Delivering tech for healthcare

Without medical technology, healthcare cannot be delivered.

At Deakin University, we're contributing to Australia's reputation as a prominent developer of medical technology worldwide.

Our health and engineering researchers are working hard with industry partners to develop and test innovative and cost-effective medical devices that will provide new diagnostic tests and interventions in our communities.

Please join us as we design and deliver the next breakthroughs in medical devices.

High-tech screening devices

Deakin's researchers are developing non-invasive and more effective tests to improve diagnosis, treatment and monitoring of cancer and other diseases.

IC Bowel Cancer, based on the work of PhD candidate Liam Ryan, Professor Jeffrey Craig and a team from the School of Medicine, aims to screen for cancer cells rather than traces of blood in stool samples. It has the potential to be a more accurate, but just as convenient, alternative to the Faecal Occult Blood Test (FOBT) for detecting bowel cancer.

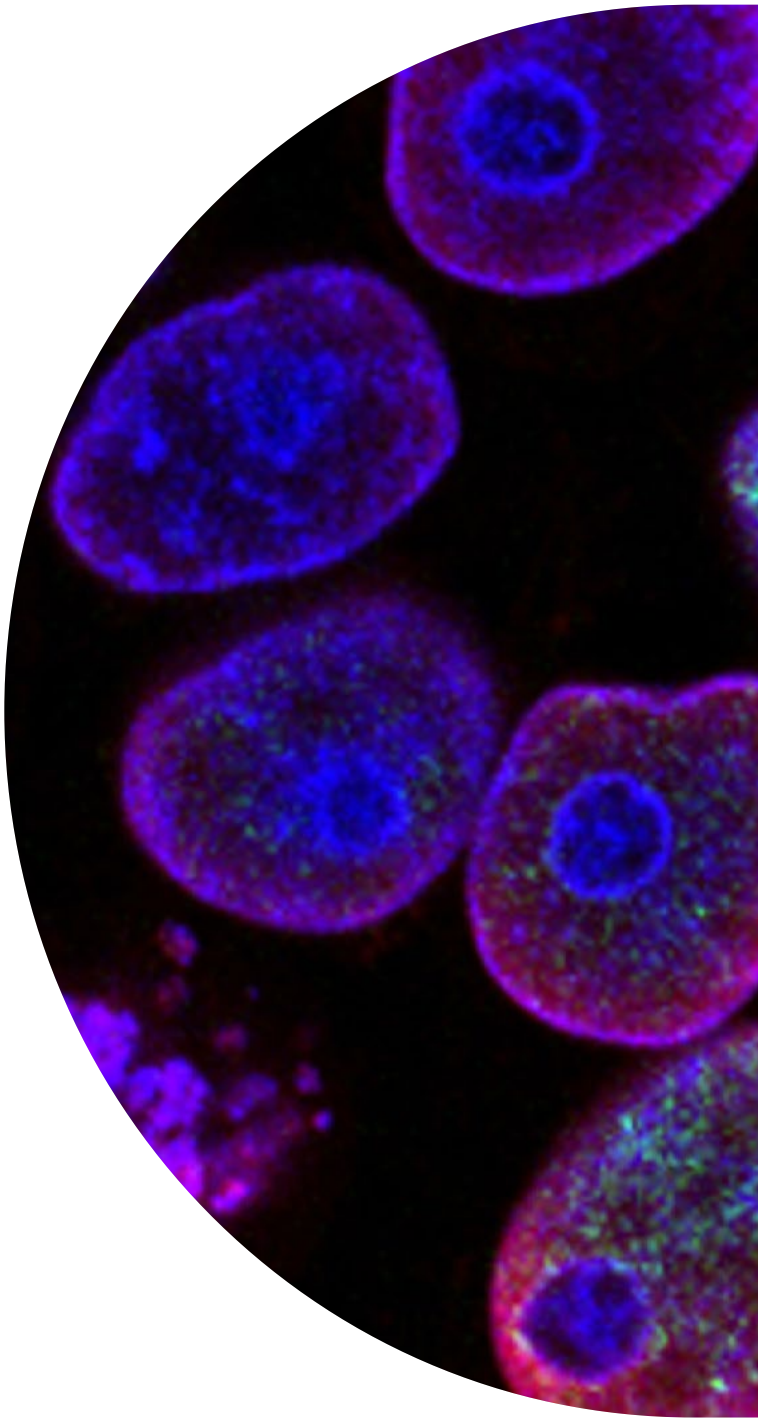
This proprietary process is being developed for commercialisation, in collaboration with colleagues from Deakin's Centre for Regional and Rural Futures (CeRRF), Epworth Healthcare and commercialisation partners.

At Deakin's Institute for Frontier Materials (IFM), Associate Professor Wren Greene has developed the Tn Antigen biosensor to detect cancer cells and measure changes to a patient's tumour status – analysing a finger prick volume of blood in just seconds, in the same way as a blood glucose test. Ultimately, it's hoped the test can be used as a bedside diagnostic tool for first-time cancer diagnosis.

Interim results from a Peter MacCallum Cancer Centre study suggest the biosensor is potentially more sensitive and more specific than an existing FDA-approved biomarker used for monitoring colorectal cancer.

Assoc. Prof. Greene and colleagues from Swinburne and Wollongong Universities are working with industry partner Universal Biosensors, a world leader in biosensing technology, to develop the Tn Antigen biosensor for commercial markets.

Assoc. Prof. Greene is also working with Assoc. Prof. Sarah Shigdar at the School of Medicine and Prof. Rosanne Guijt from CeRRF on a second generation of the biosensor platform that may one day enable at-home testing of fertility hormones.



'The Tn Antigen platform has the potential to materially improve the way in which patients and physicians monitor changes to cancer tumours in a point of care setting, using our hand-held analyser and a finger prick of whole blood. The first set of results from our Development Clinical Study with Peter MacCallum Cancer Centre are extremely promising and reinforce our confidence in moving on with the commercialisation of this product.'

John Sharman, CEO Universal Biosensors

Medical robots

A robotic surgery device that gives surgeons the sense of touch through haptic feedback makes keyhole surgery safer and more accurate than ever before by reducing trauma and lowering the risk of blood loss and infection.

Developed at Deakin's Institute for Intelligent Systems Research and Innovation (IISRI) by haptics expert Dr Mohsen Moradi Dalvand and his team, in collaboration with Harvard University and the School of Medicine, HeroSurg overcomes a major drawback in robotic surgical systems – the lack of sense of touch.

Tactile feedback allows a surgeon to differentiate between tissues and to 'feel' delicate tissues weakened by infection or inflammation and dissect them more carefully. It also allows finer and more delicate sutures in microsurgery and improves the ability to distinguish between tissues involved with cancer from normal tissue.

IISRI's Dr Parham Kebria developed a remotely operated, haptically enabled robotic arm that can carry out ultrasounds without patients needing to be in the same room, or even the same country, as clinicians.

Operators use a stylus that mimics exactly the feel of a sonographer's wand. Sensory information is taken from the robot working on the patient, so the operator can feel how much force is being used and adjust accordingly.

Cameras at multiple angles help the sonographer get to the right spots, and a live feed allows multiple clinicians, including the patient's specialist for example, to observe the scanning in real time.

In a world-first, the HERCULES ultrasound robot is being trialled on patients in the radiology department at Melbourne's Austin Health, in the hope it will show the technology is effective to roll out in regional and remote areas where access to testing services can be dangerously limited.

'It's exciting to see how far we are advancing in the space of radiology, and this is the just the first step for us in providing our community with a new tool to enhance their experience while also benefiting our staff.'

Associate Professor Natalie Yang,
Radiology Medical Director, Austin Health

BioKin

BioKin™ is a low-cost wireless motion capture device with potential to change the way rehabilitation services are delivered.

The device uses wireless 3D motion sensors and feeds data into machine learning algorithms implemented in the cloud to provide clinicians and other healthcare professionals with clinically meaningful information about the patient's condition in real time.

Developed by researchers from Deakin's School of Engineering, BioKin™ weighs 22 grams and easily attaches to a patient's clothing, wrist or ankle. It can also be embedded in day-to-day utensils, such as cups or spoons, to capture activities of daily life and help assess movement.

Led by Professor Pubudu Pathirana, the development of BioKinTM means patients can also conduct objective assessments at home, reducing the need to visit their doctor or the clinic. This lessens the strain on the medical system and saves time and money for patients, especially those living in regional or remote areas.

In collaboration with the Florey Institute of Neuroscience and Mental Health and Murdoch Children's Research Institute, BioKinTM has been expanded as an objective assessment tool to capture the severity of neurological impairments such as Friedreich's ataxia. These devices are currently being tested in independent clinical trials across multiple sites in the US and Europe for the assessment of other neurological conditions.

If you'd like to join Deakin and our partners as we work to design and deliver innovative medical devices to support healthcare for all, contact:

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