

GREAT *for the* STATE

BUSINESSNEWS

1 April 2019 | businessnews.com.au

EDITION 1

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Peter Quinn
Executive director, ICRAR
Photo: Gabriel Oliveira

INTRO

Welcome to Great for the State

As editor of *Business News*, I'm delighted to introduce a new feature that highlights the best of Western Australia.

Great for the State is a 12-page lift-out that will be published each month over the course of 2019.

Each edition will explore a theme that helps define WA.

This first edition is focused on the state's global outlook.

Chief executive Mark Pownall explores this theme on the facing page, with Austral Fisheries and shipbuilder Austal illustrating the potential for WA businesses to be global leaders.

The main article in this edition covers the state's lead role in the Square Kilometre Array, one of the

world's largest and most exciting science projects.

Journalist Matt McKenzie has also spoken to some of the people helping to develop WA's emerging tech sector.

Great for the State is designed to be a collaborative project. We've partnered with the Harry Perkins Institute of Medical Research, the University of Western Australia,

KPMG and RAC, which share our desire to showcase achievements and opportunities in WA.

In future editions, we will tease out themes that create links between people, organisations, industries and ideas.

The next edition will focus on the energy sector, including renewables, battery metals, gas and hydrogen, and developments

along the value chain, from mining to research to consumer applications.

Some of the overarching themes to be featured in future editions include indigenous development, disruption, generosity and giving, and cultural growth.

I hope you enjoy Great for the State.

Mark Beyer ■

OUR PARTNERS – HELPING US SHAPE GREAT FOR THE STATE

Dawn Freshwater

Vice-Chancellor,
University of
Western Australia



Since its foundation more than a century ago, The University of Western Australia has worked with government and industry to help build the state's economy by providing research and teaching in key areas such as agriculture, mining, engineering, health and medicine, and the arts.

I am pleased to be leading our state's first university through the UWA2030 vision process, as it strives to tackle some of the greatest global challenges caused by rapid technological change and disruption.

And this task must be undertaken while the university continues to uphold its noble purpose to advance the prosperity and welfare of the people and promote equal access to tertiary education for all. (See page 7) ■

Prof Peter Leedman

Director,
Harry Perkins Institute of
Medical Research



Research by many of our best and brightest is attracting scientists to Perth from across the globe.

Teams are focused on overcoming some of the world's most challenging diseases, including cancer, heart disease, diabetes and genetic disorders.

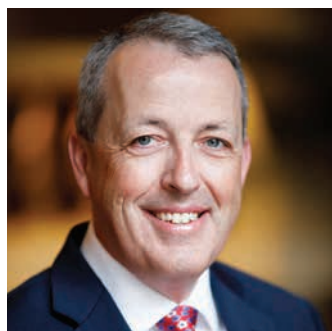
Debilitating disease is an international problem that requires an international response, and Western Australia is more than playing its part.

For example, the recent discovery of a disease gene in Perth listed 55 authors from 30 institutions across four continents. This international involvement with WA research is having a global impact. Discoveries in the lab are leading to the development of new drugs, commercialisation of biomedical innovations, and better health outcomes for patients. (See page 9) ■

Rob Slocombe

Group CEO,
RAC

Photo: LILA PHOTO



With an estimated 75 per cent of the infrastructure needed in 2050 not existing today, the way we move around will experience its biggest disruption since the invention of the motor car.

Global discussion on the potential of Autonomous Vehicle (AV) technology includes their influence on reducing road trauma, the design of urban centres, environmental benefits of electric based technology, increasing social mobility and independence, and traffic congestion.

By shaping our AV future now, we will be able to deal more effectively with the potential obstacles and hurdles, and importantly position ourselves to capture the opportunities along the journey. (See page 11) ■

Matt Woods

WA Chairman,
KPMG



There is more power behind Western Australia's economy than energy and natural resources.

Agribusiness, tourism and education are starting to make important contributions to the state's economy via export earnings, particularly to Asia. With its innovative and entrepreneurial spirit, WA is well positioned to benefit from the rapid economic growth of Asia and the increased spending power of its burgeoning middle classes. Asia's three distinct regions of North Asia (China, Japan, South Korea), ASEAN (South-East Asian nations), and India and the Middle East offer diversity for exporters, and provide significant growth opportunities. (See page 12) ■

Outward looking, export focused

Story by Mark Pownall

Over the years, WA business has finessed its offering, from commodities to services, the arts and sophisticated technologies.

Henderson-based shipbuilder **Austral** is often mispronounced as Austral.

As chance would have it there is an Austral working out of Perth, **Austral Fisheries** and, like Austral, a maritime business.

But the similarities do not end there.

These two companies are incredible champions of their own products on the international stage, where no market is too hard or too far away for them to consider.

As Austral founder and executive chairman John Rothwell told an audience of 550 people at the *Business News* 25th anniversary event, his business now has operations in five countries and is the fourth biggest shipbuilder in the US, where its largest workforce is stationed making navy vessels.

Austral Fisheries also highlights its achievements in the US as a symbol of its success. Austral chief executive David Carter is proud of his business's long fight to ensure the sustainability of its Patagonian toothfish operation off Heard Island deep in the Southern Indian Ocean.

Austral's Glacier 51 Toothfish brand is now being supplied to high-end US venues such as top-class establishment Nobu Fifty Seven in New York, a market that

requires not just the provenance of the brand to be assured but also a consistent year-round supply that would push the management and logistics capability of most businesses.

In the annals of Western Australia's business history these two businesses are not unique in their global outlook.

It is easy to suggest that a small and isolated population such as WA's had little choice to be global in its outlook. What alternative did we have when we wanted to sell our goods?

From the very start the success of our primary resources, firstly whaling, timber and agriculture, and later mining and gas, required export to foreign markets, with far too few people to consume the abundance of this vast land.

It would have been easy to settle for that. But the examples above, of complex manufacturing and sophisticated value adding through branded produce, go far beyond the basics of commodities exploitation.

But we should not discount the impact of our resources marketing on the state's psyche. For nearly two centuries we interacted with the furthest corners of the globe, touting our goods, learning from the best, becoming wealthy from our trade, and investing in ways to do things better here.

Austral may have become a global shipbuilder through its innovations in fast ferries and, later, military vessels, but its success was born from unique skills in aluminium boat making to meet the demands of the rock lobster industry, which needed very fast boats to get live produce to airports in time in order to reach consumers in Hong Kong, Tokyo and Taiwan.

That reach into Asia, which includes decades of iron ore and minerals exports followed later by LNG, is not limited to natural resources.

Perth-based investment brokers and stockbrokers **Argonaut** opened a branch in Hong Kong in 2011. Value-added dairy products have long penetrated Asia, led by **Peters & Brownes** in the 1990s, which marketed its high end Connoisseur ice-cream brand to Japan and, more recently, **Bannister Downs Dairy** has been shipping its boutique label to Singapore.

Let's not forget more obscure business leaders such as Mike Kenny, who started designing and manufacturing **MetroCount** boxes almost 30 years ago. Readers will recognise his work when they drive over the little black tubes on roads across the state. MetroCount is a leader in the traffic-monitoring world, with its devices in more than 100 countries across tens of thousands of locations at any one time.

Moodle is a Perth-based software company that has developed an open-source online course management system that has more than 100 million registered users at universities, colleges and businesses globally.

Moodle didn't lead the education push overseas. Several of our



Top left: AMBASSADOR
The WA Symphony Orchestra is a regular visitor to Asia.

Above: SERVED
David Carter (left) with Nobu Perth head chef Leif Huru and some of Austral's fresh produce.



Left: BIG PLAYER
Austral has operations in five countries and is the fourth biggest shipbuilder in the US.

98 WASO musicians on 2006 tour to China

universities have campuses or joint ventures on foreign soil. ASX-listed **Navitas** is a world leader in creating education pathways for those aspiring to university education.

An online lecture presentation system developed by the **University of Western Australia** called Lectoria became a leader in its field globally before it was sold in 2006.

Even in the arts, WA organisations have followed in the footsteps of our corporate leaders.

The **WA Symphony Orchestra** has toured Asia many times, including visiting China as it opened to the world. In 2006, the orches-

tra sent 98 musicians to Beijing, Shanghai, Shenzhen, Guangzhou and Hangzhou, the capital of WA's sister-state, the Zhejiang Province, on a tour to recognise the first LNG shipment to the emerging economic powerhouse.

Also on the cultural front it is hard not to notice the plethora of foreign representatives here. More than 90 countries have consulates in Perth, either formally staffed operations or more informal honorary roles. And WA has several trade offices around the world, a role most countries reserve for their nation's diplomatic services. ■

ON COVER

VALUE Steven Tingay says the Murchison Widefield Array will be the best bang for buck telescope of the past decade.

Science world focused on WA as telescopes scan the universe

If the MWA failed we would not have had the SKA in Australia

-Steven Tingay

The Square Kilometre Array will provide a boost for science in WA, but there was a point nearly a decade ago where the project could have been lost to the state.

Story by **Matt McKenzie** Photos by **Gabriel Oliveira**

Steven Tingay recalls when the future of the Murchison Widefield Array radio telescope, constructed about 300 kilometres inland from Geraldton and a precursor to the massive Square Kilometre Array project, hung in the balance.

Professor Tingay now serves as the deputy executive director of the International Centre for Radio Astronomy Research (ICRAR), leads the centre's Curtin University node, and was the director of the Murchison Widefield Array project from 2008 until 2016.

The Murchison project, which started operation in 2013, was a \$50 million investment that proved to be vital in helping Australia jointly win a bid to host what will be the world's largest radio telescope, the SKA.

"If the MWA failed we would not have had the SKA in Australia," Professor Tingay told *Business News*.

"It's still the only precursor (telescope) which is fully operational.

"(MWA) in itself had been a decade-long effort."

Professor Tingay said he took on the role of director at a crucial time for the project.

"Mid 2008 there was a critical juncture where the US funding partners had lost confidence in the project and the Australian funding partners were following," he said.

"I took the project over and at that time I gave it personally a 5 per cent chance of coming to any sort of fruition.

"(Stepping in) was difficult, but I thought it was a project worth saving.

"Between 2009 and 2011 was really a massive scramble to finance the project, pull together the management and the planning, give the partners confidence and get all the technical momentum behind it.

"That was a tough period."

But the result was very significant for science in Western Australia, and the project was later doubled in size for a cost of

about \$3 million, comparatively inexpensive because all the overhead infrastructure was set up in the first phase.

"All of the statistics point towards this telescope being the best bang for buck telescope of the past decade internationally," Professor Tingay said.

On the back of this success, and the CSIRO's development of the Pathfinder radio telescope observatory nearby, the global SKA consortium picked WA's Murchison region and South Africa as the two key hubs for a much bigger project.

There are still more steps to go for the development, which has a combined value across the two hubs and UK headquarters of \$1.3 billion.

Last month, the 12 member countries signed a treaty to create an international organisation to determine financial arrangements for construction of the SKA.

Those include Canada, China, India, Spain and New Zealand, with a further 20 nations involved in detailed design work.

By the end of 2021 or early 2022, funding and a construction proposal should be finalised.

Completion will mean the realisation of an idea formed in 1991.

"In the mega-science, massive project world, it's always later than you would've liked," Professor Tingay said.

Revolutionary science

ICRAR executive director Peter Quinn, who lectures at **The University of Western Australia**, said the SKA would bring a massive improvement in the world's ability to understand space and the beginnings of the universe.

"Because it is a real major advance in our capabilities, it's going to lead to Nobel Prize-class science," Professor Quinn said.

"The facility will be, when it's completed, about 3,000 times better than anything we have today."



HOME Peter Quinn returned from Europe to join SKA for the opportunity to work in the Australian landscape.

1991 SKA proposed

He said most iterations of radio astronomy delivered improvements that were about five-fold.

"It's kind of like what happened when we went from earth orbit to the moon," Professor Quinn said.

"That is absolutely guaranteed to revolutionise our understanding of the universe."

Because light takes time to travel long distances, radio telescopes that see further are able to effectively peer back to observe earlier periods in the history of the universe.

In the case of the SKA, the hope is it will access the epoch before first light, when the first stars were formed, perhaps as long as 13 billion years ago.

"It's like seeing page one of the cosmic story, the first chapter of the book, and if we get to see that chapter we can put the rest of the book together and try to figure out how this whole avalanche of structure we see actually happened," Professor Quinn said.

For Professor Quinn, who was lured back from Europe to join the project in 2006 as part of the Premier's Science Fellowship Program, the attraction was the opportunity the SKA offered Australian astronomy.

"Astronomy projects almost always happened outside Australia," Professor Quinn said.

"The sort of astronomy projects that I was involved with (needed) access to high mountains, that sort of thing, Australia just doesn't have any of that.

"When I saw the opportunity for a very large astronomy project to be based in Australia, using the unique Australian landscape as a strength, that was extremely attractive to me.

"The SKA, being the world's most sensitive radio telescope, needed a radio quiet place to live; that's becoming very hard to find in the world.

"You can imagine going to the middle of Antarctica, you'd find nobody there but building stuff in the middle of Antarctica is incredibly expensive, there's no power, no water."

The pitch for the SKA involved a huge collaboration with Curtin University, UWA, CSIRO, the then Department of Commerce, Mid West Development Commission, local Wajarri Yamaji people, and politicians including former premiers **Alan Carpenter** and **Colin Barnett** all supporting in different ways.

Department of Commerce executive **Julie de Jong** and senior

Commonwealth public servants Patricia Kelly, Jane Urquhart and David Luchetti were among those who played major roles.

Ms de Jong and her team acted as the lead state agency.

She has since moved to head up the Department of Mines, Industry Regulation and Safety, but considers the SKA work one of the most important projects she's worked on.

"I was very fortunate that I got to meet world-class radio astronomers, and we have world-class astronomers here too," Ms de Jong told *Business News*.

"It was a privilege as a public servant to be part of something that is world renowned, and it's here in WA.

"For Perth, we got two international research centres, we got the **Pawsey Centre** (supercomputers) and amazing different types of radio astronomy technical equipment.

"It was extraordinary we were able to get \$80 million out of the Commonwealth (government) for the Pawsey Centre."

Many of the skills and much of the technology required would benefit other industries, such as mining, she said.

Very big data

The amount of information created by the SKA will be of galactic proportions, with the first phase estimated to produce about three terabytes of data per second.

Continued on page 7

WA's seven wonders of the resources world

Western Australia has been home to mining for centuries, evolving from ochre pits excavated by Aboriginal peoples for rituals, art and ceremonies, to a high-tech industry that can economically supply enormous quantities of resources worldwide. Global leadership in innovation and technology adoption has supported this growth. Here are seven of the best local examples.

Shell's Prelude FLNG

The first floating gas liquefaction project approved in the world was Shell's Prelude FLNG, with the largest vessel ever constructed built in South Korea and now anchored off the coast of Broome.

Prelude was a project with a true global outlook, with billions of foreign investment dollars, a global manufacturing chain, local workforce, and overseas demand unlocking a valuable local resource.

Perth also plays a role in refining offshore technology, with the University of Western Australia's Centre for Offshore Foundation Systems and Curtin University's Sino-Australian Joint Research Centre for Ocean Engineering two examples.



Driverless trains & remote operations

Rio Tinto's auto haul rail program is one example of how WA's mining businesses have led the world in the adoption of technology. Rio invested about \$1 billion to introduce a system of autonomous rail cars on its 1,700km rail network. The big iron ore miners have also been early adopters of autonomous trucks and drill rigs, all monitored by operations centres in Perth, thousands of kilometres from the equipment. Automation improves labor productivity and increases the amount of a commodity that can be moved by each employee, lowering costs. A worker can then monitor 10 trucks, carrying 10 times the amount of iron ore, rather than driving one.

More recently Fortescue Metals Group has announced it will work on applying autonomous vehicle technology in urban areas.



Downunder Geosolutions' supercomputer

The most powerful supercomputer in the Southern Hemisphere is in a basement on Kings Park Road. Downunder Geosolutions' Bruce computer has 23 single precision petaflops of capacity and is used for geophysics calculations. Downunder also invented a fluid-immersion system to keep servers cool replacing fans and chipping about 45 per cent off power costs.

Port Hedland exports

About \$50 billion of exports move through Port Hedland annually, making it quite possibly WA's most valuable infrastructure asset. In the 2018 financial year, there were shipments of 520 million tonnes, and more than 6,000 vessel movements. Exports have grown from about 200mtpa in 2011. The phenomenal increase has been achieved through minimal capital expenditure and a focus on asset squeezing, using big data and new technology to optimise ship movements. That has enabled the state's biggest iron ore miners to lift output, and a fourth to enter the industry, without a need to build a new outer harbour at a cost of roughly \$20 billion.

Woodside's AI & robonaut

The Perth-based energy business has worked with IBM and NASA for data analytics and robotics. Five NASA anthropomorphic robots are used to test ideas for improved safety and efficiency in maintenance, while IBM's Watson AI system is used to cut down research times and improve corporate knowledge retention.

Kalgoorlie's super pit

Some cities are famous for building upwards, but in Kalgoorlie the biggest triumph came from digging. The Fimiston Open Pit mine, known as the super pit, is 600 metres deep and was created in 1989 after the amalgamation of numerous tenements. It has produced nearly 20 million ounces of gold.

Warman pump

One early example of WA innovation was the Warman Pump, designed in 1938. It was created by WA School of Mines graduate Charles Warman in Kalgoorlie, when he wanted a more efficient and reliable slurry pump. In the years following, the pumps have been sold and manufactured around the world, although the business was bought out by UK-based Weir Group in 1999. ■

Continued from page 5

Science world focused on WA

"The only reason it's so fantastic at doing all the things it does is because it collects an enormous amount of data," Professor Quinn said.

"That in itself will drive all sorts of innovation in data science and data technology."

Businesses like Google and Amazon and people in sciences such as geology and biology would all be interested in advancements in data science, and many young people were being trained and creating new solutions through involvement in the SKA and MWA, he said.

"We've seen this happen before with the Large Hadron Collider (a particle accelerator)," Professor Quinn said.

"The people who were building that needed some technologies for data, and the thing they invented was a thing called the web."

"Big science projects tend to create problems that, when you solve them, produce impact in other areas."

It was important to translate the knowledge into industry, he said,

adding that ICRAR often spoke to businesses about applying challenges and innovations from astronomy into their problems.

Ecosystem

One ongoing application of the MWA will be in tracking space junk. This could contribute to a global effort to reduce the approximately 750,000 pieces of debris orbiting Earth, which pose a threat to satellites or rocket launches.

Because it is a real major advance in our capabilities, it's going to lead to Nobel Prize-class science

-Peter Quinn

Those pieces can collide with existing space assets, or each other, creating further obstacles.

The issue is so significant that, in the worst case, a cascade of collisions would potentially prevent activities in some orbital ranges for generations.

The federal government's **Defence Innovation Hub** is working with Adelaide-based Silenium Defence on solutions, including sub-contracting ICRAR to help develop ground-based radar and space surveillance technology to monitor debris.

Other MWA projects look much further afield, including a detailed panoramic of the universe from the Southern Hemisphere, which required about 35,000 images.

The **Pawsey Centre** super-computer in Bentley was used for that work and will play a big role in storing and processing data from both the SKA and MWA.

Although Pawsey is deeply connected to astronomical research, it has had other uses.

A University of Melbourne

academic last year used the facility for a quantum computing simulation that will contribute to encryption science, a Curtin University academic worked on calculations for particle physics, and a group of institutions including the University of Ontario worked on analysis of data from neonatal wards.

Making waves

Perth has had an ongoing role in gravitational wave research through the Pawsey Centre, with a team from UWA helping optimise gravitational detection equipment in the US and Europe.

That continues a long connection to the field.

Perth scientists played a role in the 2015 discovery of gravitational waves at the Laser Interferometer Gravitational-Wave Observatory (LIGO), which is based across two locations in Washington state and Louisiana in the US.

The waves in the first detection were generated by two black holes merging, with the waves so incredibly tiny that the

impact on the laser detectors was about 10,000 times smaller than the size of a proton.

But the importance of the detection was massive because it proved one of Einstein's key theories.

Gravitational waves were a life project for UWA professor **David Blair**, who spent four decades working on methods for detection and pioneering work in precision measurement science.

That included development of microwave cavity electromechanics and work on the use of sapphires in precision measurement.

His third major work was in 2005, when he predicted the LIGO detectors would be unstable, and his team set about finding ways to stop the instability.

Nearly 10 years later, the predictions were proved right and UWA has since played a crucial role in stabilising the detectors.

Another UWA academic, Carl Blair, David's son, worked at LIGO on the operation of the detectors. ■

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UWA 2030: a blueprint for leadership

Over the coming months The University of Western Australia will launch its new vision, **UWA 2030**. It will be a bold statement in its own right, but more importantly it will provide the people of Western Australia with our blueprint for globally relevant and responsible leadership.

Nick Hillman of the UK's Higher Education Policy Institute last year wrote of 'relentless negativity' and 'endless gloom' giving the impression that higher education was in crisis, rather than being the 'world-leading sector' that it is. This rings true in the Australian university sector, certainly, but it can be applied more widely. Amid this discourse of gloom and doom – of disruption not only of business models, but also of our politics,

our institutions, our way of life itself – our students express anxieties, and our communities struggle to remain cohesive where change feels threatening. Universities are an integral part of our economies, societies and democracies. As institutions they are woven into the fabric of our cultural and intellectual narratives. The impact of digital disruption is also creating uncomfortable opportunities in higher education. When traditional rules don't apply

anymore, do you still know your purpose, your values, why you do what you do? This is a fundamental question for global leaders, whether of nations, companies or universities. Top-down control is rarely able to manage fears and anxieties, indeed it can perpetuate them. Rather, a sense of common purpose, leadership, shared direction, and shared values can unify organisations and societies alike. This idea is not new, but when it is done

well it makes the ordinary extraordinary. At UWA, we have been aware of our purpose – to advance the prosperity and welfare of the people – since it was written into our founding documents in 1911. Our **UWA 2030** vision re-manifests this for the next decade, around our civic purpose: to predict, shape and react to the grand challenges facing our communities. UWA does this by being the vanguard of trusted and community-led research,

as a meaningful partner of government and industry and as an authoritative leader in experience-orientated and humanity-led education. We are proud to be developing the next generation of globally relevant and responsible leaders. I believe in WA, and I believe in our State's university. We know our purpose. Do you?

Professor Dawn Freshwater
Vice-Chancellor
UWA



Global vision delivers local pro s

Easier movement of goods, capital and people driven by improved technology and economic reform have helped an isolated region become one of the wealthiest in the world. We've collated highlights of how WA connects into the global marketplace.



Consular presence

Nepal, Burundi, Oman, Panama and Uganda are among 92 countries with consular representation in Perth, according to the Department of Foreign Affairs and Trade.

Two of the most significant as far as Western Australia's international relationships are concerned are China, led by consul-general Lei KeZhong, and the US, with consul-general Rachel Cooke at the helm. The state government has a presence in eight foreign jurisdictions, with trade and investment offices in locations such as Dubai, Seoul, Mumbai and Jakarta. The government also has tourism offices in several countries, including Germany, Hong Kong, and the US.

Feeding the world

Half of Australia's wheat exports are produced in Western Australia, according to the Department of Primary Industries and Regional Development, worth about \$3 billion annually for the state's economy. The state is also the number one supplier of wheat for Japanese white salted udon noodles.

Innovations developed in WA include the Pink Lady apple, which emerged in 1974 after crossing the Golden Delicious and Lady Williams varieties, and the Bravo (photo above), which crossed the Royal Gala and Cripps Red. Both were created by horticulturalist Jon Cripps. More recently, Dave and Leasa Mazzardis from Gingin bred numerous varieties of blueberries, which are now sold at European supermarkets such as Tesco, Lidl and Spar.

42.1%

WA's share of Australian merchandise exports (Dec 2018)

\$65.8bn

WA intellectual property capital stock (Jun 2018)

\$850,021

WA mean net worth per household (2016)

ASX listings

Western Australia's connection to global capital markets is perhaps best highlighted by the number of companies that raise cash in the state for their projects.

About a third of all ASX-listed businesses are registered in WA. The lion's share of these are junior resources companies, many of which have projects or operations overseas. In 2014, for example, 170 of the 220 ASX-listed businesses with activities in Africa were registered in Perth. Examples include Base Resources, with the Kwale mineral sands mine in Kenya, and Perseus Mining, which mines gold in West Africa. Around a dozen Israeli businesses have listed on the ASX in the past four years with offices in Perth. There are also larger local businesses, including Woodside Petroleum and Wesfarmers, both in the ASX50.

Values and purpose

Mining magnate Andrew Forrest's leadership in worldwide initiatives to stop slavery show Perth's reach extends beyond pure corporate interests. His Minderoo Foundation and Walk Free Foundation have played influential roles, publishing four editions of the Global Slavery Index and securing support from religious leaders to stop slavery. Last year, Australia passed its own Modern Slavery Act, meaning large businesses will have to improve transparency about potential slavery in their supply chains. Perth-based Corporate Evolution is a business encouraging executives to lead with purpose and a focus on values. Clients have included McKinsey & Co, with Corporate training McKinsey consultants across the world, and a series of banks and mining businesses. Malcolm and Lisa Doig founded the business in 2004.

Regional headquarters

Nearly 80 of the Financial Times Global 500 companies have operating bases in Perth, according to the state government. Many have regional headquarters in the city, including Inpex and Chevron Australia. Shell Australia and BP both base their Australian upstream businesses in Perth, with downstream operations on the east coast. ConocoPhillips headquarters part of its upstream business in WA. The country's two biggest iron ore miners have major presences on St Georges Terrace, with Rio Tinto Iron Ore and BHP Group WA Iron Ore both headquartered there. The lure of Perth extends to government-owned foreign businesses, with examples including subsidiaries of Citic Group, China National Offshore Oil Corporation, China Baowu Steel Group, Bank of China and Industrial and Commercial Bank of China. ■

Prosperity

\$437bn

WA mining capital stock
(Jun 2018)

\$989bn

WA capital stock (Jun 2018)

Source: ABS



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Our global outlook

Look no further than medical research for a successful model on global partnering.

Discoveries made in the laboratories here in Perth are published widely for the broader scientific community. This worldwide sharing informs the work of scientists across the globe.

Scientific collaboration, by its nature is global. Scientists with specialist expertise link with others in their fields, they move countries to work with the best, present their discoveries to grow the whole knowledge base and, in doing so, the next new frontier is explored and conquered.

Scientific publications typically host a football field of names worthy of the League of Nations.

The most recent Nobel Prize for Medicine is a case in point.

It was jointly awarded to two scientists from two

countries for their ground-breaking cancer research.

For over 20 years James Allison, from America and Tasuku Honjo, from Japan investigated molecules in our bodies that put the brakes on our immune system's ability to fight cancer cells.

Their laboratories on opposite sides of world developed ways to effectively stimulate the immune system to attack tumour cells.

Their work resulted in treatments that are saving the lives of thousands of patients internationally with melanoma, lung, kidney and other cancers.

A number of melanoma patients being seen at the WA Kirkbride Melanoma Advisory Service at the Harry Perkins Institute of Medical Research in Perth are alive because of the immunotherapy treatment discovered by Allison and Honjo and their international teams.

Thankfully, global connections don't end there.

While research leads to new ways to overcome disease, investors and drug companies enable the development of new treatments which in turn need rigorous testing in healthy volunteers and patients.

Perth's leading clinical trial centre, Linear Clinical Research Ltd, which is wholly owned by the Harry Perkins Institute, runs trials for local and multinational drug companies testing treatments for the first time in humans. As a result, some Perth cancer patients are receiving new drugs, often years before they're widely available.

More than 85% of Linear's clinical trials are for companies from the U.S., Canada, China, the U.K. and E.U.

Linear has created more than 150 new jobs in WA and is expanding its operations, all as a result of the well-established global interconnectedness that is so critical for success in the broad field of medical research.

Prof Peter Leedman Director Harry Perkins Institute of Medical Research

Entrepreneurs pave global pathways for tech

Story by **Matt McKenzie** Photos by **Gabriel Oliveira**

As WA's tech sector continues to develop, *Business News* spoke to some of the people helping Perth's entrepreneurs score wins in global markets.

Above: POSITIVE
Larry Lopez is optimistic about where WA tech is heading.

Top right: GUIDANCE Peter Rossdeutscher has been a mentor to many local businesses.

\$1.3m
Funding through Plus Eight program

Western Australia's tech sector is more successful than many give it credit for, according to venture capitalist **Larry Lopez**, who moved to Perth from Silicon Valley in 2006.

"It's come a long way in the past five or six years. I'm very excited about what's going on," Mr Lopez said.

"Sometimes people's expectations are too high. I don't think we give ourselves enough credit in WA for where we are.

"I don't think we punch above our weight yet but we're on the right trajectory."

Mr Lopez serves as director of government program Accelerating Commercialisation, as a partner of Australian Venture Consultants, and on the board of the Minerals Research Institute of Western Australia, among other roles.

He has supported many emerging WA businesses through those positions, including helping graphic design software business

Canva, probably the most successful startup with Perth links, access Silicon Valley investors.

Founded in 2012 by former University of Western Australia student **Melanie Perkins**, Canva raised \$40 million in early 2018 at a valuation of \$1 billion.

To the disappointment of some in the local scene, the business is based in Sydney.

But Mr Lopez is relaxed about WA entrepreneurs making it big elsewhere.

"That's how it works," he said.

"I did a lot of work in Israel in the 1990s.

"When they first started a government program to develop a knowledge-based economy, the first mistake they made was they tried to keep the companies in Israel. That just led to a lot of issues."

The strategy was changed towards the end of the decade, and Mr Lopez said one benefit of the new approach was that many people would want to return

If we don't worry about it and just build great global companies we'll get the benefit, there's no doubt in my mind

-Larry Lopez

home, bringing their skills with them.

"Over time the market, the access to engineering talent, management talent and marketing talent grew into itself," he said.

"If we don't worry about it (if they stay headquartered locally) and just build great global companies, we'll get the benefit, there's no doubt in my mind."

Another of the challenges Mr Lopez identified in the WA sector concerned a lack of restraint around deal making.

"When I was working in Silicon Valley, if I found one or two good deals a year I was killing it," Mr Lopez said.

"That's another issue here in Perth; people don't have disci-

pline. You don't have to try and do every deal.

"People don't walk away from mediocre deals here."

He said he had moved to WA in his 40s, as his wife had wished to return to her home town.

"I'd pretty much been involved in the valley tech scene since 1978, I was just embedded," Mr Lopez said.

"I didn't really have much of a life outside tech finance. I enjoyed it but thought it'd be nice to have a little more balance."

Momentum

Mr Lopez is one member of the ecosystem supporting local tech businesses, with other names including Spacecubed founder

Brodie McCulloch, Yuwa Capital's **Matt MacFarlane**, Uearthed Solutions' Justin Strharsky, and Atomic Sky's Greg Riebe and Peter Rosssdeutscher.

In Silicon Valley investor **Bill Tai**, Curtin University boasts a particularly significant global expert attached to its campus.

Mr Tai was appointed as innovator in residence in 2010, and an adjunct professor of innovation and economic development in 2011.

In those roles at Curtin he supported the WestTech Fest and the OzApp Awards, while he also backed Canva and has been an adviser to Power Ledger.

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Shaping our AV future



Disruption to traditional forms of travel means we all need to change our current way of thinking and develop a well-defined roadmap for a safe transition into our driverless future.

We need to plan and manage the challenges of regulating AV technology, determine the long-term, planned and sustained investment in infrastructure, and ensure the social and environmental impacts and benefits are well understood by the community.

And while there are many unknowns, automated and connected vehicles will have considerable implications for our existing transport networks, cities and towns.

The biggest benefit of autonomous vehicles will undoubtedly be saving lives and reducing serious injuries on our roads, because they deliver the potential to remove one of the major causes of road crashes – human error.

The United States' National Highway Traffic Safety Administration identified that approximately 94 per cent of crashes are due to human error. This means autonomous vehicles not only have the potential to change the way we drive, the technology also has the potential to be the next game changer for road safety.

Since 2015 RAC's focus on AV technology has included working, testing and evaluating a fully driverless, electric shuttle bus. In August 2016, with the support of the WA State Government and City of South Perth, RAC commenced Australia's first automated vehicle trial on public roads.

In one of the first trials globally, the RAC Intellibus® operates five days a week, taking passengers along its 3.5-kilometre route in South Perth, interacting with traffic, parked cars, cyclists and pedestrians.

The RAC Intellibus®, which recent-

ly received funding from the Australian Government, has travelled nearly 18,500 kilometres in autonomous mode, with more than 11,500 people on board to experience driverless technology first-hand. In partnership with the City of Busselton, RAC also recently announced the first ever public demonstration to take place in regional WA.

RAC, along with two other cities globally, intends to now undertake a more complex trial (the RAC Intellibus®) of an on-demand shared mobility service in Perth.

Partnering and bringing these global advancements in technology to WA is crucial to ensuring WA can contribute to the local, national and international understanding of autonomous vehicles.

Rob Slocombe
Group CEO
RAC

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Tech ecosystem builds on organic growth

Not all local tech mentors are products of the US, however.

Mr Rossdeutscher is an example of a local boy who plied his trade overseas and returned to Perth, having spent six years as managing director of Gateway in Asia and a similar period at the helm of Targus in the Asia-Pacific region.

Both were computer businesses, and Mr Rossdeutscher was responsible for building their presence in the Asian market.

"When I came back in 2008 it was really lifestyle that drew me back to Perth," Mr Rossdeutscher told *Business News*.

At that point, he said, he wanted to give back to the sector.

Mr Rossdeutscher's mentoring and consulting work included involvement at Start Something and Atomic Sky, and investing through Perth Angels.

"We're very collaborative," he said.

"One of the good things in Perth (is) all the folks trying to grow the pathways for tech-enabled companies all work very closely."

Mr Rossdeutscher told *Business News* he was particularly proud of work he'd done at Bloom, the co-working space for young entrepreneurs at UWA, and with agribusiness accelerator Agristart.

He has also led resources in information business Intierra and advised blockchain business Power Ledger, among many others.

"We're (Perth) in a good place," Mr Rossdeutscher said.

"(We've) got a few challenges too. We need to get more investment capital into the state, need to get a few more experienced mentors."

Perth-born Greg Riebe, who worked with Mr Rossdeutscher at Atomic Sky, co-founded the Perth Angels investment network (current chair) and e-business association eGroup WA (past chair, current deputy chair).

Another high-profile player in this space is Spacecubed's **Brodie McCulloch**, who identified the lower level of government support for the tech eco-

system compared with other jurisdictions as one thing unique about WA.

"This has meant that organisations and groups that have set up to support the innovation ecosystem generally have business models that are not 100 per cent reliant on government," Mr McCulloch said.

"This is an advantage over other states as it means the WA ecosystem is more resilient and sustainable, however, there are many unrealised opportunities for government, corporates, education and the community to work more closely together."

Mr McCulloch said he was particularly proud of the Plus Eight accelerator program, run with Telstra, Hawaiian, Vukelich Group, AusIndustry and Seven West, with about \$1.3 million invested into local startups so far.

He emphasised the impact of Perth Web Girls, led by Kate Kirwin, which has helped about 1,700 women in the state learn to code, as another successful local program.

The Spacecubed co-working spaces have also grown considerably in the past five years, with new hubs established to focus on agribusiness and resources.

Unearthed's **Justin Strharsky** was one of the founding directors of Startup WA, which acts as a representative body for the sector, and organised the Morning Startup meet up for four years.

But he said some of the most rewarding engagements came from the Unearthed hackathon program, where teams help solve technological problems for larger businesses.

That program has sparked businesses such as Avant Data Solutions.

Mr Strharsky previously worked in Silicon Valley and moved to Perth in 2009.

One significant thing about Unearthed's hackathon was that it brought technology from overseas into WA, giving local mining companies the opportunity to crack into the global pool of tech talent to solve their problems, he said. ■

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MORE THAN JUST IRON ORE

It is well-known that Western Australia's economic success is based on mining, but other industries like agribusiness, tourism, and education are stepping up. This, along with our close ties to Asia, is helping to drive our future economic and social prosperity.

WA is more closely linked to the growing economies of Asia than the other Australian states. Our top 10 merchandise export markets, and our top services export markets are in Asia, and we get more tourists and students from Asia than any other region.

While resources still make up the bulk of our exports, other sectors have started to realise their potential. Agriculture and food are significant export earners for WA, bringing in \$8.5 billion in 2016-17, and making up 17 percent of Australia's agrifood exports. ¹

Service exports are also an important earner,

bringing in \$6.7 billion over FY2018², with tourism and education making important contributions.

The education sector generated about \$1.9 billion in export income in 2017, supported an estimated 10,000 full-time jobs, and contributed to increased tourism. The state's 50,000 international students attracted 1.5 visiting friends and relatives from overseas. ³

However, there's vast opportunity to boost our tourism numbers even further from Asia. For example, we can leverage new marketing initiatives such as the 'quokka-selfie' posted on Instagram by actor Chris Hemsworth when visiting Rottnest island, which generated over 4.1 million 'likes' and turned the eyes of the world to our state.

Matt Woods
WA Chairman, KPMG

1 Western Australia's Agrifood | Fibre | Fisheries | Forestry Industries 2018, p.17

2 WA Economic Profile, February 2019, pp. 8-9

3 <https://www.jtsi.wa.gov.au/news-media/news-detail/2018/10/23/landmark-strategy-launches-new-era-for-international-education-in-western-australia>

