

PR MOTING PERTH



INNOVATION

An innovative city by any measure • The future of fabric design
Electric jet ski out to foil two-strokes • World-class Perth ideas



An innovative city by any measure

At its core, innovation brings about change

STORY: MARION FULKER

*Driverless trucks
at work.*

INNOVATION is a key element in the establishment and development of economies and industries.

It is often described as the result of various activities that are performed across all sectors of society, leading to either small incremental changes in processes and products or to large socio-economic and industrial structural shifts.

Originally designed as a closed system for researchers and scientists to communicate with each other, the World Wide Web has become

an open platform that most of us use on a daily basis, to do everything from studying to shopping.

The opening up of iron ore mining in the 1960s in the state's north embodies a large shift, one that continues to benefit the Western Australian and Australian economies.

A more recent innovation in this space has been the introduction of automation, with driverless trains moving the ore from the mine to the port, and autonomous trucks working on mine sites.

The Kwinana Industrial

Area's development started a decade earlier and is WA's best example of industry symbiosis and economic resilience, with innovation and collaboration meaning almost all by-products from one firm are used by another in their production process.

Mining and resources are part of the state's DNA; it's what we are known for.

But Perth's story is more than that. It is home to innovative people.

Top of mind are the medical professionals who dedicate years of their lives

to research, often resulting in ground-breaking solutions. For example, Nobel Prize winner Barry Marshall and his colleague, Robin Warren, who discovered the link between helicobacter pylori and most peptic ulcers, or Fiona Wood's world-leading development of spray-on skin to treat burns.

It's clear that our creatives can handle their own on the world stage, too, including WA Academy of Performing Arts graduate Hugh Jackman, and bands such as Tame Impala and Eskimo Joe.



Fiona Wood developed spray-on skin.

Meanwhile, WA's young tech entrepreneurs are becoming increasingly visible.

Most notable of these at the moment are Melanie Perkins, Cliff Obrecht and Cameron Adams, who founded Canva in 2012 and have overseen its growth to a business valued at about \$20 billion.

Other innovators and start-ups working in the gig economy can be found at Spacecubed and other co-working spaces every day. Each doing things their way in non-traditional environments, such as local animators working

for studios in California from their local cafes.

These, and more, are our home-grown success stories. They make us proud of good people who put their knowledge, expertise and curiosity to work for the common good, or completely change the way things are done.

Measuring innovation isn't easy because it is hard to quantify, so researchers refer to patent applications as a proxy measure. The data shows that the US has the highest level of patent applications by country. It is also home to innovation-rich Silicon Valley.

Australia's most populous city, Sydney, has the nation's largest number patents with Perth ranking in third or fourth place during the past two decades.

I suggest we need to find a more exacting way of measuring the value and/

or efficiency gains of finding a solution to a problem by bringing new insights, know-how, technology and collaboration to the table.

As climate change impacts are felt more profoundly, here in this region we have 60,000 years of cultural practice on which to draw upon.

Embracing this will give us a deeper understanding of country and how to care for it. Bush medicines and indigenous plants and foods can keep us healthier and provide the opportunity for Aboriginal knowhow to have a profound effect on the traditional food and pharmaceutical sectors, both locally and globally.

At its core, innovation brings about change. As the

people at Australia's western edge, a place that has been changing and adapting for centuries, we have much to be proud of.

We live in a distinctive state with a unique capital city, rich in natural resources and both entrepreneurial and innovative by nature.

This edition of Promoting Perth will introduce you to some new faces, people innovating and making a profound difference locally, nationally and internationally.

In true form, they are likely to be doing this quietly, without fuss or recognition, because that is Perth's way. Modest to a fault yet profoundly impactful. Always punching above its weight. ✓

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The future of fabric design

Nanollose is at the forefront of a global movement towards the creation of sustainable textiles.

STORY: KATIE McDONALD | IMAGES: DAVID HENRY

A PERTH biotech company is bringing science to fashion, creating clothing from liquid waste and aiming to scale its capabilities to reach a global market.

Nanollose, which is based in Bentley's Technology Park, is focused on advancing the production, processing and applications of microbial cellulose: a type of cellulose produced by naturally occurring bacteria (microbes).

Rayon fibres, which are used in many clothing products, are made from cellulose, primarily derived from trees in the form of wood pulp.

After initially experimenting with alcohol – making headlines for its dress made from sparkling wine in 2016 – Nanollose has spent the past few years working on the conversion of coconut water

into fibres and textiles.

During the fermentation process, microbes convert the carbon – sugars naturally found in coconut water – into a jelly-like substance that is then cleaned, dried and spun into fibre via a spinneret.

The result is a tree-free rayon fibre Nanollose has since branded Nullarbor fibre.

Nanollose executive chair Wayne Best said the company was on the cusp of ramping up production of the fibre, with samples made for the fashion industry expected later this year.

"Most people have never heard of cellulose but it's the world's most abundant natural polymer used in every facet of our lives," Dr Best told *Business News*.

"Clothes, paper, tissues, towels, sheets, sanitary products,

bandages, tea bags ... it's everywhere.

"What the industry currently does, however, is chop down trees. A lot of people don't realise clothes are made from wood pulp.

"With Nullarbor, the bugs [microbes] create a purer form of cellulose, creating a stronger, superior fibre."

Since 2014, Nanollose has been conducting most of its testing in a laboratory setting, listing on the ASX in 2017 to raise capital.

Those funds boosted its research and development and, in 2018, Nanollose unveiled its first garment (a sweater) prototype made from Nullarbor fibre.

Last year, the business signed an agreement with India-headquartered Grasim Industries, part of the Aditya Birla Group, one of the largest

global producers of rayon fibres.

Since then, Nanollose has been working to take its invention out of the lab, with the work now moving to Birla's pilot plant in India.

While the application of Nanollose's material was far reaching, Dr Best, an organic chemist, said the company had set its sights on the fashion industry first.

The sector had the fewest barriers to entry, he said, was equipped with existing infrastructure to produce plant

fibres at scale and was underpinned by a market already receptive to environmentally friendly products.

Dr Best said suppliers were also beginning to look for alternatives to cotton, which was water intensive and reaching peak production, and were also placing more importance on the traceability of the origins of raw materials.

The huge elasticity of margins within the fashion industry was another drawcard, well suited to a novel technology at the early stages of high-cost,



“Our isolation works to our advantage -Wayne Best



Wayne Best
wants Nanollose
to stay in Perth.

low-volume output, he said.

“It would be very difficult to charge \$500 for a ream of paper, but you can charge \$500 for a t-shirt if you’ve got the right brand and the right story to go along with it,” Dr Best said.

“It’d be hard to name a fashion label that hasn’t contacted us ...even those from within the supply chain.

“The fashion industry also has a lot of pressure from consumers ... they look on hang tags to see what it’s made of; if it’s synthetic, biodegradable, slavery free.

“People are more aware now.

“And everyone talks about how bad fast fashion is. But it’s not going away, we have to make it better.”

It’s estimated the clothing industry generates 92 million

tonnes of textile waste each year, making it one of the world’s biggest polluters.

And considering more than 70 per cent of clothes are made from non-biodegradable synthetic fibres, textile waste can take 200 years or more to decompose.

With mounting consumer pressure to do better, multinational organisations such as Nike and H&M have already shifted to becoming more sustainable, with both engaged in recycling initiatives.

And earlier this year, Stella McCartney unveiled her first Mylo garment, a leather alternative made from mushrooms produced by US materials company Bolt Threads.

Elsewhere, Orange Fiber in Italy is converting orange remnants from a juice-processing plant into fabric.

Dr Best said beyond coconut water, Nanollose’s microbial cellulose technology had the potential to convert many other types of waste, as long as the waste contained organic carbon.

That included agricultural and food waste, such as juices and alcohols, with the possibility to one day convert industrial waste like brake fluid.

“Recycling materials is great, but you can’t recycle forever because every time you recycle it degrades and you still need a raw material,” Dr Best said.

“This [material] is natural. We take the waste and bugs do it all for you.

“And it’s 100 per cent biodegradable.

“At the moment we’re just using coconut water because it’s a readily accessible waste and we have an existing supplier.

“Once we get to full commercial production, we hope to be able to have lots of these little factories fermenting waste, like a franchise model.

“If someone has a sugar mill and they want to be able to use their waste ... we’ll license the tech to them, buy their cellulose and get it turned into fibre.”

For now, however, Dr Best said the team was focused on its first significant milestone: the production of fibre at a pilot scale.

“We’ve demonstrated the tech works, we’ve filed the patent, and we’ve got the sweater to prove it,” he said.

“It’s just about scaling up.

“While that sounds simple, with anything going from a lab to pilot to commercial scale, we expect some challenges. But so far, it’s going well.

“I’ve got high hopes and hopefully I’ll be seeing people walking around wearing microbial cellulose in the not-too-distant future.”

Dr Best said while it would be easier in many circumstances to relocate Nanollose from Perth, given its lack of existing production facilities and an investment culture rapt with mining, he didn’t plan to shift.

“Perth is a great place for innovation,” he said.

“I think the lifestyle influences our ability to be more thoughtful and innovative, to come up with crazy ideas.

“Our isolation works to our advantage. Perth is out of the box. Being ‘out of the box’ allows you to think outside of the box.

“So, it’s almost a natural way for us to think.”



“By getting up on the foils, and stabilising those foils, we’re making it safer, simpler and smoother than a normal boat
-Joshua Portlock

Electric jet ski out to foil two-strokes

STORY: JORDAN MURRAY

Electrifying the jet ski industry is a top priority for two Perth-based innovators.

FEW items symbolise the fast money and extravagance of Western Australia’s most recent mining boom quite like the jet ski.

The small, nimble, powered craft dominated pockets of the Swan River and off Perth’s beaches for the better part of the 2010s, as cashed-up tradies and other fly-in, fly-out workers enjoyed the fruits of their labour.

A jet ski even famously

played a starring role in Colin Barnett’s flagging re-election campaign of 2017, when Dixie Marshall (strategic communications director) reportedly proposed then-treasurer Mike Nahan ride one for the press alongside a flurry of other seafaring ministers.

Dr Nahan, not surprisingly, did not go along with said plan.

Much as they are an

emblem of the previous decade’s excesses, however, jet skis continue to capture the imagination of Australians, based on most recent sales figures.

Latest data from the country’s top boating industry body indicate close to half of all motorised watercraft sales in 2019 were jet skis, an increase in sales of more than 47 per cent during the past decade.

Sales grew at a faster rate than those for boats, with Sea Doo, Yamaha and Kawasaki most popular.

Tempering that market activity is a strenuous regulatory framework that governs the coastline of most of Australia’s capital cities.

In Perth, for instance, much of the Swan River is off-limits to powered watercraft, save for a handful of pockets



47%

Increase in
jet ski sales
past decade

Electro Nautic's WaveFlyer relies on patent pending stabilisation technology.

dotted around the foreshores of South Perth, Bicton and Claremont.

Jet skis are banned in Sydney Harbour, while the majority of the Brisbane River is a no-go zone.

Many of the arguments against jet skis focus on their ability to ruin amenity, with community consternation arising last October after WA's Department of Transport considered allowing some jet skis to operate in waters near East Perth.

Environmental standards are also an issue, given jet skis are generally powered by two-stroke petrol engines, which pollute the environment and can allow users to interact with (and potentially harm) ocean wildlife.

Those concerns motivated much of the thinking behind Electro Nautic's WaveFlyer, an electrified take on the standard powered watercraft that aims to do away with the stigma attached to jet skis' pollution and noise.

Created in partnership with Electro.Aero and the University of Western Australia, with funding courtesy of ASX-listed lithium miner Galaxy Resources, the WaveFlyer is a unique vehicle that uses a hydrofoil propulsion system to lift it out of the water during use.

Co-founder Joshua Portlock said the WaveFlyer's combination of electric power and its hydrofoil system would prove disruptive if commercialised and taken to market.

"When you go to electrify a car there's only so much you can do to improve efficiency,

like reducing drag by a few per cent or saving weight by a few per cent," Mr Portlock told Business News.

"When you go to an electric, hydroform watercraft, you're reducing drag by more than 75 per cent.

"It's such a game-changing difference in efficiency to get up on the hydrofoils that it's really an enabling technology.

"Vice versa, little electric direct-drive motors are an enabling technology for hydrofoils, so they really go together.

"If you're just trying to change out a petrol engine for an electric, outboard motor, you're really going to get quite underwhelming performance with a tenth of the endurance ... but when you use hydrofoils, you get four times more range and at least double the speed than we would on a normal hull.

"By getting up on the foils, and stabilising those foils, we're making it safer, simpler and smoother than a normal boat."

Despite the state's abundance of coastline and uptake in powered watercraft, WA has never been especially well-known for its innovations in transportation.

Auto manufacturing has never taken off at a local level, and its major contribution through innovation – Ralph Sarich's invention of the orbital engine in 1972 – was never used in practice, despite early promise.

It remains to be seen what path the WaveFlyer takes, as

“We can see the aviation startups everywhere, but [electric] boats are still lagging behind

-Richard Charlton

Electro Nautic embarks on a \$3 million round of seed funding.

Co-founder Richard Charlton said that, by attempting to popularise the use of electric watercraft, the company was tapping into an under-the-radar market that ran parallel to that of electric cars and planes.

He said increasingly tight regulatory requirements could help drive awareness

of the WaveFlyer and meet a ready market.

"We can see the aviation startups everywhere, but [electric] boats are still lagging behind," Mr Charlton said.

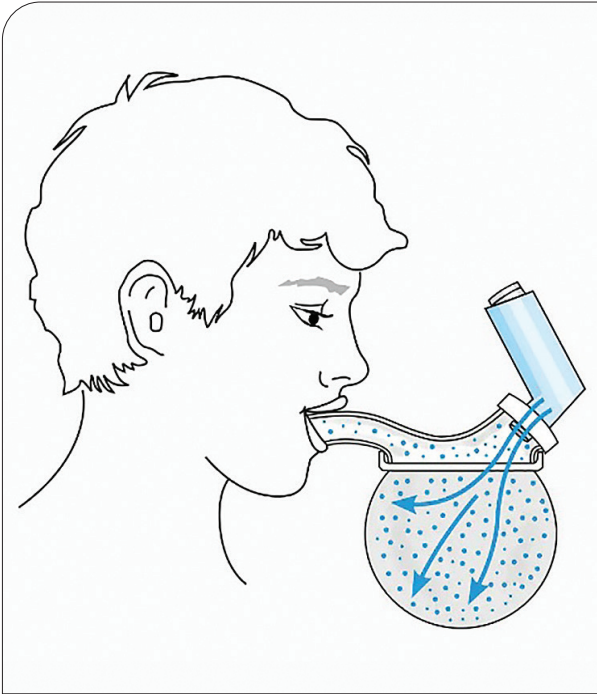
"You get on the water and you see watercraft that are belching smoke, are loud and causing damage through soil erosion.

"This has got to be changed.



World-class Perth ideas

Perth is home to some interesting and innovative inventions in industries as diverse as beauty, health and horse racing.



Inspiring

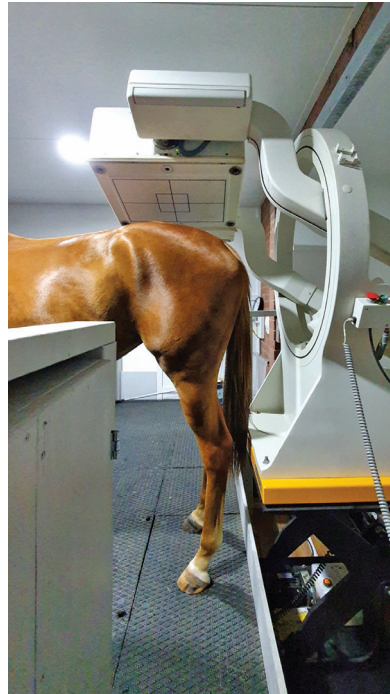
MEDICAL company Inspiring has created a device to improve the lives of people with respiratory conditions, including asthma.

Paediatric respiratory clinician Barry Clements, in collaboration with scientists at the Telethon Kids Institute and the Wal-yan Respiratory Research Centre, has spent the past four years designing and trialling the Universal Spacer System: a new type of spacer to improve the delivery, and therefore effectiveness, of respiratory medication.

According to Inspiring, 90 per cent of those who use inhaled medication find the average percentage of dose delivered to the lung is poor, ranging from 10-15 per cent. It said efficiency can reach up to 30 per cent when a spacer is used with a puffer, but spacers are not commonly used as they are rigid and bulky.

Professor Clements' solution is a collapsible spacer system that is more user-friendly, lightweight and ensures more medicine reaches the lungs. The company has acquired international patent protection for its technology to be used in metred-dose inhalers, or puffers, dry powder inhalers and nebulisers.

Inspiring is focused on commercialising its puffer first, through licensing or acquisition of the technology.



TeleMedVET

RESEARCH organisation TeleMedVET is taking human nuclear medicine and applying it to horses to help prevent injuries on the track. TeleMedVET was founded by Pete Tually, one of the directors of Western Australian health technology company TeleMed, and Chris Cowcher.

The company built the TeleMedVET Equine Research and Development Centre next to Ascot Racecourse, where researchers and veterinarians will use the technology to learn more about the molecular processes that lead to equine bone fatigue to avoid lameness and fractures.

The scanner used is one of the first in the world that can perform three-dimensional evaluations of a horse's lower spine and pelvis. It is hoped the research will help horses run faster and ensure fractures are identified early to prevent further injury.

TeleMedVET had success in April when the first cross-sectional image of a horse pelvis was accepted for publication in a major international journal. It recently received backing from agriculture and wine business Amelia Park, which took a 20 per cent stake in the company.



Face Halo

VICTORIA Beckham and Miranda Kerr are among those using a make-up remover produced by Perth business Face Halo.

Founded in 2017 by Lizzy Pike, Face Halo creates make-up wipes that can be reused after being washed as an alternative to disposable wipes, which end up in landfill and take a long time to break down.

Ms Pike used her 15 years' experience in fibre technology to create make-up remover wipes that are effective, non-toxic, environmentally friendly and cost-efficient.

The product is now sold in more than 10,000 retail stores worldwide and is available in large Australian stores, including Coles and Myer. Earlier this year, the company started an upcycle program to ensure Face Halo wipes

do not end up in landfill. Old wipes returned to the company are then used to make clothes.

