GREAT *for* *the* STATE

EDITION 5

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MACMAHON RAC *For the better* KPMG THE UNIVERSITY OF WESTERN AUSTRALIA *Perkins* HARRY PERKINS INSTITUTE OF MEDICAL RESEARCH

EDITION 5

Disruption

When ideas make an impact, Western Australians benefit from healthier lives, job opportunities and increased connections to the world around them.

OUR PARTNERS – HELPING US SHAPE GREAT FOR THE STATE

Rob Slocombe
Group CEO
RAC
Photo: LILA PHOTO

Mobility is facing a level of disruption that will surpass the invention of the motor vehicle itself. The transportation revolution will be more extensive, and the changes so profound, we can't presently comprehend all of them. However, we must start to prepare for the opportunities they present.

The safety and liveability of all Western Australians, and indeed the economic competitiveness of our entire state, requires we act now to ready ourselves for this exciting new paradigm in mobility.

(See page 6) ■

Rob Shannon
Associate director
UWA Innovation Quarter

Through the Innovation Quarter, The University of Western Australia has launched IQX, which is providing small and medium-sized businesses with a space on campus for co-location and collaboration with UWA's academic, research and student community.

The IQX initiative is delivering great benefits for WA businesses. Within the first 12 months alone, achievements have included investments of more than $2 million in resident small to medium enterprises, major buyout and merger activity, and the creation of more than 46 new jobs.

(See page 10) ■

John Barrington
Executive chairman
Artrya Pty Ltd
Director
Perkins Institute

We know the most common cause of heart disease and stroke is the build-up of plaque in arteries. Less easy to identify is whether the plaque will remain stable and be harmless or rupture and cause a heart attack. This has long been a challenge for heart researchers. There is an opportunity now for artificial intelligence to step in. With an ageing population and rising demand for medical services, an AI solution would be significantly beneficial.

A new Western Australian startup, Artrya Pty Ltd, is developing cloud-based AI solutions to diagnose patients at risk of heart attack with greater accuracy and faster than before. The Artrya AI product is designed to interpret Computed Tomography Coronary Angiogram (CTCA) scans and automatically generate reports that will allow cardiologists to choose treatments that could lower the incidence of heart attack (as treatment could be instituted early), improve lives and result in significant savings to health systems in Australia and globally.

(See page 11) ■

Ashley Brown
Innovation, Digital and Data
KPMG

Innovation and disruption are critical to not only fuelling business growth and driving productivity, but also to a company's long-term survival. The old adage 'if you are not going forwards, you are going backwards' has never been more true than in today's rapidly changing, digitally evolving environment.

Western Australia has produced many world-class innovations, particularly in the fields of biotechnology, cyber-security, mining and energy resources. The team at KPMG's Innovation, Digital and Data practice in Perth believes our state is uniquely positioned to become a truly international hub of innovation, if we can develop a stronger tolerance to failure.

(See page 12) ■

GREAT *for the* STATE

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> **In 20 years' time, screenings will be done at primary care level, using artificial intelligence and other things**
>
> *-Yogesan Kanagasingam*

Innovation revolution for disease, disability

PROGRESSIVE VISION
Yogesan Kanagasingam has been at the vanguard of pushing telehealth in Australia.

Story by **Matt Mckenzie**   Photos by **Gabriel Oliveira**

Technology is dramatically expanding access to and the effectiveness of healthcare from the cities to WA's most remote parts.

Telehealth has come a long way since Yogesan Kanagasingam moved from Norway to Western Australia in the 1990s.

More than two decades ago, Australia was lagging in its adoption of the technology, which allows patients and medical professionals to interact remotely using devices such as computers or mobile phones.

The intervening period has been one of significant change, however, with more than 60,000 telehealth appointments now made annually in WA.

Most were through the **WA Country Health Service** and **Royal Flying Doctor Service.**

Professor Kanagasingam, who is now the head of telemedicine and mobile health at the **CSIRO**, believes the benefits will extend beyond the bush.

"Telemedicine is well advanced nowadays in Australia ... it is getting to the stage it is part of the mainstream," Professor Kanagasingam told *Business News*.

"There's a long wait list for ophthalmology at Royal Perth Hospital and public hospitals, which is unnecessary, they don't need to be on a wait list.

"In 20 years' time, screenings will be done at primary care level, using artificial intelligence and other things, and then primary care providers will manage their patients (and determine) whether specialists need to see their patients."

> **Without assistive technology, I would be nothing** - *Joey Harrall*

INDEPENDENCE Joey Harrall (left) and Michael Tait at the Rocky Bay facility in Cockburn.

Home-based monitoring is one example of telehealth that can have an impact in cities as well as regions.

"Somebody comes for a heart operation, and then they go back and [are] managed from home," Professor Kanagasingam said.

Another example of telehealth's utility is the development of a mobile application that will enable general practitioners to send photos and data to specialists for a rapid response analysis.

Professor Fiona Wood, best known for her work treating burns victims, is involved in a project to do just that.

Professor Kanagasingam is passionate about the technology's potential role in screening for diseases at the primary care level.

"I developed a portable device when I was at **Lions Eye Institute** … for diagnosing eye diseases, retinal and anti-retinal," he said.

"It was very low cost, at that time (existing) devices were costing $50,000.

"I thought something was wrong."

Some of the technology was licensed to an Israeli company later bought by IBM, while a Singapore-based business, **TeleMed-C**, is commercialising devices off the back of Professor Kanagasingam's work.

NASA uses one of those devices, the Smart-I, to monitor eye health on the International Space Station, he said.

"They're planning for a Mars trip," Professor Kanagasingam said.

"They're asking what are the things that could happen if astronauts stay a long time in space?"

The devices are much less expensive than alternatives, he said, at around $5,000 compared with $30,000.

"I want to see this device on each and every GP's table," Professor Kanagasingam said.

"You can change entirely the screening program, it could be used to screen for heart disease and other things, systemic diseases."

Artificial intelligence

It's widely predicted that artificial intelligence will create massive opportunities for medicine.

Techniques such as machine learning can be used to train a computer program, known as a neural network, to recognise small details in images that can be an indicator of a person's health.

Sometimes these are nearly imperceptible to a human eye.

Telethon Kids Institute post-doctoral research fellow Martyn Symons is using these techniques, known as computer vision, to screen for kids who have neurodevelopmental difficulties.

A computer can detect minute differences in the faces of children with Fetal Alcohol Spectrum Disorder, making a diagnosis possible even when details about alcohol use during pregnancy are not available.

At the **Harry Perkins Institute of Medical Research**, Wesfarmers chair in cardiology, Girish Dwivedi, is using machine learning techniques to detect heart disease.

Professor Dwivedi is working with Perth startup **Artrya**.

The product will read angiogram scans and, using computing power, can reduce a diagnosis time from up to a week to about 10 minutes.

Professor Kanagasingam's work has included using computer vision to analyse eye images for signs of diabetes.

More than 1 million Australians have diabetes, with a third of these people expected to have sight impairment to some degree. Early detection of problems can help prevent irreversible loss of sight.

Using AI means many more patients can be easily examined, and will dramatically extend the power of ophthalmologists – they'll be freed-up to spend more time treating patients.

Professor Kanagasingam was an Australian of the Year finalist in 2015 for this work.

His other projects include preventing heart disease and Alzheimer's.

"If you can identify those who are high risk of getting heart diseases (early), you can change their lifestyle," Professor Kanagasingam said.

Long distance

WA Country Health Service executive director of innovation and development WA, Robyn Sermon, told *Business News* telehealth appointments at the CHS had grown from about 500 in 2012 to 19,000 in 2018.

Ms Sermon said the service had focused on emergency telehealth, setting up a command centre in the city with doctors available 24-7 to connect with regional services.

"We have 80 regional emergency departments," she said.

"Each of those 80 now has video access to highly trained doctors [in Perth]."

That provides a backup to doctors on the ground.

New services are now coming on line, such as mental health and psychiatry consulting from the command centre, and inpatient telehealth.

"If a local GP is away on leave, or sick, what we've had to do in the past is move patients to a larger hospital with doctors," Ms Sermon said.

"Now we leave them there, where it's clinically appropriate, and there is a ward round done with an iPad.

"We had an example a few weeks ago; a palliative patient got to die in their hometown, rather than get moved and then be hundreds of kilometres away … the family would have [had] to come across too."

Within five years, Ms Sermon said, there would be remote advanced monitoring of acute patients.

This might use wearable technology and would be backed up by AI, which she said was becoming effective at picking up when a person's condition was deteriorating.

Another big telehealth deliverer is the Royal Flying Doctor Service, which provided nearly 45,000 telehealth consultations in WA in the 2018 financial year.

RFDS has recently begun a telehealth primary care service to Eucla.

One practical example of the impact was a person who had an asthma attack in a remote indigenous community, where telehealth was used to coordinate an on-the-ground response while aerial support flew in, a spokesperson said.

Assistive technology

There has been mass adoption of smart technology during the past decade, such as phones and speakers. About 17 million Australians have smart phones, for example.

This technology is having an immense impact helping people

> ## I'm sure we're still scratching the surface, there's so much difference technology can make in our world
>
> *- Michael Tait*

with disabilities engage with the wider world.

Rocky Bay runs a facility with around 150 staff and volunteers in Cockburn to prepare and curate assistive technology for people with disabilities.

The investment was about $9 million, supported by **Lotterywest**.

The technology used depends on individual circumstances, Rocky Bay manager therapy professional services Cheryl Lockwood said.

Devices such as the Google Home are particularly handy because they can be voice activated.

"[T]he advent of smart technology really opened up the whole market for our clients," Ms Lockwood told *Business News*.

"If we went back probably five or 10 years, you were looking at completely smart wiring a house."

Assistive technology can be used to control lights, a front door, turn a television off and on, or move a bed up and down, reducing reliance on carers and increasing flexibility for patients.

Joey Harrall has been one beneficiary of Rocky Bay's support, using a switch that can be moved by his head to control a computer system on his wheelchair to speak for him.

"Without assistive technology, I would be nothing," Mr Harrall said.

"My chair has bluetooth for interfacing with phones, tablets, laptops and anything else that can support a bluetooth mouse or bluetooth switch input device.

"My chair also … allows me to lift up to look at people in the eye, without them needing to look down at me while I'm speaking to them."

In Mr Harrall's case, the technology enabled him to complete a certificate IV program through Rocky Bay to mentor people with disabilities.

He said the training had enabled him to support other people going through similar experiences.

"Peer-to-peer support is so important, you can talk more freely with someone who has similar living experience to yourself," Mr Harrall said.

Rocky Bay chief executive Michael Tait said he was passionate about driving the take up of assistive technology.

"We've come a long way," he said.

"The key thing is about connection to the world, choice and independence.

"I'm sure we're still scratching the surface, there's so much difference technology can make in our world."

Mr Tait said the use of assistive technology was an international trend, and Rocky Bay was aligned with other providers through Ability First Australia.

"We've been on the journey longer than most," he said.

"Technology is moving so fast, and becoming so accessible in terms of the cost.

"We don't need to reinvent the wheel, but we need to connect the customer to the technology that's been made available."

Mr Tait said there would be about $1 billion of funding for technology allocated through the National Disability Insurance Scheme.

"We've got a burgeoning internal cottage industry in Rocky Bay," he said.

"The next two or three years, it's really about partnering and learning from the Rio Tintos of the world." ∎

Seven WA disruptions, then and now

Story by **Matt Mckenzie**

We share seven of the many stories of WA ingenuity and entrepreneurship to have had an impact during the past five decades.

1972 — Orbital Engine

When Ralph Sarich was crowned the ABC inventor of the year in 1972, it was potentially the beginning of Perth as a home of automotive technology.

Mr Sarich developed the orbital engine, which uses one orbiting piston to create five or more combustion chambers with the power of a six-cylinder engine.

He received backing from BHP, which bought a $50 million stake in the business, worth nearly $500 million today. Orbital was worth $1 billion at peak value.

The engine itself never ignited in the market and Mr Sarich retired as CEO in 1992.

But related technology, such as fuel injection, is licensed, while the company now makes drone engine parts.

1983 — Australia II

Perth was at the heart of one of Australia's greatest disruptions in sport when *Australia II* won the 1983 America's Cup yacht race off Newport, Rhode Island. The *Australia II* syndicate, based in Perth, was the first non-American team to win the race since its inception in 1851.

A key element of the victory was the winged keel used on the yacht, which had a special horizontal plane under the water to increase stability and cut resistance. The keel was invented by Sydney-born marine architect Ben Lexcen, while the enterprise was funded by colourful Perth businessman Alan Bond.

Local boat builder Steve Ward assembled the yacht in Cottesloe.

1988 — Austal

Shipbuilder Austal has regularly pushed the boundaries on the water through use of aluminium in manufacturing, construction of large trimarans, and now, artificial intelligence to stabilise vessels in all weather conditions.

Austal has been one of the leaders in the use of aluminium in boats and in development of multi-hulled vessels. Taken together, it means the ships are among the fastest on the water.

In 2005, the business launched the *HSC Benchijigua Express*, a fast ferry made of aluminium, which was then the longest trimaran in the world.

That year, Austal also won the first contract to build a trimaran littoral combat ship for the US Navy.

The accelerating mobility revolution

By 2030, more than 50 per cent of revenue generated by the mobility industry is likely to be disrupted. That's according to a report by McKinsey and Co which also predicts that within the next few years, our vehicles will become fully connected "virtual chauffeurs", able to anticipate and deliver on riders' needs in real-time.

And with an estimated 75 per cent of the infrastructure needed in 2050 not existing today, we have not faced such a dramatic step change since the invention and mass adoption of the motor vehicle.

It's not just technological disruption though. The nature of how we travel is also evolving. Given the way we live, work and consume is so deeply connected to how we get around, the very fabric of our society faces one of the biggest changes of the past century.

Personal car ownership, while still a dominating factor, is starting to decline as consumers begin to look toward more contemporary solutions. Ride-sharing, car and bike sharing, park sharing, and car-pooling are all challengers to the traditional notion of 'owning' your vehicle. Future generations are also bringing a new perspective,

which is evident in a German survey which found that 75 per cent of 18-24 year-olds would rather live without a vehicle than without their smartphone. It would seem an hour spent in traffic is an hour they are away from their social network.

Disruption, in all sectors, is already pervasive. The key is no longer simply acknowledging it exists (that's clearly accepted). Rather, we need to be prepared to take hold of the opportunities and overcome the hurdles. Disruption will demand reform; in how we fund, build, power and ultimately use our transport system. Regulators must become more agile in responding to rapidly changing landscapes. In doing so they can ensure Australia remains globally competitive and that the benefits of the mobility revolution are delivered without delay.

While it might be hard to visualise precisely what disruption will bring, the benefits of this looming transport transformation — a safer, cleaner, and more connected community — are well worth embracing.

Rob Slocombe
Group CEO, RAC

The RAC Intellibus Trial has been operating in South Perth since 2016 and has seen more than 12,000 people take part. More recently the Intellibus visited WA's South West. This work is helping prepare Australia for the safe transition to driverless vehicles and a future world of safer, easier and more sustainable transport.

RAC For the better

1993 — Spray on Skin

Fiona Wood has devoted her life to treating burn victims, developing a spray-on skin solution to radically improve treatment times and recovery prospects.
It uses a sample of the patient's skin, which is suspended in a solution that can be applied to regenerate skin over damaged cells.
The spray attracted considerable interest after usage following the 2002 Bali bombings, where Dr Wood was involved in the treatment of 28 patients.
For the innovation, Dr Wood was awarded Australian of the Year in 2005.
The technology is being commercialised through Avita Medical, with a wound care device approved for use in the US last year.

2010 — HealthEngine

A team led by Perth doctor Marcus Tan has used technology in a simple but effective way to improve the healthcare industry, helping patients book and manage healthcare online.
The company says it helps patients navigate the complex medical system and supports providers to make the journey easier for patients.
One benefit, HealthEngine says, is that it reduces the likelihood people will visit emergency departments when they need to visit a doctor immediately.
The booking service was rolled out across Perth in 2012, and as of May, the platform has one million bookings a month.
The company faced criticism last year for selectively posting users' reviews, and for sharing patient data with outside parties.

1998 — Lectopia; 2001 — Moodle

WA has a remarkable history of innovation in education.
Autonomous lecture recording platform Lectopia was developed by The University of Western Australia, and was used at more than 20 institutions.
In 2007, it was acquired by US-based company Anystream, then rolled into the Echo360 product.
A second example is Moodle, a learning management platform developed out of Curtin University by Martin Dougiamas.
Moodle is used by more than 60 per cent of the universities in Australia, and more than 100 million people are registered around the world.
The platform is free and open source.
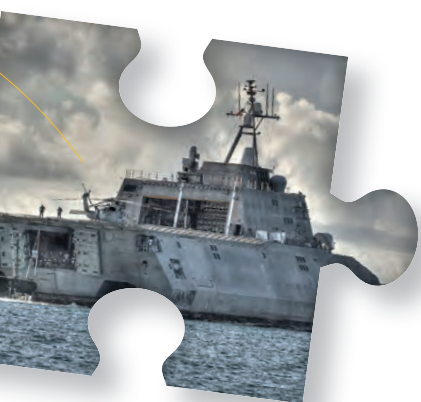
2018 — Minderoo Foundation modern slavery

Disruptive impact can extend beyond business.
The Forrest family's Minderoo Foundation is one example, with the organisation behind a global push to eradicate slavery.
Minderoo funds the Global Slavery Index, which highlights countries where slavery continues to be a problem.
The organisation estimates more than 40 million people in the world are still living in slavery.
In 2018, federal parliament legislated reporting requirements for big businesses to address slavery risks in their supply chains.
That will mean a thorough analysis of the sources of imported equipment and materials to ensure no forced labour in production. ■

Disruption in

Three big changes in the transport industry will revolutionise how Western Australians move around in decades to come.

Story by **Matt Mckenzie**   Main photo by **Gabriel Oliveira**

Within their lifetimes, young Western Australians could witness the end of driving, the end of petrol, and possibly, the end of car ownership itself.

Together, these three dramatic changes to the transport sector would have the biggest impact since the invention of the automobile.

Already, signs of transformation are emerging.

Amid the looming eventuality of such dramatic upheaval, the state will need to think ahead about how it can take best advantage of the opportunities, according to industry leaders who spoke to *Business News*.

One example of how this disruption is unfolding is with autonomous vehicles, where WA has good form.

In the Pilbara, big iron ore miners use trucks without drivers, and autonomous drill equipment, while **Rio Tinto** operates the Auto Haul rail network.

On a different scale, the **Royal Automobile Club of WA** has been trialling an autonomous bus, the Intellibus, on the South Perth foreshore and in Busselton.

That was only the second autonomous bus trial on public streets in the world, RAC general manager of public policy and mobility Anne Still told *Business News*.

"There are very few (trials) operating on public roads that allow the public to participate," Ms Still said.

"That speaks to WA being a leader among leaders in this field.

"It's widely accepted that the work being done in the Pilbara and other places, for many years now, is world leading.

"It puts WA in a good place in terms of our preparation for these giant leaps forward in autonomous [technology]."

Similar trials are now under way in other states and some cities around the world.

Ms Still said the South Perth trial, which started nearly three years ago, was an opportunity to learn about the technology, give the community a chance to use it, and work with (local) governments to develop a pathway for readiness.

Autonomous vehicles are ranked on a scale from zero to five, with levels one and two including partial automation for systems such as braking.

Level three would include automated lane keeping assistance or emergency braking, while level four would mean full automation in some circumstances, like local roads.

The Intellibus is at level four.

But it's a long way to level five – complete automation.

"That last 10 per cent (is hard) ... we use a lot of visual cues when driving," Ms Still said.

"It's using artificial intelligence."

Driverless

Driverless vehicles could dramatically improve road safety and help alleviate congestion, if managed correctly, Ms Still said.

There was also a risk, however, that congestion would worsen if a large number of vehicles were moving through the road network without passengers.

She said there were hundreds of sections within legislation that needed to change nationally to allow autonomous vehicles to operate on a large scale.

For example, just importing the buses was difficult because they did not have a steering wheel.

"If you look at the WA road code, the word driver is mentioned 988 times," Ms Still said.

"The way the system is set up at the moment isn't fit-for-purpose in terms of a world with autonomous vehicles.

"That's not insurmountable, but governments have a role ... preparing a pathway for readiness."

Other considerations will be insurance, responsibility in the case of an accident, and the ethical decisions that will arise from that.

Then there will be investment required into the network itself, with sensors and communications equipment to make freeways 'smarter'.

RAC has been using buses manufactured by French company Navya, and more recently bought autonomous cars from that business for a trial at Perth Airport.

Navya also supplied an Intellibus for a second trial in WA, at **Curtin University**.

This, in turn, created opportunities for research synergies, including at the university's co-innovation centre with **Cisco**, one of 14 Cisco operates in the world.

Cisco lead of Innovation Central Perth, Tom Goerke, said the centre was the first place in the world to trial a new protocol for managing interactions between objects and sensors.

He said further work on autonomous vehicles in WA was under way in Karratha at **Fortescue Metals Group's** Future of Mobility Centre.

"We could have autonomous vehicles in Karratha much earlier than what people think," Mr Goerke told *Business News*.

"The technology is moving so quickly, regulation and infrastructure are saying 'How do (we) keep up?'"

He said the potential for driverless vehicles extended to waterways, with the use of autonomous vessels for iron ore exports one possibility canvassed at a recent Pilbara 2050 conference.

Fuel-less

The move towards electric vehicles seems to still be in first gear.

Eighty-one electric vehicles were sold in WA during the first half of this year, while a further 943 hybrid vehicles hit the roads, according to data from the Federal Chamber of Automotive Industries.

Taken together, that's about 2 per cent of new vehicle sales.

There is evidence that the move to electric cars will pick-up the pace, however.

Several of the big automakers are producing or planning electric vehicles, including VW, Toyota, Nissan and Audi, while businesses such as Tesla started purely as electric car makers.

Market access will no doubt be made easier for electric vehicle producers due to legislative moves in some countries to ban combustible fuel vehicles, with the UK targeting 2040 for such a shift.

In WA, RAC's Ms Still was confident that electric vehicles would eventually gain traction.

Two contributing factors would be price reductions and continuing range improvements.

A recent forecast had suggested electric vehicles will reach price parity within five years, she said, while range had lifted from around 100 kilometres initially to be more like 800km on a single charge.

There were also efforts under way to introduce charging stations.

RAC built the electric highway network of fast chargers from Perth to Augusta, with 11 charging stations.

Tesla has rolled out about 20 fast-charging stations in WA, while other locations include the Wesley Tower car park in the CBD.

Ms Still said the take-up of electric cars would produce health and environmental benefits.

"We have an enormous challenge around air pollution," she said.

"This is becoming more of a priority, certainly a discussion point, for WA.

"As many as 2,500 deaths can be attributed to air pollution in Australia per year."

Ownerless

The rise of **Uber** and other ride-sharing services in competition with taxis has opened up a further possibility – on-demand transport.

And the potential extends beyond ordering a car with a mobile application.

A great example is Uber Pool, which has been used in cities including Los Angeles and London for years.

m**O**ti**O**n

ACCELERATION Anne Still says regulations will need to change to harness autonomous cars fully.

With Uber Pool, customers who are taking trips on similar routes will share an Uber ride matched by the company's route optimisation algorithms.

The riders disperse the cost between them, although the routes are less direct.

The service will be trialled in Perth from the end of July.

Another example is Sydney-based **Drive My Car**, where vehicle owners can rent cars to peers, which recently expanded to Perth.

The idea extends to a concept called 'mobility as a service', which is like public transport with an additional dimension.

Users would not even need to own cars.

Instead, they might hail vehicles from a network node using an app.

Both RAC and the Cisco-Curtin researchers said they were keeping appraised of this developing field.

"We've been running a project called mobility as a service," Cisco's Mr Goerke said.

"We can collect the information so (the network) can understand the current and future load that will come onto it."

A bus would be a good example.

"(In Perth) we probably run a large green bus to parts of the network with one or two people on it," Mr Goerke said.

That's an inefficient use of resources, but one many of us recognise from experience.

When customers order transport, the computers underpinning the network would instead make a decision about how to most efficiently provide the trip.

In place of a big bus, private ridesharing services could be allocated by the network operator to a route with only a couple of customers at a much lower cost.

"People get a better service and it's cheaper for the taxpayer," Mr Goerke said. ◾

> **The way the system is set up at the moment isn't fit-for-purpose in terms of a world with autonomous vehicles**
>
> *- Anne Still*

Blue sky opportunities

Story by **Matt Mckenzie**　Photo by **Gabriel Oliveira**

STRIKING
Drones add an additional dimension to anything requiring human eyes.

In the dunes of the state's South West, on the mine sites of the red north, or in remote villages around the world, drones are unlocking opportunities.

For the South West Catchments Council, drones simplify inspection of revegetation work, such as recent projects at Five Mile Brook and The Maidens near Bunbury.

Previously, staff would need to set up a series of sampling places, each a square metre in area, and hand count seedlings – a highly labour-intensive practice.

Now it can be done by drone, chief executive Steve Ewings told *Business News*.

"We use drones monitoring regeneration sites, so we can assess with some metrics the regrowth in vegetation," Mr Ewings said.

"We fly a transect that has hundreds of images in it, and it's pitched together in one GPS meta-tagged image."

Local startup Soar takes the potential of drone imaging a step further, with an online marketplace where customers can contract pilots over a system powered by blockchain.

Drone uses extend beyond photography and video capabilities, however.

Examples include infrared detection or the use of ultrasonic devices to measure the thickness of steel.

Chief executive of aerial imaging and sensing business RemSense, Steve Brown, said there had been significant growth in demand for drones from mining and energy businesses due to the improvements in safety and productivity they offered.

Mr Brown said using people for inspection work at height was complex, expensive, and required significant approvals processes.

Drones were better suited to those projects, he said.

Similarly, mine shutdowns could be cut significantly using drones for inspections, which reduced the impact on production, Mr Brown said, improving cost competitiveness for export-intensive industries.

Applecross-based pilot training provider Global Drone Solutions is hoping to have an overseas impact through a partnership with WeRobotics.

WeRobotics, a non-profit, has set up 23 flying labs around the world to build drone capability in developing countries.

The intention is to help communities prepare for disaster relief, assist in distribution of medical equipment, and potentially ignite new businesses.

GDS has helped train about 60 pilots for WeRobotics using an online course, with chief executive Mahmood Hus-

> **It's always stuck with me … to make sure we help others as well**
> *–Mahmood Hussein*

sein telling *Business News* he had wanted to have a positive social impact through his business.

"I was born in Pakistan in a rural village," Mr Hussein said.

"It's always stuck with me … to make sure we help others as well."

He said the training, which includes a big component of theory such as aerodynamics, had been key in reducing the number of drones that had crashed or been lost. ∎

The art of disruption: innovation at UWA IQX

Universities are drivers of innovation, facilitating connections and collaboration between researchers, students, founders, funders, investors and industry. But accessing these attributes can be difficult. The resources of most small to medium enterprises do not always allow for such opportunities, even though some of the most valuable seeds of disruptive, innovative thinking lie within them.

The University of Western Australia is a globally networked, billion-dollar enterprise, with world-leading research and teaching, talented people and the appetite to meet the grandest challenges facing modern society.

IQX is one of the many ways UWA is supporting innovation; connecting UWA's academic and student community with local small to medium enterprises with a space on campus for co-location and collaboration.

The IQX operating model is agile, driven by a unique partnership arrangement between UWA and operating partner Business Foundations that offers the best of both organisations to the community. Through co-location at IQX, members are supported to grow their enterprises. Within the first 12 months alone, achievements have included investments of more than $2 million in resident small to medium enterprises, major buyout and merger activity and the creation of more than 46 new jobs.

More than 500 new connections have been made between members, researchers, students and industry. IQX has event and meeting spaces that support a range of community events, programs and activities – from accelerator programs to yoga, workshops, training , film nights and even music festivals. There have been more than 15,000 visits in just over a year.

In a rapidly changing world that demands entirely new types of thinking, UWA has recognised the need to seek out and embrace the new and unknown, and to encourage adaptive and open approaches. In doing so, it is creating new generations of thinkers who will change the way we in WA interact with each other and the world.

To find out how research and education at UWA can benefit your organisation email **uwaiq@uwa.edu.au** For information on IQX and the opportunities available for small to medium businesses visit **www.innovation.uwa.edu.au/iqx**

Rob Shannon
Associate Director
UWA Innovation Quarter

Perkins, Green lead modern disruptors

Story by **Matt Mckenzie**

Before the business she co-founded attained its $1billion 'unicorn' valuation, Melanie Perkins hit a point where she thought she had failed her co-founders.

Ms Perkins was in the US, chasing investment from Silicon Valley entrepreneur Bill Tai into her online publisher, Canva.

To get Mr Tai's support, Ms Perkins needed an excellent engineer to join the team.

"But no resumé I brought him was up to scratch," Ms Perkins told *Business News*.

"Eventually, after three months of accosting engineers anywhere I could and being rejected more times than I would have thought possible, my visa to the US expired.

"I felt like a complete and utter failure.

"I'd spent thousands of dollars in the US, and I felt like I'd let my co-founder, Cliff Obrecht, down."

It was then she was introduced to Cameron Adams, who joined as a co-founder, and together, the three built a business that was recently valued at $3.6 billion.

Although Canva is based in Sydney, the company has a strong Western Australian link, with both Ms Perkins and Mr Obrecht graduates of The University of Western Australia.

A program and grant from the WA Innovator of the Year awards, for which Canva's predecessor, Fusion Books, was a finalist in 2008, helped get the business off the ground.

Ms Perkins said other major funding sources were a Commercialisation Australia grant, research tax concessions, and a loan from NAB, which she said had supported the business when other banks would not.

"Access to early-stage funding is critical to starting a startup – working part-time jobs, piecing together funding from family and friends, spending all of your savings, eating on the cheap and working from home or a garage – this is the beginning for most startups," Ms Perkins said.

The inspiration for Canva had come while she was teaching graphic design programs part time during university.

"I realised that they were incredibly complex to learn, and set out to make them much easier to use," Ms Perkins said.

PAINTING SUCCESS
Canva, co-founded by Melanie Perkins, is probably the most successful tech startup linked to WA.

15m
Canva users

Electric potential

Mr Tai, who is also a visiting professor at Curtin University, played a pivotal role in the story of another Perth success story, Power Ledger, a startup that uses blockchain to track electricity movements on a grid from distributed sources.

Power Ledger is chaired by Jemma Green, who also served as deputy mayor of Perth and worked at investment bank JP Morgan.

At its peak in early 2018, Power Ledger's crypto token had a market capitalisation of more than $US600 million, and the business won Sir Richard Branson's global Extreme Tech Challenge award in 2018.

The company's technology has been used at a property development in White Gum Valley, with a Japanese solar energy provider, and with an electric car charging project in California's Silicon Valley. ■

Can AI prevent heart attacks?

PREDICTING if someone is at imminent risk of a heart attack has been for a long time the Holy Grail for heart researchers. WA start-up Artrya Pty Ltd is now applying Artificial Intelligence to the challenge.

Despite decades of excellent research and the development of sophisticated imaging techniques, heart disease is still the world's biggest killer.

The build-up of plaque and the subsequent narrowing of arteries has been the major focus.

However, narrowed arteries are only part of the story. Heart attacks also occur in people with less than 50% narrowing. In fact, 50% of men and 64% of women who die of heart attack have never had a warning signal and two thirds of them have less than 50% narrowing in the artery.

The reason is due to a particular type of plaque which can erupt and suddenly block an artery. This plaque is different from the hard calcium detected in CT calcium scans, and is much more difficult to accurately identify.

Artrya's all-Western Australian team is developing an Artificial Intelligence solution that if successful could disrupt current approaches and successfully identify at risk patients.

The start-up is leveraging Perth's concentration of leading researchers and has brought together a team of 11 West Australians comprising cardiologists, Artificial Intelligence experts and engineers.

First, the plan is to deliver a system using non-invasive scans to help clinicians better evaluate cardiovascular risk. The aim is to provide a patient report to the treating cardiologist within minutes, as any delay potentially leaves a patient at heightened risk.

In Australia current wait times can be up to a week. In the UK 230,000 people waited a month before their scan results were received.

Next the team aims to develop technology that not only identifies plaque but pinpoints plaque which is at heightened risk of rupturing and causing a fatal blockage.

To achieve this, machines which detect individual pixels will be used as they can work at higher levels of accuracy, consistency and sensitivity than the human eye.

Already $1million, over-subscribed, in angel funding from Western Australian investors has been put toward the project.

It will be a major breakthrough if a cost effective and safe technique of interpreting CTCA scan can be developed that identifies patients at risk of dying of heart attack.

John Barrington AM
Executive Chairman, Artrya Pty Ltd

MACMAHON RAC For the better KPMG THE UNIVERSITY OF WESTERN AUSTRALIA Perkins HARRY PERKINS INSTITUTE OF MEDICAL RESEARCH

Building connections to enable disruption

Story by **Matt Mckenzie**

Western Australia in 2029 will be dramatically different from today.

Some cars might be autonomous, drones will be buzzing through the sky, visits to the doctor will be possible online, and household objects will be connected to the web.

But there's something that needs to underpin all of this – internet infrastructure.

There is already work under way on this front.

Probably the best known is the National Broadband Network, a $50 billion project to deliver broadband across the country with speeds of at least 25 megabits per second.

The alternatives are wireless, either fixed or mobile.

Telstra is already rolling out 5G mobile telecommunications in Western Australia, with access in a zone around Perth CBD.

That connectivity will slowly spread across the metropolitan area in the year ahead.

5G uses shorter wavelengths than earlier cell phone generations and is more powerful.

Telstra network engineering executive Channa Seneviratne said 5G technology would be a major enabler for transport, industrial uses, and at home.

"In five to seven years' time, 5G will be as ubiquitous as electricity, in my view," Mr Seneviratne told *Business News*.

"You'll see different types of it controlling every aspect of our lives; at home, the way we work, the automation that'll be possible, entertainment experiences, smart grids."

Mr Seneviratne said 5G and the NBN would be complementary, with NBN to be used for bigger downloads, while 5G had lower latency.

"To control a vehicle autonomously, you need to send a command, you don't need to send a lot of data, but it needs to get to that vehicle quickly," he said.

"That's where the low latency of 5G comes into play.

"When you want a vehicle to stop, you need to stop immediately.

"A delay of up to a second, at high speed, not a good thing, you need really low millisecond delays."

For businesses, 5G could mean high-tech equipment connected to the internet without massive cabling requirements, while for customers, 5G will have virtual reality applications, aiding streaming of sports matches, he said.

Local internet provider Pentanet is rolling out its own fixed wireless network, a different technology, in Perth.

Pentanet managing director Stephen Cornish said cloud computing was becoming more prevalent.

That meant data centres would store information, with processing power centralised, so a good link from a home computer or mobile phone was vital, Mr Cornish said.

Mr Cornish said both fixed wireless and 5G could hit speeds faster than fibre optic cables used in the NBN.

But fixed wireless requires line-of-sight to a tower, while 5G can not send signals over very long distances.

Mr Cornish has an ambitious plan for Pentanet.

"I want to bring gigabyte per second internet into the suburbs," he said. ∎

> **In five to seven years' time, 5G will be as ubiquitous as electricity, in my view**
>
> *-Channa Seneviratne*

Disruption and innovation critical to corporate survival

One of the key findings of our 2019 Global CEO Outlook was that 84 percent of the 1,300 CEOs surveyed told us they want a culture where it is accepted that errors and mistakes are part of the innovation process, yet only 56 percent said that they currently have a culture where 'fail fast' innovation is celebrated. The paradox is stark; why is innovating seen as 'unsafe' when the opposite – not innovating – is perhaps the greatest organisational risk of all? How do we balance the risks that come with innovating against the bigger risk, the existential risk, of not innovating and eventually being disrupted?

The old adage that states that "if you are not going forwards, you are going backwards" is particularly relevant here. Globalisation is lifting consumer expectations, which each of us carry forward into every other facet of our day-to-day lives. We expect, and increasingly demand, Uber-like service, Amazon-like convenience and Apple-like experiences in every interaction; whether it is dealing with a government agency, seeking support from our own HR department, or doing our weekly grocery shopping. With the bar constantly increasing, it is more important than ever that organisations put

their customers (both internal and external) at the centre of their innovation agenda, to understand their needs and design solutions that engage and delight them, in order to remain relevant in this hyper-connected world.

No single organisation is big enough to have all of the innovative ideas. Collaboration is the key; with partners, with researchers, with innovative startups and scaleups, and in some cases even with competitors. Through initiatives such as startup accelerator programs, industry clusters and cooperative research centres, we are starting to see greater collaboration across some of our key sectors. By creating these connections and lowering the barriers to adoption of disruptive technologies we can expect to see greater innovation and productivity, underpinning the long-term global competitiveness for our key export industries.

By harnessing innovation Western Australia can not only survive disruption, but we can lead it. In fact, in a number of critical fields, we already do.

Ashley Brown
Innovation, Digital and Data
KPMG

KPMG