatest threat to domestic security worldwide. However, until recently they could not be reliably detected by typical airport security scans. Detection of inorganic explosive traces has been revolutionised by a world leading research collaboration involving Professor Rosanne Guijt, leader of Deakin University's Smart Sensing team, the University of Tasmania (UTAS) and industry partner, Grey Innovation Group.

Funded by an ARC Linkage grant, UTAS's Professor Michael Breadmore and Professor Guijt, who relocated from UTAS to Deakin three years ago to lead Deakin's Smart Sensing team, have continued to collaborate. Together and with industry partners, they are exploring next generation applications for the fully-deployable chemical analysis system that is the core technology of GreyScan, drawing on their collective, cross-disciplinary strengths in inorganic compound analysis, microfluidics, microfabrication, and engineering. Deakin's focus within this collaborative effort is to advance the sophistication, capability and wider utilisation of technologies including sensing systems and automation.

It was a ten-year journey to create GreyScan, supported by several research grants from the Australian Research Council, as well as the US military. The next application, EcoDetection, is the beneficiary of this prior investment of human and research capital. Designed to detect chemical traces in water, rather than homemade explosives, it is already deployed in pilot settings in Australia and New Zealand. This game changing system uses innovative sensors to test water quality every 15 minutes and transmit the data in real-time, rather than waiting weeks for test results in response to contamination events.

In March 2020, GreyScan launched the world's first fieldable Trace Virus Detector, which again repurposes the original technology to detect surface traces of COVID-19 in community and public settings.

GreyScan now employs 20 people at a dedicated manufacturing plant in Port Melbourne, holds distribution agreements in multiple regions and is working with the International Air Transport Association to update international aviation regulations. As EcoDetection approaches commercialisation, this is a compelling demonstration of how long-term collaboration between researchers and industry partners, combining blue sky and applied research and channelling the creativity of multi-disciplinary teams, results in products with truly global relevance and enormous commercial potential.



◀ Deakin researchers Associate Professor Robert Shellie, Dr Ryan Nai and Professor Rosanne Guijt, who contributed to the GreyScan project

# FormFlow

## New housing forms using iconic corrugated steel in bushfire zones

- **Practical solutions to the housing needs of bushfire-affected communities**
- **Accelerating the translation of brilliant ideas into new applications for an established product**
- **University-industry partnership creates new manufacturing jobs**

An innovative new production technology applied to Bluescope corrugated steel will provide attractive, affordable, fire-rated housing solutions in bushfire zones. FormFlow was founded in 2016 by Deakin academics, Dr Matthew Dingle and Dr Matthias Weiss, with the owners of Geelong’s award-winning engineering firm Austeng, Ross and Lyn George. FormFlow is now a technology development partner of Bluescope Steel.

Hosted within Deakin University’s ManuFutures advanced manufacturing innovation and acceleration hub, the FormFlow team accessed technology and business scale up support to commercialise their idea. Together they developed an industrial-scale machine that bends corrugated steel sheets at sharp angles, while preserving structure, coating and strength. Applying the mathematical principles of origami, the result is a seamless, airtight structure, eliminating seams and capping, with six-star energy efficiency and enhanced fire resistance.

Students and academics from Deakin University’s School of Architecture and Built Environment have designed attractive, affordable modular homes using FormFlow. The company has a contract to supply transitional accommodation for homeless people and is now fielding many inquiries from bushfire ravaged communities, where individuals needing to rebuild are desperately seeking affordable homes that comply with new fire ratings.

With staff numbers expected to double to cope with demand, FormFlow’s team of 12 has outgrown its location at ManuFutures and will move into new premises in North Geelong later in 2020.

▼ *Dr Matthew Dingle and Dr Matthias Weiss*

ManuFutures is Deakin University’s purpose-built advanced manufacturing innovation and acceleration hub that has generated 112 new jobs since it opened in 2018. ManuFutures hosts up to 15 enterprises at a time and provides a nationally unique model of scale-up services, combining technical, research, business mentoring and export support, as well as delivering 35 student engagement or internship opportunities per year, totalling 500 to date. It is located within the Geelong Future Economy Precinct at Deakin’s Waurn Ponds campus, which integrates the University’s specialised research capabilities and equipment with industrial-scale infrastructure to deliver complete solutions for Deakin’s industry partners. The Precinct has led to the creation of over 2000 new jobs in the past 10 years.



# HeiQ Australia

## Seamless partnership between industry and researchers creates global textile innovations

- **Innovative materials with extraordinary functionality used to develop smarter products and fight COVID-19**
- **Partner-centric researchers take a nimble approach to meet industry needs**
- **Local manufacturing opportunities and global export volumes**

HeiQ Australia is focused on the research, development, and commercialisation of novel materials for modifying the properties of textiles. Its parent company, HeiQ Materials AG, was co-founded in Switzerland in 2005 by Australian scientist, Dr Murray Height. HeiQ supplies textile makers with specialised treatments that are applied onto the surface of textiles during their manufacture. Its unique products add functionality, such as adaptive cooling, odour control, antimicrobial properties and moisture management, to everyday apparel produced by over 200 global textile brands.

Attracted by Deakin University's novel technology to produce short polymer fibres that offer a unique platform for functionalising surfaces, Dr Height established HeiQ Australia, which became one of the first tenants in ManuFutures in 2018. The company works seamlessly with a cross-disciplinary team of researchers led by Associate Professor Alessandra Sutti at Deakin's Institute for Frontier Materials, including researchers from the ARC Industrial Transformation Research Hub for Future Fibres.

A partner-centric approach that meets HeiQ's industry requirements and tight commercial time frames has seen the team successfully develop and share new technologies such as HeiQ Real Silk, with HeiQ's global operations in Switzerland, the US, China, Portugal and Taiwan.

Developed over six years, this symbiotic relationship between Deakin researchers and HeiQ has fostered a nimble research structure that has allowed the company and the research to pivot during the COVID-19 pandemic. Together, the team is helping to further advance the HeiQ Viroblock textile treatment technology. When the pandemic began, HeiQ expedited production of HeiQ Viroblock, which combines silver antimicrobial technology and vesicle technology to rapidly destroy enveloped viruses, including coronaviruses. Testing indicates that HeiQ Viroblock achieves a virus reduction of over 99.9% relative to the control.

Since March 2020, this product is being used to treat face masks with anti-viral and anti-bacterial properties, and is manufactured in Europe, the US and Victoria for global markets. The team is working fast to extend the capabilities and applications of HeiQ Viroblock. The development of textiles and surfaces that are virus and bacteria-resistant is one aspect of helping to address the current pandemic emergency, as well as future pandemic threats.

HeiQ Australia and Deakin researchers are also continuing to collaborate on new starting materials for novel textile treatments to improve sustainability, including waste materials from agricultural or food processing and recycled textiles. Future product applications and topics being explored include home furnishings, uniforms, and scope for increased Australian-based manufacturing capability.

▼ *Dr Murray Height and Carlo Centonze CEO HeiQ Group. Associate Professor Alessandra Sutti, Dr Emma Prime, Manager of the Future Fibres Hub and team.*



# Electric Motorbike

## Unlocking hidden entrepreneurship to develop new products for global markets

- **Extending the electric vehicle revolution to motorcycles to create jobs**
- **Holistic business support and university research expertise bring an entrepreneur's dream to market**
- **Local manufacturing opportunities and global export potential**

After 18 years working as a fitter and turner at Ford Geelong, and with extensive hands-on experience in motor sports and motorbike design under his 'Engineered to Slide' (ETS) brand, Nigel Petrie recognised the massive potential for electric motorbikes to develop as a new industry sector and market opportunity in Australia. They are quieter, more environmentally friendly and there is strong demand from the public. Nigel had developed a ground-breaking, high-tech electric driveline for motorcycles, but he lacked the educational background, business knowledge and confidence to convert this product into a viable commercial operation.

Taking up residency at Deakin's ManuFutures changed all that, as it surrounded him with a team who contributed diverse technical and business skills that helped him deal with every issue that arose, as well as access to government grants. Nigel credits the team with speeding up his entrepreneurial journey from idea to reality and planning his business future. His electric driveline for motorcycles is the most power-dense available. It combines several technologies in novel ways, drawing on Deakin academics' expertise in software, engineering, materials science and battery technologies, including researchers from the Institute for Frontier Materials.

The ecosystem of ManuFutures has also been a success factor, with co-tenant Partington Advanced Engineering contributing carbon fibre knowhow.

Initially, the electric driveline can convert petrol motorbikes to electric, and is currently undergoing federal road safety approval, ahead of a fully produced electric motorbike prototype with a lithium battery in early 2021. Once this reaches commercial production in Geelong 2022, Nigel's current staff of three will grow to ten people. There is strong export potential, as demand for electric motorcycles grows around the world, and Geelong's deep automotive manufacturing heritage is reimaged.

---

▼ Nigel Petrie

