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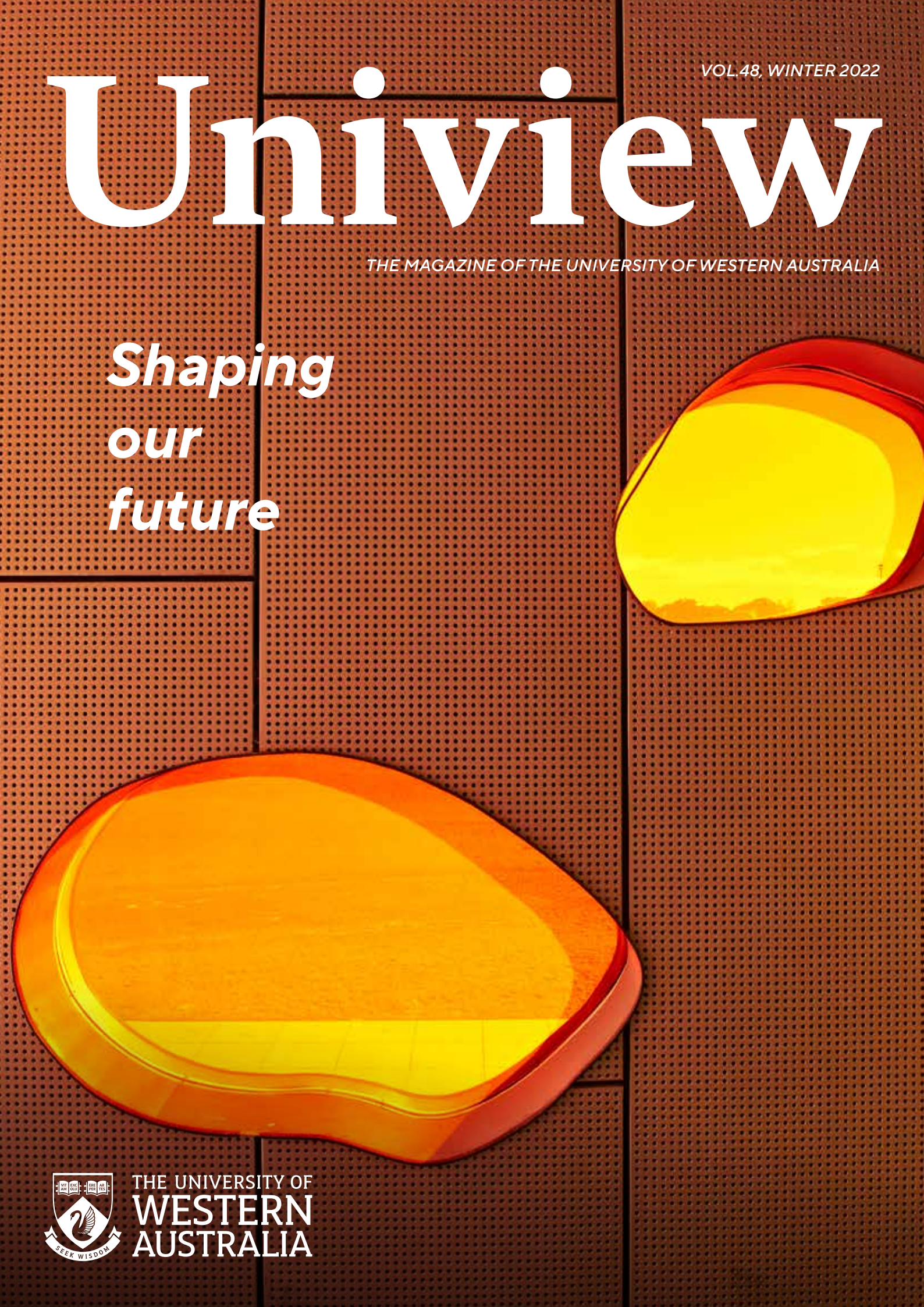
Uniview

THE MAGAZINE OF THE UNIVERSITY OF WESTERN AUSTRALIA

Shaping our future



THE UNIVERSITY OF WESTERN AUSTRALIA

Message from **the Editor**

Welcome to our winter edition of *Uniview*, where we highlight some of the trailblazing technology and innovation projects and initiatives involving UWA researchers, often in partnership with government or industry.

These projects have real-world applications in fields as diverse as medicine, life sciences, engineering, geophysics and geology logging.

They include Perth Biodesign which is training the next generation of biomedical entrepreneurs by identifying unmet clinical needs, and BioZone, which brings together researchers from science, engineering, health and medicine to solve complex challenges leading to improved patient care.

We also showcase the new Centre for Applied Bioinformatics, drawing together expertise from six UWA schools as well as the Harry Perkins Institute of Medical Research, Telethon Kids Institute and the Marshall Centre. Centre researchers are working collaboratively to collect and analyse complex biological data, driving research across biomedical, agricultural and environmental disciplines.

And we reveal how an intriguing archaeological discovery inspired a new bone-grafting treatment using a by-product of pearl shells, while also boosting the manufacturing industry in the Kimberley.

The latest exhibition *Sustaining the art of practice* is one of the highlights of the newly refurbished Lawrence Wilson Art Gallery. The gallery reopened in June following major works to restore light and access through the original cruciform construction, enhancing the entry and retail areas.

Finally, don't miss Terry Larder's Flashback feature celebrating 90 years of Winthrop Hall – a fascinating look at this iconic building which has hosted royalty, Hollywood stars, prime ministers and presidents as well as countless UWA students who have experienced the agony of exams and the ecstasy of graduations.

We hope you enjoy this edition of Uniview.

Simone Hewett
Associate Director, Corporate Communications

Building a better world for the future

The big buzz around bioinformatics

The science revolution

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The University of Western Australia acknowledges that its campuses are situated on Noongar land, and that Noongar people remain the spiritual and cultural custodians of their land, and continue to practise their values, languages, beliefs and knowledge.

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Cover image: UWA Business school panels. Credit: Frances Andrijich

THE UNIVERSITY OF WESTERN AUSTRALIA

GROUP OF EIGHT AUSTRALIA MEMBER

Professor Amit Chakma, Vice-Chancellor
The University of Western Australia

From the **Vice-Chancellery**

Strengthening our innovation **and links with industry**

Western Australia is an extraordinary place, and The University of Western Australia has a pivotal role to play in it.

For decades, UWA bore the sole responsibility for university education in Western Australia; producing graduates who made their mark and were vital to the State's progress.

We no longer stand alone, but we remain the dedicated servant of a richly diverse Western Australian community.

Western Australia has an entrepreneurial spirit: outward-looking, adventurous, and undeterred by challenges of landscape and climate. Here, to see a challenge is to begin work on meeting it and overcoming it.

The public-spiritedness of one of WA's entrepreneurs, Sir John Winthrop Hackett, led to the creation of a Chair in Agriculture. The UWA Institute of Agriculture, which leads Australia and has an outstanding international reputation, has built strong partnerships with WA's agricultural industries.

We build practical connections with industry in all its forms. As the founder of the Perth Festival, we have creative and ongoing involvement with the arts and entertainment industries. In a state abounding in mineral wealth, we play a multi-faceted role, ranking in the world's top three universities in Mining and Mineral Engineering. With an immense coastline and an Indian Ocean perspective, we are ranked in the world's top 10 for marine/ocean engineering.

We put our work to effect, as the second-highest ranking university in Australia* for our success in commercialising our research; enabling us to make our discoveries available nationally and internationally. They include more than a third of all Australian biomedical contributions which have won international approval.

Our commitment extends throughout the entire University. We encourage our students to develop practical understanding in their chosen fields, and to embrace responsibility and leadership. They are inspired and encouraged by the examples of the alumni who have preceded them.

Professor Amit Chakma, Vice-Chancellor
The University of Western Australia

*Survey of Outcomes for Commercialisation of Publicly funded Research (2020)

Transport and energy experts develop emissions reduction strategy

Transport and energy scientists, engineers, planners and economists have come together to inform the development of an emissions reduction strategy for Australia's transport system.

The 18 experts, including Professor Thomas Bräunl from UWA's School of Engineering, developed FACTS: a Framework for an Australian Clean Transport Strategy.

FACTS was formed to enable and boost cooperative action across Federal, State, Territory and local governments in Australia, together with industry, to support the decarbonisation of the transport sector, and in turn, the uptake of low and zero emission transport technologies and strategies.

"FACTS is an Australia-wide initiative for clean transport, and UWA's Renewable Energy Vehicle (REV) Project has been at the forefront of this for almost 15 years," Professor Bräunl said.

"While we have concentrated on the technological issues in REV, FACTS is now targeting politicians and industry decision-makers for making policy changes towards renewable transport."

Based on Australia's current emission reduction targets, transport will represent more than 50 per cent of the country's domestic emissions by 2030, with around a third of domestic emissions coming solely from cars and light commercial vehicles. FACTS recommends Australia aim to achieve net zero transport emissions by 2050.

"There is limited time to achieve significant emission reductions," Professor Bräunl said.

"Australia must set a clear vision for rapid transport sector decarbonisation and invest in the development of transformative technologies that will enable all countries to limit climate change impacts."

FACTS found transitioning the transport sector to cleaner alternatives was inevitable, given the economic, social and environmental benefits that this transformation could deliver. However, shifts to meet climate targets must be accelerated which required ambitious policy action and funding.

Has data collection from professional athletes gone too far?

A new discussion paper from the Australian Academy of Science and The University of Western Australia's Minderoo Tech & Policy Lab has found the growth in personal and sensitive information collected from professional athletes over the past decade has outpaced the scientifically proven benefit to players.

According to the paper, by a 12-person Expert Working Group, the number of parties interested in athlete information – especially commercial parties – has dramatically shifted the risk-versus-reward ratio against the athletes.

Tech Director of the UWA Minderoo Tech & Policy Lab Jacqueline Alderson, a leading biomechanist and international expert in the use of data and technology in sport and health, led the paper's scientific review.

"There are significant limitations to what technology can measure and infer about athletes," Associate Professor Alderson said.

"Remote tracking and wearables offer insights into gross player movement and effort metrics, but we are still some distance from that technology providing robust performance improvement and injury prevention."

Personal and sensitive information collected from sportspeople, on and off the field, ranges from sensor and video-based monitoring of athletes bodies during competition and training to the intimacies of mental health, sleep quality, food intake and menstruation.

The discussion paper aims to mobilise a national conversation to identify gaps and potential risks in sports data governance across the major football codes, as well as basketball, netball and cricket in Australia.

The paper identifies that Australia has a historic opportunity to set forward-looking practices for sports data governance, including legal, organisational and ethical limits around athlete data collection and use.

Read the discussion paper here: science.org.au/datainsport

‘WA is a state with enormous potential, but only if we act now by embracing well-informed policy to make change and secure our future.’

Report explores WA’s future as we head towards 2050

Western Australia is likely to remain one of the safest places in the world, both from infectious diseases and military onslaught, through to 2050 and beyond, according to a new report launched by The University of Western Australia.

WA 2050: People, Place, Prosperity published by the UWA Public Policy Institute (PPI), lays out what’s at stake during the next 30 years and ways to boost the future of the State.

PPI Director Professor Shamit Saggar said more than 50 contributors across business, government and higher education participated in the ground-breaking report.

They looked at three overlapping themes: the future of West Australians, the transformation of physical place and environment, and the challenges and opportunities facing WA’s prosperity.

“WA is a state with enormous potential, but only if we act now by embracing well-informed policy to make change and secure our future,” Professor Saggar said.

“State politics is often short-sighted, based on election cycles, and hesitant in making long-term commitments. Our researchers can speed up the process by isolating what works elsewhere, through data-sharing and adding expert insights for decision makers in government, business and non-profits.”

For example, diversifying the current mining-led WA economy through new sustainable markets, Professor Saggar said, required a significant shift of mindset echoing the pioneering work of businesses that first built the State’s export-based resources economy 30 years ago.

“We also need long-term visionary plans for increasing migration, and creative, interconnected urban development to house the State’s projected population in safe, green, spaces with well-serviced infrastructure,” he said.

“The State has historically decried its isolation, most notably from the minds and priorities of national political and business leaders.”

BUILDING A BETTER WORLD FOR THE FUTURE

By Annelies Gartner

New initiatives and collaborations are putting The University of Western Australia at the forefront of the growing biomedical and health innovation ecosystem.

Biodesign Australia, a network administered by UWA, enables Biodesign programs across Australia to share resources, speakers and best practice to provide a quality experience for participants and biomedical innovations for patients.

Biodesign programs commenced in Australia in 2016 and are now in Perth, Melbourne, Sydney, Adelaide and Brisbane.

Professor Kevin Pfleger, Director Biomedical and Health Innovation, says collectively the programs have trained hundreds of budding entrepreneurs through MedTech and digital health courses.

"Perth Biodesign is training the next generation of biomedical entrepreneurs by identifying unmet clinical needs, inventing solutions that address these needs and creating implementation strategies that fit within a complex healthcare sector," Professor Pfleger says.

"It brings together multidisciplinary teams of people who want to make a difference in healthcare and build the connection

between industry, academia, health services and specialised service providers to create a healthcare innovation opportunity."

Recently a new partnership between Texas Medical Center, the largest medical city in the world, and Biodesign Australia was announced at Science on the Swan in Perth.

Professor Pfleger, who is also President of the Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists, says the collaboration allows further access to talent and clinical trial activity, expanded funding opportunities and markets.

"By uniting the programming, talent and expertise found at Biodesign Australia and Texas Medical Center we are creating a dynamic ecosystem that will help to shape the future of healthcare," Professor Pfleger says.

The iPREP Biodesign program, an initiative between Perth Biodesign and iPREP WA, gives PhD candidates an industry engagement opportunity and training on design thinking, while at the same time giving industry access to invaluable research expertise and talent.

"The program is an opportunity to improve the sustainability and competitiveness of Australian innovations by giving PhD students a competitive advantage across a broad range of future career paths in industry," Professor Pfleger explains.

Bill McKeon and Kevin Pfleger

> ❮ By uniting the programming, talent and expertise found at Biodesign Australia and Texas Medical Center we are creating a dynamic ecosystem that will help to shape the future of healthcare. ❯

"It helps bridge the 'industry-research divide' by linking the abilities of PhD students to the development needs of industries."

Furthering UWA's imprint on the sector is the WA Life Sciences Innovation Hub - a partnership with the Department of Jobs, Tourism, Science and Innovation of the WA Government, and MTPConnect, the national industry growth centre for medical technology, biotechnology and pharmaceuticals.

WA Life Sciences Innovation Hub works to support the WA Health and Medical Life Sciences Industry Strategy, facilitating biomedical and health innovation and entrepreneurship, creating new jobs and diversifying the economy.

Located at the Harry Perkins Institute of Medical Research in Nedlands, the hub drives initiatives in the health and medical life sciences that deliver growth opportunities for WA.

"The innovation hub delivers programs to connect the innovation community, build capacity and new skills, attract investment and foster commercialisation," Professor Pfleger says.

The hub's Manufacturing Voucher Program is providing a boost for medical products manufacturing in WA and under the scheme five WA-based companies have been awarded a total of $450,000 to accelerate innovation projects requiring advanced manufacturing capabilities.

Matched with cash co-contributions of $600,000, the program is injecting more than $1 million into WA's medical technology, biotechnology and pharmaceutical sector.

Established in 2014, the BioZone at UWA brings together researchers with a shared vision and purpose from across the University, from science and engineering to health and medicine.

The researchers use a transdisciplinary approach to biomedical research to solve complex challenges, leading to improved patient care.

"We need innovative solutions that address the increasing complexity of local and global challenges so we can find answers to problems that may seem impossible to solve," Professor Pfleger explains.

"These problems require transformative change in the way we learn, think and interact."

The BioZone PhD program trains the next generation of researchers to work across disciplines and create imaginative and revolutionary outcomes.

In their first year of the program, students are encouraged to work in a wide range of areas to gain broad and varied experience. They are then instrumental in designing their own project while continuing to study and research across multiple disciplines.

UWA has a strong track record in translating its research into medical products, including six FDA-approved drugs and multiple FDA-approved medical devices.

The growth of the biotech industry in WA saw researchers from UWA, Harry Perkins Institute of Medical Research and Perth Biodesign recognised for their innovative initiatives at the New Industries Fund: WA Innovator of the Year Awards 2021.

Apricot, an advanced coronary artery assessment tool developed by Navier Medical, won the Rio Tinto Emerging Innovation category. Winners of Perth Biodesign for Medtech 2019, VeinTech, was awarded the Business News Great for the State Platinum Award for VeinWave, a portable hand-held vein imaging device designed to help clinicians successfully target the right vein, first time, every time.

Winners of Perth Biodesign for Medtech 2019, VeinTech: Dr Katherine Arenson, Nikhilesh Bappoo and Nicholas Buckley

iPREP Biodesign

Perth Biodesign for Medtech

WA's mark in the industry will continue to expand when the AusBiotech 2022 conference brings the Australian and global biotechnology network to Perth from October 25 to 28.

Life sciences investment conference, AusBioInvest 2022, is also taking place in Perth this year on October 27. The event connects innovative businesses and investors to help ideas get the funding they need to succeed in an extremely competitive market.

Straight after AusBiotech at the end of October will be the Biomedical Engineering Innovation, Design and Entrepreneurship Alliance Asia Pacific (BME IDEA APAC) meeting. Hosted this year by Biodesign Australia, directors and facilitators of Biodesign programs from around the world will assemble in Perth to showcase innovation and share best practice.

APSA-ASCEPT 2022, the joint conference of the Australasian Pharmaceutical Science Association and Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists, will also be in Perth at the end of November, completing an incredible line-up of biomedical conferences in Perth.

UWA Deputy Vice-Chancellor (Research) Anna Nowak says UWA's biomedical and health research and innovation are among the best in the world.

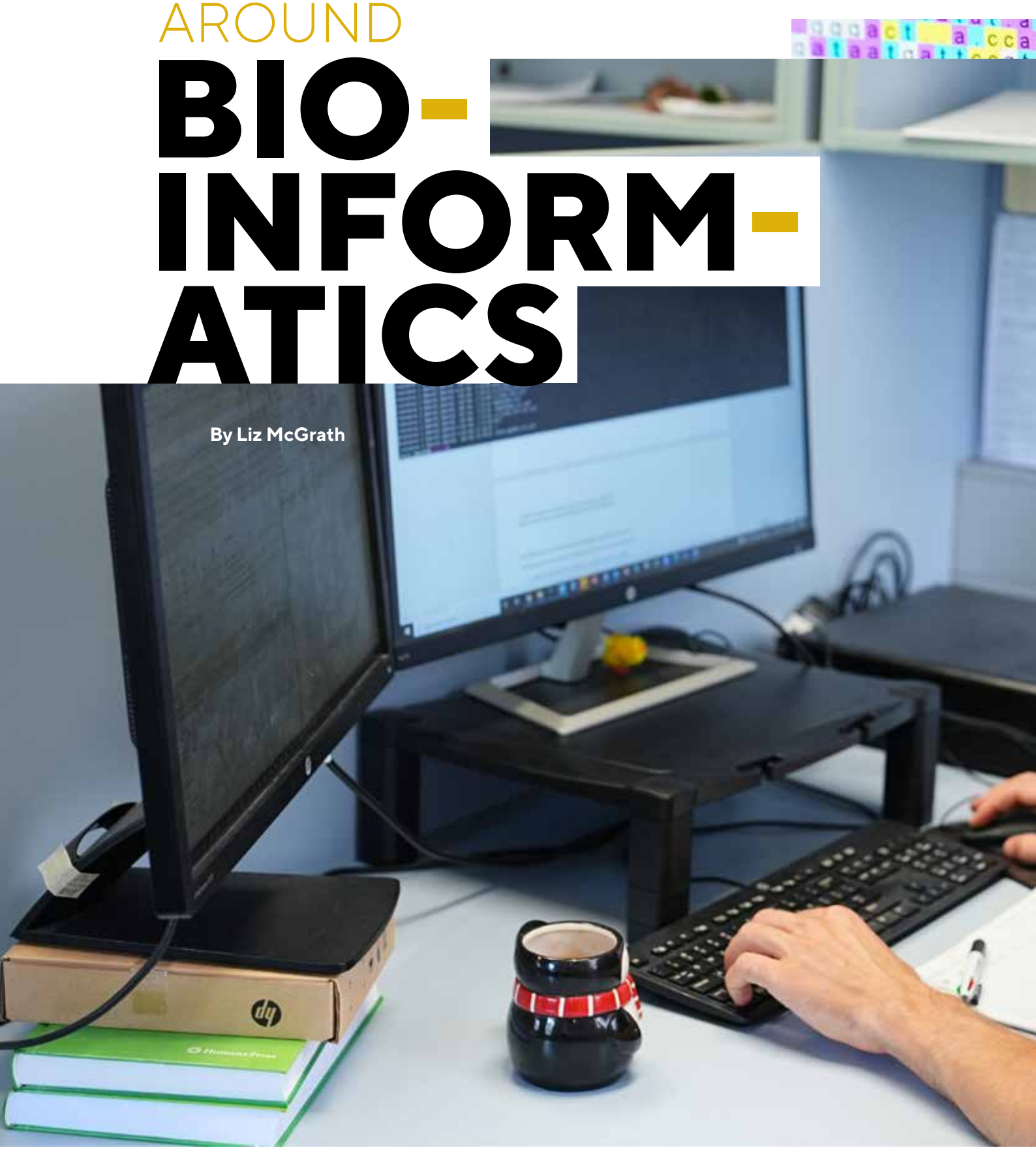
"The University will continue to grow our research capacity and connect researchers, enabling UWA to make a positive impact on the health of our local and global communities," Professor Nowak says.

"The common thread is research towards a better world." ■

> ❮ We need innovative solutions that address the increasing complexity of local and global challenges so we can find answers to problems that may seem impossible to solve. ❯

THE BIG BUZZ AROUND BIO-INFORM-ATICS

By Liz McGrath



Two decades ago, sequencing the entire human genome – that is the order of all 3.2 billion pairs of DNA letters in the helix – took years. Today, next-generation sequencing can do the same thing in 24 hours.

Third year PhD student Jacob Martin

The ambitious and international Human Genome Project, which remains the world's largest collaborative biological project, led to a huge demand for analysis and interpretation of the unprecedented wealth of biological data it generated.

Which was when the evolving science of bioinformatics, the interdisciplinary field that harnesses computer science, mathematics, physics and biology, entered the mainstream.

Associate Professor Silvana Gaudieri, head of the Department of Anatomy, Physiology and Human Biology at UWA's School of Human Sciences and an Executive member of UWA's new Centre for Applied Bioinformatics, has seen firsthand the way bioinformatics is transforming research.

As the head of a research group examining host-viral interactions, including studies demonstrating the adaptation of viruses such as Hepatitis C, Hepatitis B and HIV to immune responses at a population level, she now depends on it.

"One of the things that we're looking at is the way that the immune system responds to infection," she says. "We need to know which genes are turned on and turned off and how that may differ from person to person.

"For any one sample, and bearing in mind we're looking at both the pathogen and the person, we're probably looking at 100 gigabytes of data – that's a deep, deep dive into data which requires a lot of computational ability and a forum or environment in which to communicate and collaborate."

Which is where UWA's Centre for Applied Bioinformatics comes in.

"While it's still in its infancy, the idea is to provide an environment in which research groups – often working with big human-based data sets or non-human-based datasets that generate enormous gigabytes of data – can access the expertise and training they need to analyse that data," Associate Professor Gaudieri explains.

"Many academics have gone through their careers being involved in lab work but without the training and skills needed for complex bioinformatic analysis, these are techniques that didn't exist when they started out," she says.

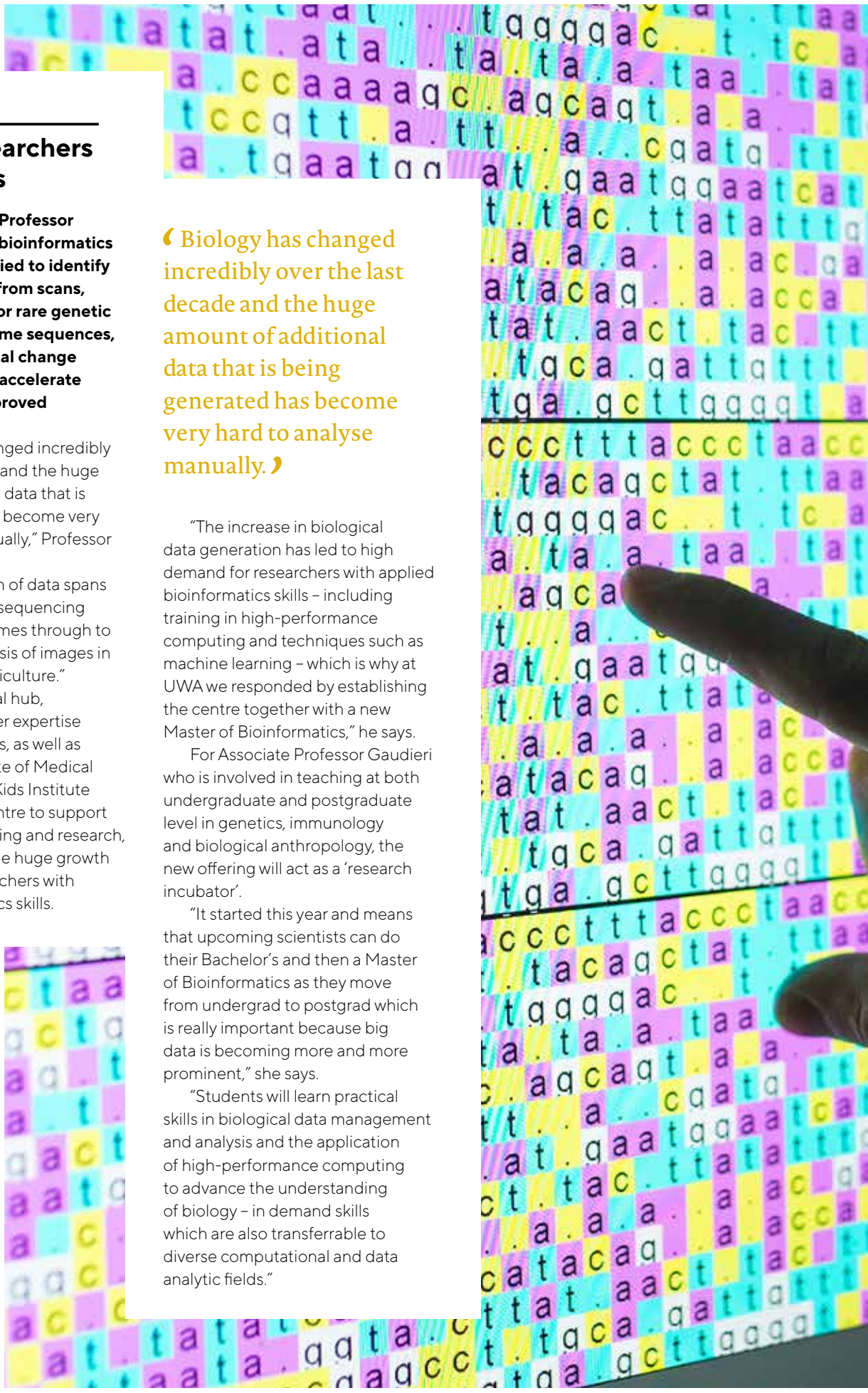
Helping researchers and students

Centre director Professor Dave Edwards said bioinformatics was now being applied to identify early-stage cancer from scans, discover the basis for rare genetic diseases from genome sequences, model environmental change on ecosystems and accelerate the breeding of improved crop varieties.

"Biology has changed incredibly over the last decade and the huge amount of additional data that is being generated has become very hard to analyse manually," Professor Edwards says.

"The rapid growth of data spans everything from the sequencing and analysis of genomes through to the automated analysis of images in biomedicine and agriculture."

He says the virtual hub, which brings together expertise from six UWA schools, as well as Harry Perkins Institute of Medical Research, Telethon Kids Institute and the Marshall Centre to support bioinformatics teaching and research, will also help meet the huge growth in demand for researchers with applied bioinformatics skills.



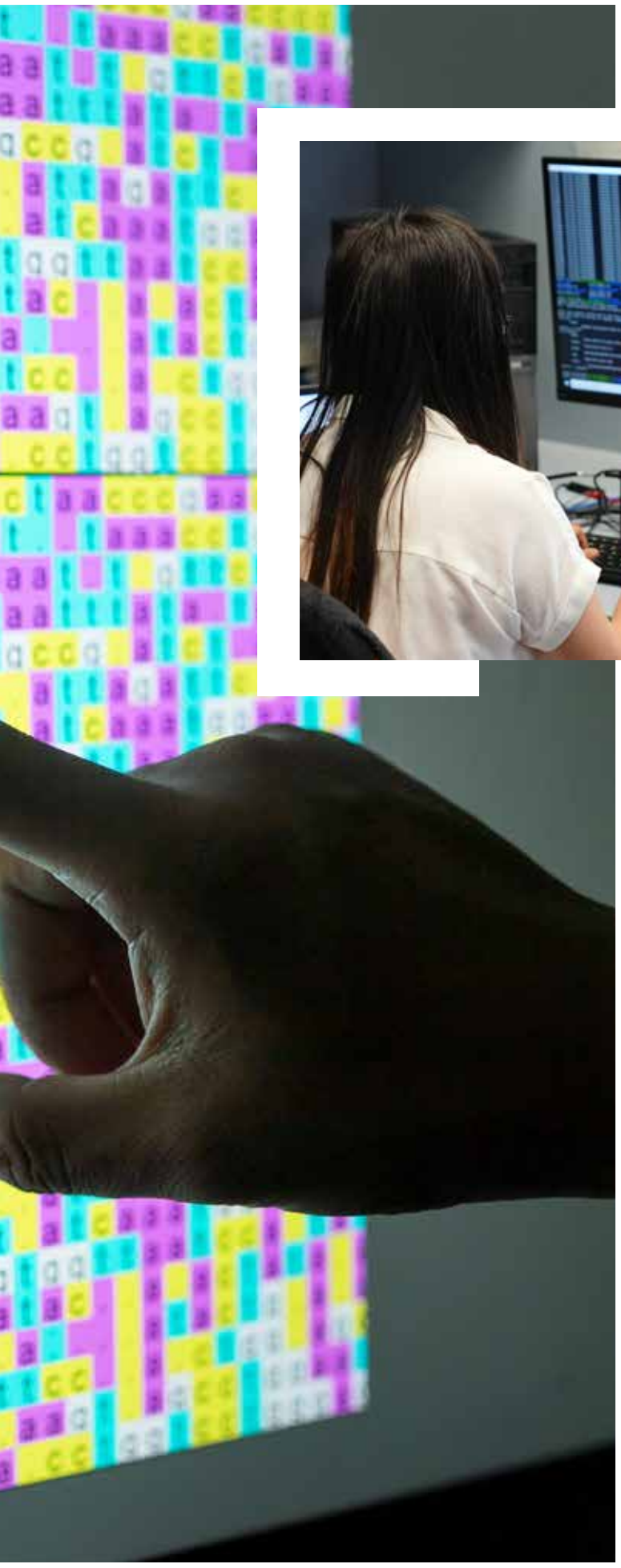
> ❮ Biology has changed incredibly over the last decade and the huge amount of additional data that is being generated has become very hard to analyse manually. ❯

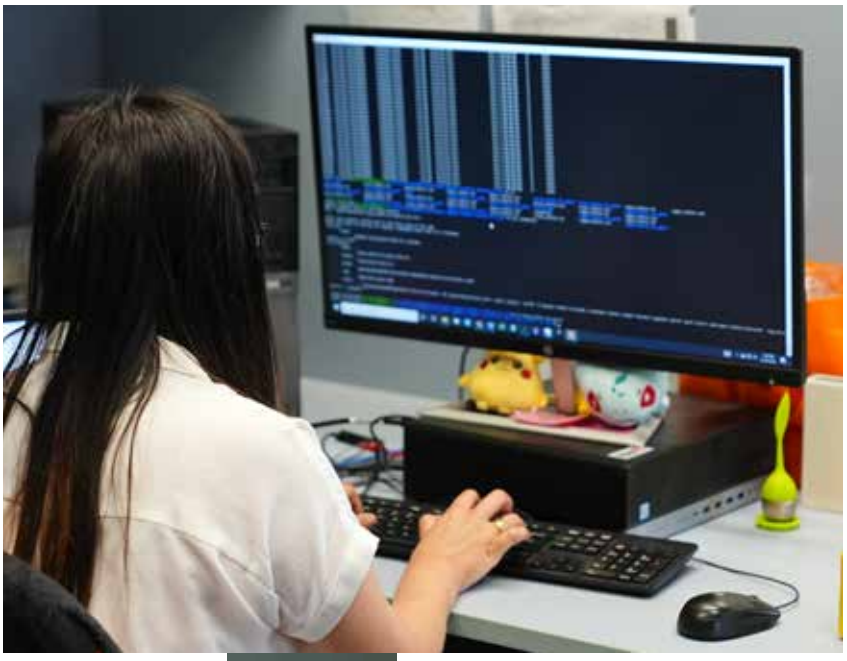
"The increase in biological data generation has led to high demand for researchers with applied bioinformatics skills – including training in high-performance computing and techniques such as machine learning – which is why at UWA we responded by establishing the centre together with a new Master of Bioinformatics," he says.

For Associate Professor Gaudieri who is involved in teaching at both undergraduate and postgraduate level in genetics, immunology and biological anthropology, the new offering will act as a 'research incubator'.

"It started this year and means that upcoming scientists can do their Bachelor's and then a Master of Bioinformatics as they move from undergrad to postgrad which is really important because big data is becoming more and more prominent," she says.

"Students will learn practical skills in biological data management and analysis and the application of high-performance computing to advance the understanding of biology – in demand skills which are also transferrable to diverse computational and data analytic fields."





Providing connectivity across a diverse field

Professor Edwards says one of the challenges in establishing the centre and one of the reasons it's a virtual centre is that bioinformatics is so diverse.

"Many researchers who need bioinformatics skills are isolated in different groups, sometimes doing a bit of laboratory work and generating a lot of data, and the challenge is that they lack the experience or the community to help them solve their problems, they're often banging their heads against the wall to try and identify things," he says.

"We're bringing them together and showing them that UWA has this capability across a broad range of skills, and providing the connectivity which we can only really do as a major centre.

"Bioinformatics methods and applications change rapidly, and no single individual or group can stay ahead of all developments, but by collaborating through the centre we can support advances in this field across biological disciplines."

The centre is working across universities, with state, national and international organisations to deliver applied bioinformatics training and research excellence to advance medical, environmental, and agricultural research in the state. ■

THE SCIENCE REVOLUTION

The research team from Xcalibur and UWA (left to right) Eric Steele (Xcalibur R&D engineer), Joogroop Singh (UWA MSc student), Aidan Loasby (UWA PhD student), Andrew Sunderland (UWA research fellow).

Recognised internationally as an outstanding research-intensive university, UWA is focused on growing innovation and industry engagement at a place where bright ideas are made every day and helping translate them into commercial reality. Here are just two examples.

Mapping the earth from above to discover economic mineral resources

UWA has been collaborating with Xcalibur Multiphysics, a world leader in airborne geophysical surveys, since 2005, a relationship that is generating not only new technologies but also offering research opportunities for early career scientists.

Xcalibur has a fleet of aircraft with gravity, electromagnetic, magnetic and radiometric sensors that can map subsurface mineral, energy and water resources over large areas where the researchers involved in the collaboration – Dr Andrew Sunderland, Eric Steele, Professor Ju Li and Emeritus Professor David Blair – are experts in mechanical instrumentation and electronics.

Through their work, the team has generated patentable electromagnetic and gravity sensing technologies that the company is licensed to use with its fleet of aeroplanes, technologies that allow Xcalibur to explore deeper into the Earth and enable discovery of economic mineral resources.

"Electromagnetic methods are particularly effective at discovering massive sulphide ore bodies which contain the copper, nickel, cobalt and other minerals needed for sustainable energy generation and electric vehicles," Dr Sunderland said.

"The new technologies will also allow Xcalibur to map complex geological and hydrogeological features at significantly higher resolution. This will assist Australian water-resource managers develop efficient water management plans, understand salinity problems and identify new groundwater resources."

Professor Blair said the research was part of the ARC Centre of Excellence for Gravitational Wave Discovery (OzGrav). "Many of our techniques were inspired by instrumentation developed for gravitational wave detectors, with the project a great example of how fundamental research provides practical benefits," Professor Blair said.

Xcalibur director Teo Hage said the expertise available at UWA provided an invaluable resource for the company.

"Although Xcalibur maintains a research and development capability, in-house projects tend to focus on efforts to improve productivity," Mr Hage said.

"Our continued successful collaboration with UWA allows us to collaboratively pursue new ideas and concepts that are outside the scope of our internal R&D risk profile."

Through the collaboration, Xcalibur, UWA and the Australian Research Council (ARC) are also supporting the research of two PhD and two Masters of Engineering students.

Technology to improve lubrication in machinery and manufacturing

Industries such as manufacturing, engineering and space exploration might soon have access to a new, advanced lubricant courtesy of a technology being fast-tracked towards commercialisation by Ablano, a spin-out company from UWA.

Through its collaboration with Head of UWA's Department of Chemical Engineering Professor Hui Tong Chua and his research group, Ablano plans to scale up the technology to create lubricating materials that will ultimately assist in better running machinery and lowering emissions.

The UWA team has developed a novel manufacturing method (the subject of several patent applications that have been licensed exclusively to Ablano) that concentrates light from a lamp to transform precursor powders into nanoparticles, with average sizes less than one-thousandth the diameter of the typical human hair.

Although Ablano and the UWA research team have demonstrated the method can be used with a suite of materials that hold promise as lubricants, the first material being explored is boron nitride.

"The size of the boron nitride nanoparticles, their hollow, spherical structure and crystalline nature, combined with their properties of being stable, strong and bio-compatible should result in a range of new, improved lubricants and lubricant additives," Professor Chua said.

As an example, when used in car engines, these materials are expected to reduce engine wear and fuel consumption as well as improve power and torque performance. The team hopes to complete the technology validation tests early next year as part of its commercialisation milestones.

An expert in chemical engineering, Professor Chua is already well known for the successful spin off of his catalytic methane cracking technology, now known as the Hazer Process, as Hazer Group Ltd., which raised $5m in its Initial Public Offering on the Australian Stock Exchange (ASX:HZR) in November 2015. ■

HOW DATA SCIENCE is revolutionising geology logging

By Liz McGrath

UWA's Centre for Data-driven Geoscience team (from left to right): Dr Tom Horrocks; Mr David Nathan; Dr Minh Tran; Prof Eun-Jung Holden; Dr Chris Gonzalez; Mr Luke Smith; Dr Daniel Wedge; and Mr Tasman Gillfeather-Clark.

A robust understanding of what lies underneath the surface of the earth is fundamental to mining, and nowhere more so than in resource-rich Western Australia. However, it's typically a complex and time-consuming endeavour.

Building on a research partnership that spans the past 10 years, a new $6.1 million four-year research partnership between UWA and Rio Tinto Iron Ore (RTIO) is set to change that by developing innovative data science solutions for automated geology logging.

For the vast scale of world-class iron ore mining operations in the Pilbara, geological information was routinely logged at mine sites, Dr Daniel Wedge from UWA's Centre for Data-driven Geoscience (CDG) at the School of Earth Sciences explained.

"Rock samples from drillholes, in particular, provide crucial details about the potential size and shape of the orebody, making the accuracy of logging these essential for mine operations and planning," Dr Wedge said.

"Until recently, geologists, metallurgists and geotechnical engineers have had to manually interpret and record materials found in drill core samples.

"The visual and textural ambiguity of some mineralogical types in small chip samples means that this logging has relied heavily on geologists' ability and subjective biases, meaning different geologists produce different results."

The new project will use machine learning, computer vision, spatial modelling and optimisation techniques to integrate diverse drill hole data including spectroscopy, photographic imagery, geochemistry and geophysics data in order to model material compositions, geomechanical proxies and their spatial distribution, ultimately leading to improved mining practices.

It's yet another example of how data science, which unlocks value and meaning from vast volumes of information, is being adopted to assist industries across the world.

> ‘The new project involves entwining advanced data science, geological understanding of the data, and Rio Tinto Iron Ore’s extensive knowledge of the mining area.’

Dr Minh Tran from the UWA Centre for Data-driven Geoscience demonstrating her virtual reality software.

Building on a strong 10-year relationship

Dr Angus McFarlane, RTIO Principal, Ore and Product Characterisation, said past partnerships between the two organisations resulted in UWA’s commercialisation of automated downhole image analysis software, and three RTIO-driven joint patent applications on machine learning-based modelling of geology.

“The UWA team has already successfully developed machine learning-based methods and tools for the analysis of stratigraphy and their material compositions for resource evaluation,” Dr McFarlane said.

“The latest engagement will adapt and extend some of these advances for mining, the next stage of the industry workflow from resource evaluation.”

Professor Eun-Jung Holden, who leads CDG and UWA’s Data Institute, said, the new project involved entwining advanced data science, geological understanding of the data, and RTIO’s extensive knowledge of the mining area.

“Applying machine learning-based solutions tailored for industry is a big challenge,” said Professor Holden, who recently received the top honour in the Artificial Intelligence Applied to Mining category at the Women in AI Awards 2022 (Australia and New Zealand).

“As a research team, we benefited greatly by being integrated into our sponsor’s teams, to get experience of their current day-to-day practices and geological knowledge.”

Dr Tom Horrocks from CDG said that knowledge was crucial.

“Improving the team’s understanding of what end-user geoscientists do with the data at various stages, what they want to do but currently cannot, and how best to integrate these new solutions into existing infrastructure is critical for building industry applications such as these,” Dr Horrocks said.

RTIO Manager Geoscience & Water, Research, Development and Technology, Tom Green, described the project as important for the future.

“UWA and RTIO teams have developed a respectful and collaborative culture that returns mutual benefits,” he said.

“We’re now are at the forefront of transforming our geological interpretation using data science through this partnership.” ■

By Annelies Gartner

PEARLER OF AN IDEA

TRANSFORMING BONE GRAFT TREATMENT

Tour Guide Rahim with mother of pearl shell

Nacre, a calcium carbonate structure present in mollusc shells, has been highlighted as a promising solution to a shortage of bone implant materials and the finding is boosting the manufacturing sector in the Kimberley.

An intriguing archaeological discovery inspired the new bone grafting treatment which uses a by-product of pearl shells.

Ancient Mayan skulls discovered in Mexico were found to have perfectly fitting teeth made of nacre and radiographs showed the teeth had roots perfectly integrated into the surrounding bone.

A study led by Professor Minghao Zheng and Dr Rui Ruan, from The University of Western Australia's Medical School, has shown that nacre possesses potent osteogenic properties and could potentially be suitable as a source for bone substitute material.

"As people around the world are living longer, we are seeing an increased demand for bone substitutes and graft for surgical treatment of orthopaedic conditions," says Professor Zheng, also Head of Bone and Brain Axis Research at the Perron Institute.

"More than two million bone grafting procedures to treat bone defects are performed annually worldwide, making it the second most frequent tissue transplantation."

Up until now the ideal bone graft material was autograft sourced directly from the patient.

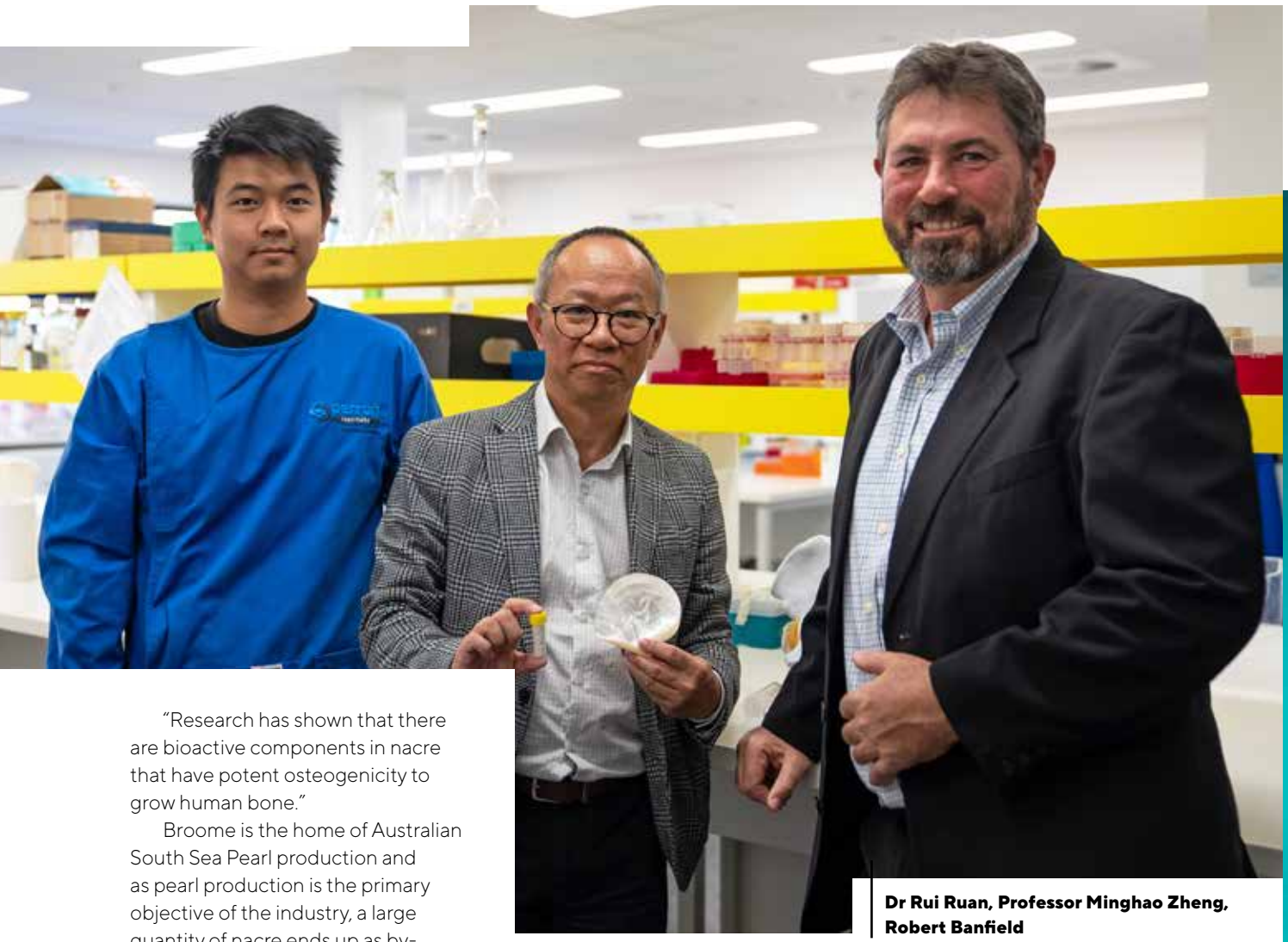
A downside of autograft is sourcing the material is an invasive procedure which sometimes results in donor site morbidity and presents significant clinical and economic disadvantages.

Allograft or xenograft – using biochemical processed bone sourced from deceased people or from animals - have always presented a risk of transmitted diseases and potential immunogenic reaction.

Synthetic bone substitutes, on the other hand, have a problem with providing effective osseointegration – the direct structural and functional connection between living bone and surface living bone and the surface of a loadbearing artificial implant.

> ‘As people around the world are living longer, we are seeing an increased demand for bone substitutes and graft for surgical treatment of orthopaedic conditions.’

"There is an unmet need to address the limitations of bone substitute and to improve its bio-functional properties," Professor Zheng says.



Dr Rui Ruan, Professor Minghao Zheng, Robert Banfield

"Research has shown that there are bioactive components in nacre that have potent osteogenicity to grow human bone."

Broome is the home of Australian South Sea Pearl production and as pearl production is the primary objective of the industry, a large quantity of nacre ends up as by-product.

Research has shown the nacre from silver-lipped pearl oysters in Broome is rich in trace elements and free of any environmental contamination, and the best in enhancement of biomineralisation and bone formation.

The team has subsequently developed a patented technology for using nacre to make a bone substitute named PearlBone.

New Broome-based biotech company Marine Biomedical intends to develop medical products and devices from sustainably certified nacre, including PearlBone.

This is the first medical manufacturing company set up in the Kimberley region and will use nacre from Broome to manufacture Pearlbone under the good manufacture practice guidelines to obtain FDA market authorisation of the product for orthopaedic use.

Professor Zheng, who devoted many years to the development of the product, says its potential for orthopaedic applications could not be understated.

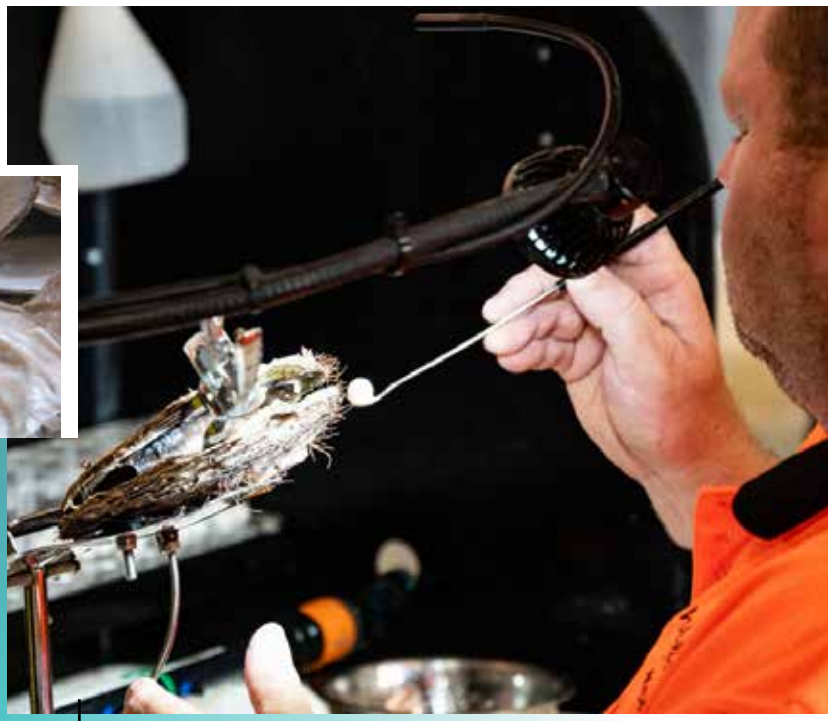
"In a preclinical study of a rabbit critical bone defect model, Pearlbone displayed better bone healing efficacy when compared to the most commonly used bone substitute, hydroxyapatite," he says.

"Our work has proven that PearlBone substantially supports the process of new bone formation, compared to other synthetic bone substitutes in the market.

"The results to date are very encouraging – through PearlBone, there is a revolutionary opportunity to utilise the process of marine biomineralisation in lieu of traditional devices in orthopaedic, trauma and reconstructive surgical applications."

Marine Biomedical has recently received two significant funding awards contributed by State and Federal sources to establish the first medical device manufacture facility in Broome enabling the production of PearlBone for use in orthopaedic applications.

Patrick Moase, CEO of Marine Biomedical, says the grants will help develop economic diversity and create jobs.



CEO Paul Birch harvesting oyster

> Research has shown that there are bioactive components in nacre that have potent osteogenicity to grow human bone.

"Marine Biomedical is hugely appreciative of these grants and encouraged to see that development of regional innovation, along with industry diversity, particularly in the medical space, is supported by those who see northern Australia as a zone that has the potential to attract expertise and achieve great outcomes for the community," Mr Moase says.

The biotech company's collaboration with researchers from UWA and Broome pearling business Willie Creek Pearls will give the Kimberley pearling industry an opportunity to harvest mother-of-pearl and turn it into a sustainable new product.

Willie Creek Pearls Chairman and Marine Biomedical partner Robert Banfield says he welcomes the opportunity to expand the opportunities for Broome's internationally renowned pearling industry.

"Modern pearl farming has tended to view nacre as a by-product, but this opportunity to develop PearlBone from this incredible source material shines a light on a whole new opportunity for the pearl farming industry," Mr Banfield says.

Professor Kevin Pfleger, director of Biomedical Innovation at UWA and MTPConnect WA Life Sciences Innovation Hub, says Marine Biomedical was leading the way in unlocking the incredible potential of our oceans to develop biomedical applications in Australia.

"It demonstrates the capacity for innovation and research excellence in Western Australia," Professor Pfleger says.

Marine Biomedical will continue the development of PearlBone and pursue regulatory approval for the product in several countries, including the United States and Australia, in the next two to three years. ■

RESPONSIBLE LEADERSHIP

helps build business, people and community

Dr Donella Caspersz,
UWA Business School
MIR '94, PhD '01

The list of challenges facing leaders keeps getting longer. Key employee pressures include helping employees achieve work-family balance while juggling 24/7 working from home, the 'great resignation' because of questions about the meaning of work following the pandemic experience, and the physical and transition risks demanded by the effects of climate change on economy and society. But what is the leadership approach leaders should consider to manage these challenges, while safeguarding a sustainable future for the business, as well as people working in their organisation and the wider community?

Sustainability of business, people and the wider community

The effects of work on wellbeing are well established and documented by a growing body of research. Healthy and productive workplaces are of paramount importance to supporting employee engagement, voice and equity. We also know that work affects active citizenship within organisational life, and externally in communities. We need ethical, just and healthy workplaces to maintain and strengthen business, economy and the general wellbeing of society. This topic formed part of a discussion at the Grand Challenges Summit.

The lens has recently turned to examining the approach of responsible leadership in trying to find an answer to this question. Responsible leadership is the "art" of building and sustaining relationships with the variety of stakeholders linkec to an organisation – employees, customers, suppliers, industry, community groups – on the basis of values and ethics. The aim of responsible leadership is to build sustainable organisations that create and capture value by being attuned to the demands for social change.

My research has explored responsible leadership with family business leaders in the context of the pandemic. Family businesses are 70 per cent of Australia's businesses with most small-to-medium-size businesses being family controlled. Undoubtedly there was a preoccupation with crisis management as a result of the pandemic. Thus, some leaders – especially tourist operators – closed their doors while others downsized. However, there was also evidence of strategising to embed business sustainability by pivoting operations. For instance, one business expanded its operations to include the manufacture of personal protective equipment. There was also evidence of forward thinking where another business aggressively stockpiled inventory to be able to assure customers of supply when borders were closing and supply chains were squeezed.

Importantly, there was evidence of what is described as leaders strategising to "secure the core" of the business; that is their relationships with employees, customers, suppliers and community. Leaders reported striving to safeguard the employment, health and wellbeing of employees. A known phenomenon is that family business employees are often considered "family" mainly because the organisational footprint of family business – especially those that are small-to-medium in size – creates an interpersonal employment relationship. While there exists a debate about the implications for employees, the research found that when faced with the pandemic, leaders actively worked to protect their employees because *"we're a family company and we consider everyone part of the family"*.

With customers, the research found that leaders actively engaged with their customers, through regular communications, by offering "drop in" opportunities for customers when allowed, as well as advocating, *"Don't go underground, don't be a squirrel. Get out there and wave the flags and give people confidence they will get over this"*.

Finally, they ensured that they took especially good care of the "extended family" of suppliers. One business actively directed business opportunities to "loyal suppliers" to help them survive during the pandemic, saying *"we've been there for each other in times of good and bad. And supported each other"*.

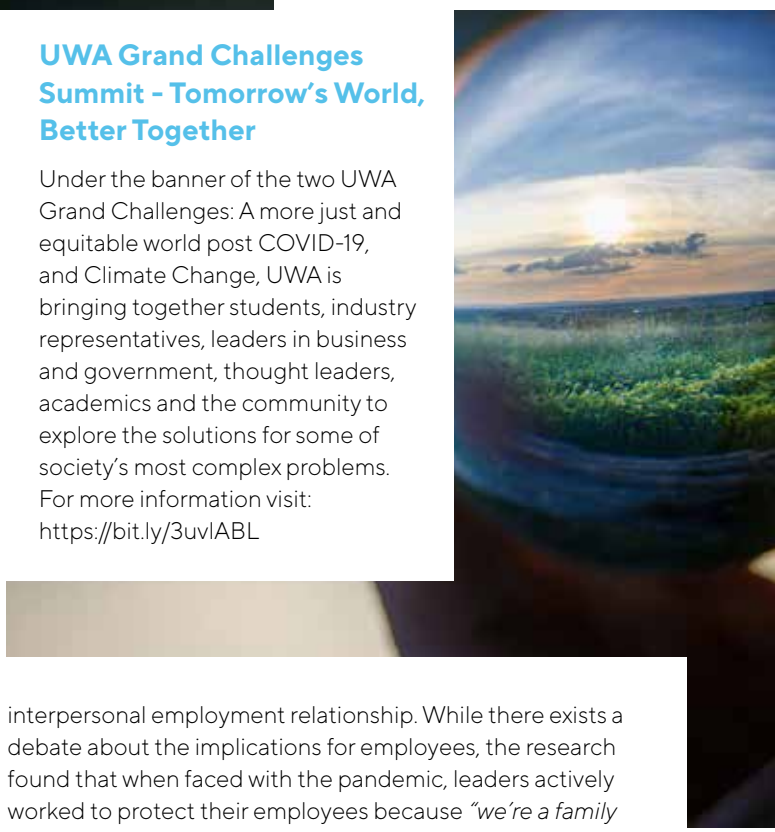
Is this a phenomenon of family business? Family values will clearly permeate family business because of family involvement in the business. As most small-to-medium-size businesses begin and mostly remain as family businesses, family values also influence this business sector.

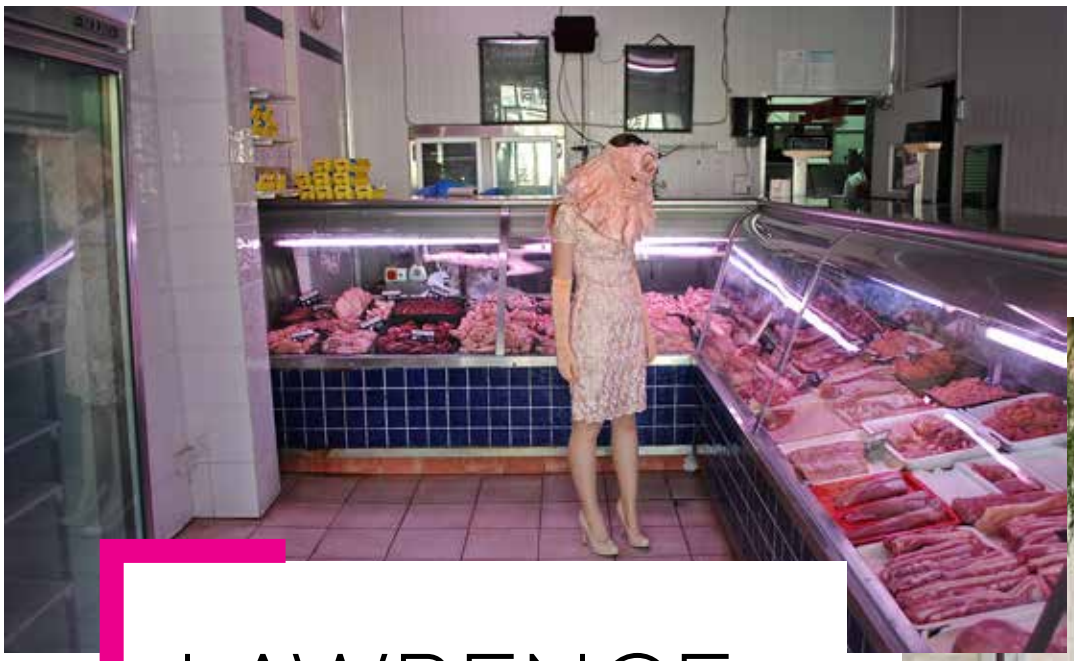
However, apart from the tourism and hospitality businesses where sustainability was dramatically affected by pandemic border closures, most businesses remained in operation with some saying that they had the "best years" of business, even paying back what they had received in pandemic payments from the government. Does responsible leadership foster sustainable businesses? The research suggests this may be the case.

Donella Caspersz is a senior lecturer and UN Director PRME (Principles of Responsible Management Education) at the UWA Business School. Donella's research and teaching interests focus on management, especially family business organisational issues, and employment relations particularly in the area of migration. This presentation was given at the UWA Grand Challenges Summit, February, 2022, held at the UWA Club.

UWA Grand Challenges Summit - Tomorrow's World, Better Together

Under the banner of the two UWA Grand Challenges: A more just and equitable world post COVID-19, and Climate Change, UWA is bringing together students, industry representatives, leaders in business and government, thought leaders, academics and the community to explore the solutions for some of society's most complex problems. For more information visit: https://bit.ly/3uvlABL





Jody Quackenbush, *The butcher shop,* Northbridge, 2013, giclée print on archival paper, 42 x 59.4 cm, Cruthers Collection of Women's Art, The University of Western Australia

LAWRENCE WILSON ART GALLERY **REOPENS**

Lawrence Wilson Art Gallery reopened with a new exhibition, *Sustaining the art of practice,* on display in the renovated gallery.

A series of refurbishments have restored light and access through the original cruciform construction and enhanced the entry and retail space.

The renovation also provided more exhibition space for the display of a selection of works from the Cruthers Collection of Women's Art.

Sustaining the art of practice draws on works from the Cruthers Collection to reveal links between artists and the communities and environments that support their practice.

Curated by Lee Kinsella, the exhibition is an opportunity to consider relationships including the legacy of family, art historical precedents, community, landscape and Country.

"Artists are engaged in swirling social relationships and part of communities that are vibrant and alive in the expression of culture - art, performance, music, poetry," Ms Kinsella says.

The exhibition also proffers portraits as a visual link to give viewers an insight into the individuals who are important to the artist.

Groupings of newly acquired works that are the legacy of a friendship between Maria Kozic and Sally Jackson in Melbourne through the 1980s and into the early 90s are on display.

Sustaining the art of practice runs until 20 August. The Lawrence Wilson Art Gallery is open Tuesdays to Saturdays, 12pm to 5pm, and admission is free. For more information, visit the LWAG website:
uwa.edu.au/lwag/home

Lydia Young, *Untitled*, 2016
Seven pigment prints on Hahnemuhle hemp paper, 30 x 42 cm, Cruthers Collection of Women's Art, The University of Western Australia, Purchased through the Sheila Foundation Champions Donor Circle, 2020. Copyright and courtesy of the artist and Tjarlirli Art

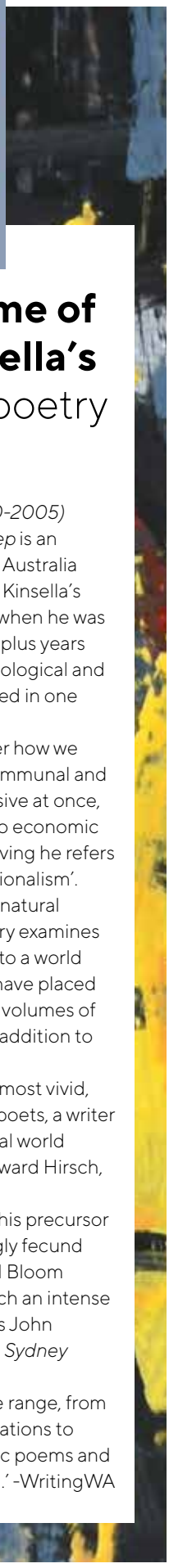
A newly commissioned video installation by Badimia and Yued artist Amanda Bell, Raquel Ormella's hand-made banners, Lydia Young's photography of Ngaanyatjarra lands and Perth-based artist Jody Quackenbush's textile creations also feature in the exhibition.

Professor Helen Grace's photographic series *Christmas dinner*, 1979, documents the days of preparation and invisible labour performed by women in the family, as led by the matriarch on the family farm.

Professor Grace's photographic series are exhibited alongside the work of Narelle Jubelin and Margaret Morgan – artist friends and colleagues who feature in her private photographic records.

Works by Australian artist Susan Norrie extend the theme of *Sustaining the art of practice* as relationships between artists span two decades, with a photograph taken by Professor Grace featuring Norrie, Morgan and Jubelin at a dinner party more than 25 years ago.

Professor Grace opened the exhibition and presented a talk in the gallery on Saturday 25 June. She also contributed to the catalogue, which features commissioned essays that trace relationships, respect and reciprocity.



First volume of John Kinsella's collected poetry published

Volume One (1980-2005) The Ascension of Sheep is an impressive addition to Australia literature and features Kinsella's poetry dating back to when he was 17. Moving through 41-plus years of writing, Kinsella's ecological and lyrical poetry is collected in one place for the first time.

His poems consider how we might be regionally communal and internationally responsive at once, without succumbing to economic globalism: a mode of living he refers to as 'international regionalism'. Always attuned to the natural world, his activist poetry examines how humans respond to a world that they themselves have placed under pressure. These volumes of poetry are a landmark addition to Australian literature.

'One of Australia's most vivid, energetic and stormy poets, a writer who turns to the natural world with a fierce light.' -Edward Hirsch, Washington Post

'John Kinsella, like his precursor Ashbery, is astonishingly fecund and inventive.' -Harold Bloom

'Few poets give such an intense sense of the present as John Kinsella.' -Lisa Gorton, *Sydney Morning Herald*

'Works of immense range, from extended lyrical meditations to taut experimental sonic poems and everything in between.' -WritingWA

Q and A with Dr Katherine Iscoe

Dr Katherine Iscoe, Activator, Compassionate Leadership Educator

Dr Katherine Iscoe is the Co-Founder and Chief Executive Officer of Advanced Human Imaging Limited based in Perth. Katherine is a confidence and compassion expert and uses her personal experiences and qualifications in medical sciences, health and wellness to inspire, motivate and help her clients lead a successful life.

Tell us a bit about yourself and your companies Dr Katherine and Advanced Human Imaging. What led you to take this particular path?

I think I had the most unusual career path in history! I was formerly a restaurant owner and a pastry chef. After going bankrupt I decided to 'give university a try'. Between each degree I thought to myself 'that's it, I'm done'. I even started in real estate for a while (don't ask). But if it weren't for these rabbit holes I don't believe I would be where I am today. So for the people reading this thinking 'I have no idea what I'm doing or where I'm going' understand that one day this will be your unique superpower. Keep going.

How did studying a PhD at UWA help you pursue your passion for health and wellness?

People underestimate the power of education, often thinking of students as tunnel-vision bookworms who only look at things from one perspective. Studying at UWA not only brought me to this beautiful country, but introduced me to a new world of people who forced me to think about things in new ways. Health and wellness, while a universal concept, is approached differently by different cultures. My PhD (in exercise physiology and biotechnology) enabled me to learn this concept and apply it to my future career.

What does a typical day look like for you?

No matter what, it starts with coffee – I'm not a morning person! My partner always has a fresh cup waiting for me from our local cafe. I throw some walking clothes on and take my two fur babies for a walk – the fresh air and sunshine are prerequisites to get my mind ready for the day. Depending on the day will dictate how I dress and whether or not I have to put 'my face on'. I head to the office (my pups join me) and get into the day with emails, meetings and check-ins. At the end of the day my partner and I go for a long walk with the pups to download and support each other with whatever happened throughout the day, including a strategy to do better the next day. I cook dinner (also mental therapy for me) and then watch a little Netflix (currently addicted to documentaries) and if necessary, continue a bit of work. Bedtime for me is around 9.30/10pm.

You are known as a compassionate leader who regularly speaks on the topics of self-worth, failure in business, igniting confidence, but also the psychology of shaming. Why are these such important topics of discussion?

My father, long ago, shared the quote 'to thine own self be true'. At the time, I casually understood the meaning but didn't quite understand the importance of practising it. Compassion, I believe, is the action-focused antidote for low self-worth, failure and shame. It's important to recognise that it is not self-pity, nor complacency, but rather tells a person 'hey, this sucks right now, but you're not alone, and this won't last forever'. There is a tremendous amount of research by Dr Kristen Neff which shows that people who practise self-compassion are more likely to be motivated, set higher standards for themselves, and are more likely to set new goals when things fail. And if that doesn't describe a good leader, I don't know what does!

Katherine speaking at a UWA graduation ceremony in 2018

What does failing in business teach you and how do you bounce back?

Firstly, I need to say that anyone who tells you that it's easy to bounce back from failure is just plain lying. It sucks! So it's important to remind yourself that you're human (which is darn hard when you're a high achiever). This is a concept known as 'Common Humanity' in which you need to accept that your experience isn't "God punishing you" with a magnifying glass. You have not been chosen to be the world's worst human and made to suffer for it... unless you have killed a nun. The next step is objectivity and widening your lens: was the failure due to things in your control? If so, break them down and persist in finding solutions. If they were out of your control, what does your business need to do to protect itself for future blind spots? Lastly (and perhaps most importantly), don't make the fatal error you can brave failure alone. Get feedback from your tribe, the people who support you but don't bullshit you.

We are currently living in times of uncertainty. What does a healthy and balanced society look like according to you?

Ain't this the million dollar question! So many big topics to consider, from education to the environment. But I believe it needs to start from within – what's in each and every person's control – their mindset. Because while we're waiting for top-down and bottom-up reform (needed for a healthier society), leadership is an inside-out job. No one can ever take away a person's desire to be healthy and balanced. To do this, however, I believe having purpose is the most critical factor.

What would be your one piece of advice to your younger self?

'The curious paradox is that when I accept myself just as I am, then I can change.' - Carl Rogers

Stop caring about what other people think of you, and care about what you think of yourself. If you don't like what you see, remind yourself that only you can change yourself: **don't complain, change**.

UWA CONSULT connects industry to research expertise

With some of the best and brightest minds and cutting-edge research infrastructure on offer, UWA is well-positioned to help tackle some of the world's most difficult challenges. Enhancing this capability is the University's new commercial arm, UWA Consult, which makes it even easier for industry to connect with UWA.

UWA Consult was built after extensive stakeholder consultation to enable a simpler way to engage with industry and community members to meet their expert consulting needs.

Pro Vice-Chancellor Engagement, Samantha Tough, says UWA has streamlined consulting to make it much easier and faster for industry to access its knowledge and increase the impact of its research with more partners.

"UWA Consult provides opportunities for our research community to foster connections with industry, government and not-for-profits through the translation of their research and to advance knowledge more broadly," Ms Tough says.

UWA Consult helps business, industry and government representatives tap into a pool of more than 1,500 leading subject matter experts in a wide range of disciplines including engineering, law, business, health, education, policy, social sciences, psychology and agriculture. UWA researchers can provide skills and expertise to assist organisations with technical or commercial challenges, patent evaluation and technical due diligence, advice on strategic planning, master classes and professional upskilling, or involvement in scientific and clinical advisory boards.

> UWA Consult helps business, industry and government representatives tap into a pool of more than 1,500 leading subject matter experts in a wide range of disciplines.

Associate Professor Katie Attwell

Winthrop Professor Marc Tennant AM

Winthrop Professor Marc Tennant AM recently established UWA Consult contracts for projects relating to oral health for WA Country Health Service and a nationally recognised health insurance business.

"Bringing the wisdom of 25 years of experience to the critical decision point for a major strategic business decision, and to have respect for that wisdom was a complete highlight," Professor Tennant says. "Consulting enables me to share a little in the ongoing impact that organisations make on society.

"My consulting journey working with hundreds of partners has led to the lives of millions of Australians being better off. That is the nice part of doing consulting; the practical legacy you can leave for the next generation. Seeing our insights of years of research having impact in the real world is a great way to engage with our community."

A representative from WA Country Health Service acknowledged the impact of these contributions.

"Marc has been one of the nation's driving forces in Rural and Remote Oral Health," he said. "The wisdom and experience he has brought to the system continues to make a difference for all Rural West Australians. The collaboration between health system and top level academics is vital to the future of our State."

"Associate Professor Attwell provided deep current insights and knowledge to address a skills gap we would not have been able to source via traditional consultants. She was able to take our executives and senior leaders on a journey to confidently discuss vaccinations with our staff," according to a WA aged care provider.

UWA has an extensive range of research equipment and infrastructure which isn't available elsewhere in the southern hemisphere. This includes the Centre for Microscopy, Characterisation and Analysis, which provides world-class microscopy and microanalysis facilities such as the electron, ion, light imaging and microanalysis facilities, unique ion probe and MRI facilities used in science, medicine and industrial applications. Expert staff provide support ranging from initial project discussion and planning through to application of cutting-edge techniques and assistance with data interpretation.

UWA Consult also enables the University to ensure its research and knowledge can benefit the widest range of communities in the Indian Ocean Rim and beyond; playing a significant role in commercial endeavours and furthering UWA's aim to be the university partner of choice for industry.

When researchers work in a consulting capacity it provides an opportunity to build networks and relationships but also helps the University realise its vision to become a more enterprising and engaged institution. Researchers embrace the opportunities to work with business because it helps them inject real-world insights into their teaching and identify new areas of impactful research.

THE LOVE LANGUAGE OF VIDEO ART

Blue Room Theatre, 900s (Of Storytelling), 20 - 23 January 2021. Photography by Duncan Wright. (L-R:) Elisha Rahimi, Raneen Kousari, Asha Kiani, Elham Eshraghian-Haakansson.

For Elham Eshraghian-Haakansson four months spent working with the local Victoria Park Community as part of a Spaced arts organisation project *Know Thy Neighbour #3* earlier this year, informed her on the notions of place and home that are integral to her Forrest Research Foundation's Creative and Performance Leadership Fellowship.

The artist was "over the moon" to be named one of two inaugural recipients of the creative research fellowships which kicked off in April to encourage arts and humanities professionals to pursue further study in their areas of interest.

For Ms Eshraghian-Haakansson it's an opportunity to explore new ground in digital media and in particular the area of virtual reality (VR), looking at the techniques and methods needed to help audiences to become co-authors of her work, rather than just passive bystanders.

She has been connecting with residents and the St Mary's Outreach Service and Victoria Park Community Centre to further understand the meaning of 'home' in relation to local contexts and social identity to identify ways of building empathy.

She's now reflecting on these experiences through art therapeutic practice with principal industry collaborator Cara Phillips, to create virtual connectivity that explores personal, familial and communal interactions to dislocation.

Family archive, 1999, recorded on camcorder by Kamran Eshraghian. (L-R): Ashkaan Hadi, Elham Eshraghian-Haakansson, Natasha Yorke, Omid Eshraghian, Jason Eshraghian.

Her team, including principal academic collaborator Dr Ionat Zurr from UWA's School of Design, Immerse Australia's Natalie Marinho, research associate Dr Ali Fardinpour and VR Director of Photography Mahmudul Raz are supporting the research and creative progression of her Fellowship project, *'Through My Eyes: The Virtual Architecture of Empathy and Connection'*.

Moving images have always held a fascination for the award-winning young Iranian-Australian Bahá'í video artist, director, and researcher.

As she grew up, and became more deeply aware of her family's history as refugees of the 1979 Iranian Revolution, the source material for her art projects shifted.

Like hundreds of thousands of others, the artist's mother, uncle, and grandparents were forced to flee to the relative safety of Pakistan to escape persecution, and almost certainly execution, over their Bahá'í faith.

"Every decision my grandma made during that time I'm here because of it, she is why my family is safe," the 25-year-old, whose family settled in Western Australia, says.

It's the emotional impact of that conflict and what Ms Eshraghian-Haakansson describes as "the universality of grief and of loss that comes with displacement" that now underpin her work and practice in empathic art-making.

While she has explored different mediums, completing a unit in video art while at university left her convinced, she'd "found her calling" and "love for language".

The Fine Arts graduate from UWA, who has recently completed her Masters, has exhibited her work nationally and internationally and is the recipient of a growing list of prestigious awards for her work.

Of the current Know Thy Neighbour #3 program, she said she believes it is important in today's world to "explore communal care as well as self-care when considering our mental wellbeing and sense of hope and home".

"I try to seek understanding between strangers and develop ways of connecting, especially when disconnection feels so prevalent and there's social unrest, climate change, the pandemic and a whole host of other things that people are feeling. Art is very potent in poetically realising this thread of understanding," she said.

Emeritus Professor Jenny Gregory

From the Warden of Convocation

As a UWA graduate and former staff member, it is a great honour to be the elected representative of more than 141,000 fellow graduates of UWA and charged with contributing to the advancement of our university, higher education and the community.

There is so much about UWA that has withstood the test of time but for me, and many others, the University's unique sense of place is its greatest asset. Our magnificent landscape for learning on Whadjuk Noongar Boodjar grounds us in the beauty of our natural environment. Winthrop Hall and the Hackett buildings add to our deep sense of heritage, while providing a sense of continuity as we prepare for the future.

At a human level, there are so many graduates who have an enduring personal relationship with the University as volunteers, parents or grandparents of current students, or as participants in events and campus life. And we continue to retain amazing staff who are inspirational teachers and researchers, with a great commitment to seeking wisdom and making UWA the best it can be.

This year, we expect to increase involvement in mentoring and internships, providing a great opportunity for our members to engage with the University and help our students. We also plan to host webinars on higher education issues of relevance to UWA.

We look forward to revitalising the work of Convocation Council, with a new strategic plan for the next five years, which has the endorsement and strong support of UWA.

Convocation has a long history of providing travel and research awards, and we host a successful 50th anniversary lunch each year and a commemorative tree planting by the Warden and Guild President, followed by a sundowner each Convocation Day.

I encourage all graduates to stay in touch and to get involved in events, volunteering and life at UWA.

Read our full *In Conversation with the Warden of Convocation* interview with Emeritus Professor Jenny Gregory at **uwa.edu.au/news/topics/uniview**

Key Dates

Convocation Spring General Meeting

Thursday 15 September at 6.30pm

In person at The University Club of WA or via Zoom.

50th Reunion Luncheon for Graduates of 1972

Saturday 26 November at 12 noon

If you are a '72 graduate, please get in touch at convocation@uwa.edu.au

2022 Convocation Day

Has been deferred and will be rescheduled pending COVID-19 guidelines.

For details of elections and upcoming events visit **convocation.uwa.edu.au**

To ensure you receive regular news about UWA and Convocation, update your contact details by visiting **alumni.uwa.edu.au/update**, or by scanning the QR code.

Health Data for the Future

By Siobhon Eacott (BSc '19)

Associate Professor Rebecca Glauert

Associate Professor, Scientific Director of The Raine Study, and head of the Western Australian Child Development Atlas (CDA), Rebecca Glauert (UWA's School of Population and Global Health) is a world expert in the fast-growing field of data linkage.

Data linkage, in simple terms, is a method of bringing together information, from different sources, but relating to the same individual or event. Many of our life experiences from the moment we are born until our death generate data that is collected and used for a range of purposes. For example, information is routinely collected when you go to school, visit a hospital, when you get married or divorced and when you have a baby. This data is collected by different organisations all over Australia.

Using this data, maps can be created to identify relationships between areas of development for communities and provide insight into long-term outcomes for vulnerable groups.

Despite her success in the field, Associate Professor Glauert's journey to data linkage was far from straightforward - her psychology-based PhD thesis investigated the effects of body dissatisfaction on perception.

"Once I completed my PhD I was keen to work in an area where I could make a real impact. I ended up interviewing for a position with The Raine Study at the Telethon Kids Institute. At this point, serendipity played a part, and whilst I was considered too "overqualified" for the position I had interviewed for, my details were passed on to another team."

"It was like the stars aligned. I ended up working with Professor Fiona Stanley, as the Coordinator of the Developmental Pathways in WA Children Project – one of the first examples of large-scale data linkage in the world."

It was through her work at Telethon Kids Institute, interacting with multiple government agencies and data from across the health and community sectors, that Associate Professor Glauert had the idea to geographically map the data to create a "picture" of the health and wellbeing of children and young people.

"So much work around children and young people is conducted in silos. I really felt that we needed to change the mindset, we need to look at the whole, and we can do that by bringing data, and government, together."

As a first-of-its-kind initiative, The Ian Potter and Minderoo Foundations saw the value of the project and funded the creation of the WA Child Development Atlas to investigate factors leading to differences in health and developmental outcomes for children and young people.

The Atlas has also received additional support from The Ian Potter Foundation for further development and expansion.

Through comprehensive maps and linked data on child wellbeing, learning outcomes and health, the project provides unique insight into the areas of greatest need in WA for policymakers, service planning, and research.

"The Minderoo and The Ian Potter Foundations came on board because they could see there's actually a lot of applicability to this. They understood our vision, and supported it, which has been amazing."

> ❮ It was like the stars aligned. I ended up working with Professor Fiona Stanley, as the Coordinator of the Developmental Pathways in WA Children Project – one of the first examples of large-scale data linkage in the world. ❯

The Raine Study team

Recognising the vast amounts of data available across Australia, Associate Professor Glauert realised insights into many seemingly unsolvable child development issues could be found within information that had already been collected. It just needed to be linked and utilised.

"If we're going to look at the health and wellbeing of children, we need to look at more than just their health. We know that there are so many things that impact on children's lives, including their environment, family, education and socioeconomic status."

In addition to her work in data linkage, Associate Professor Glauert was recently appointed Scientific Director of The Raine Study which has recorded over 30 years' worth of expansive health and lifestyle data around a cohort first established in 1989. Supported by all five of WA's universities, Telethon Kids Institute, the Women and Infants Research Foundation, The Raine Medical Research Foundation, Lotterywest and most recently the Stan Perron Charitable Foundation, the study has enabled significant health and medical discoveries, setting international standards and having a lasting impact on child health outcomes around the world.

Speaking on the importance of both The Raine Study, and the WA Child Development Atlas, Associate Professor Glauert highlighted the imperative for data to be used to improve lives.

"WA is a world leader in terms of the data we have on health and wellbeing. Not only do we have some of the longest running cohorts, but we also have one of the most advanced data linkage systems. We need to unlock the potential of that data to make real change. "

"It's about democratising the data we have available on our citizens. It's data about us, so it should be used to improve our health and wellbeing. I think we have a moral obligation to do so."

Associate Professor Rebecca Glauert is also leading the Australian National Child Health and Development Atlas, with partners from across the country. The team are creating a centralised data asset which incorporates Commonwealth, State and non-government organization data relevant to Australian children and their health.

A HISTORY IN PICTURES:

Celebrating 90 Years of Winthrop Hall

By Terry Larder

It has played host to world-famous artists and actors, royalty, prime ministers, presidents, heads of state, as well as thousands of students and staff, and this year UWA's majestic Winthrop Hall celebrated its 90th anniversary. We asked Terry Larder, UWA historian, volunteer and tour guide, to illustrate its history with photos and facts you may not know.

Sir Alfred Langler

The mosaic masterpiece by Napier Waller on display in the foyer of Winthrop Hall acknowledges the achievements of Sir Alfred Langler. When Sir John Winthrop Hackett died in 1916, property values were greatly depressed by the Great War. However, with careful and masterful management Langler, the Executor and Trustee of Hackett's will reported to Senate in 1926, that owing to the post-war boom and with also the sale of West Australian newspaper that the Hackett bequest had quadrupled and was now capitalised to be £425,000 ($32 million today).

The Hall was redesigned due to poor soil quality

Following testing by the Engineering School to determine the bearing of the soil, it was decided to limit the load to two tons per square foot – meaning a re-design of the clock tower and parts of the Hall. The foundations are in sand with the water level just six meters below ground level. Below the water level there are beds of clay and of coarse grits.

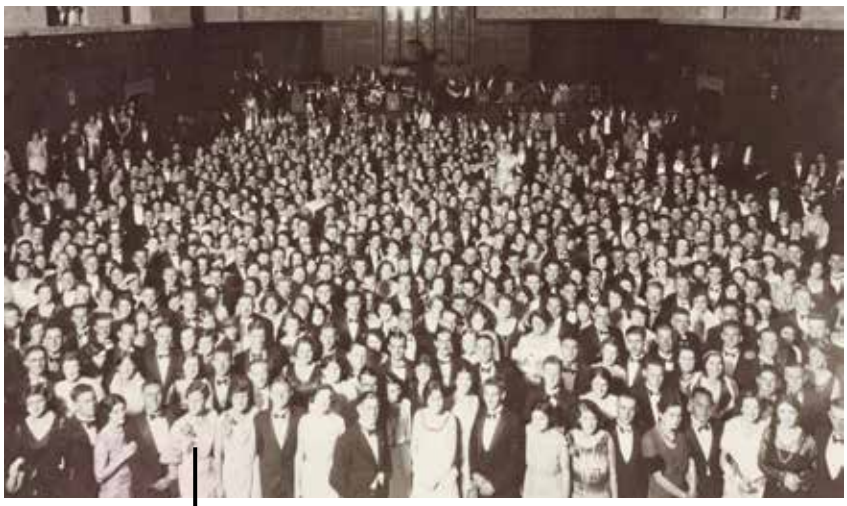
What Winthrop Hall looked like before the organ was installed

This photo was taken in 1954, one year after the Queen's coronation. Her Majesty visited the University and gave her maiden speech in Winthrop Hall.

This was taken ten years before the McGillivray bequest and the installation of the Walker organ in 1964. You will note there is a cartoon by Henry Holliday, which is framed in the screen behind the dais. Below the cartoon it is written "The weapons of our warfare are not carnal, but mighty through God for the pulling down of strongholds." This delicate artwork on paper is now housed in the Lawrence Wilson Art Gallery.

Ancient sandstone embellishes design

Winthrop Hall's inner wall is constructed of brick with the outer wall consisting of fine-grained, high-grade Tamala limestone. Less than two million years old, the limestone was transported from Coogee to the Crawley site, by horse and cart from 1926 to 1931. Donnybrook standstone, often beautifully marked is freely used round Winthrop Hall, the Great Gate and the Senate Chamber. This ancient sandstone is from the Cretaceous period (66m-145m), which predates the dinosaurs.



First Graduation Ball 1932, Winthrop Hall

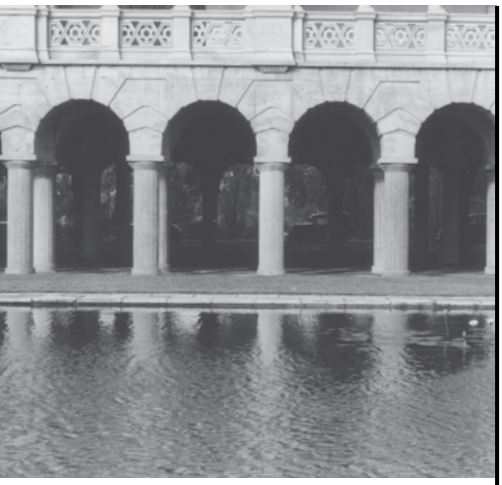
Little did these fresh young faces know that the 'dark clouds' of war would be only just seven years away, but here they are in fine celebration at their Graduation Ball held on 15 April 1932. All previous UWA graduations prior to the opening of Winthrop Hall were held in the Government House Ballroom.

Patricia Hackett, (pictured) representing her mother in April 1932

The opening of Winthrop Hall was a prestigious four-day event, including the opening ceremony, concerts and a graduation ceremony and ball from 13 – 16 April 1932.

Lady Hackett-Moulden, the widow of Sir John Winthrop Hackett – whom he married when he was 57 and she was 18 – was due to receive her Honorary Degree of Doctor of Laws at the opening ceremony. However, she could not attend due to the death of her second husband, the Mayor of Adelaide, Frank Moulden, a week earlier. Patricia Hackett accepted the Honorary Doctorate on her mother's behalf and was also presented with a key to Winthrop Hall. This key is now held in the University's archives.

Lady Hackett-Moulden was the first woman honorary doctorate of the University. UWA has bestowed a further 51 honorary doctorates to women since 1932.



The Undercroft

Designed as an open space and a meeting place for students, it also featured a small platform from which any student had the right to address other students and staff. One could only imagine the lively debates of politics that ensued at that time in the 1930s. The Undercroft was later enclosed to house the burgeoning library collection before the Reid Library was opened in 1964.

A VALUABLE AND CONTINUING CONNECTION

CELEBRATING UWA'S PROFESSORS EMERITI

To celebrate the vital contributions of Emeriti Professors – both new and existing – the University has established the UWA Emeriti Professors College.

The new body will ensure that our Emeritus Professors continue to receive the recognition they deserve for their valuable and longstanding service.

Announced by the Chancellor during last December's Academic Board dinner, the new College will formalise its engagement with the University – while building friendship and collegiality between members – through opportunities for social connection and ongoing intellectual projects.

An early goal is provision of a framework to assist in the continuation of research, teaching and mentoring by members of the College.

Visit **alumni.uwa.edu.au/emeriti-college** to find out more and read profiles of our 2021 Emeriti Professors, or email contact us via alumnirelations@uwa.edu.au

A small advisory group is driving the formation and ongoing nature of the College and we acknowledge their guidance to date:

Ms Fiona Allan, Chief Advancement Officer (Chair)

Professor Marc Tennant AM, Deputy Chair, Academic Board

Dr Kabilan Krishnasamy, University Academic Secretary

Emeritus Professor James Trevelyan

Emeritus Professor Jenny Gregory AM

Emeritus Professor Geoff Riley AM

Emeritus Professor Izan Izan

Mr Keiran Hargreaves, Associate Director, Alumni Engagement and Community Relations

Ms Jenn Parsons, Senior Alumni Engagement Manager

> ‘Having grown our use of virtual reality over the last four years, it is clear that it helps promote class engagement and enthusiasm.’

Virtual learning now a reality for STEM in schools

A new initiative from The University of Western Australia is using virtual reality and immersive learning to take school students into authentic science, technology, engineering and mathematics (STEM) experiences.

Karina Price, the founder of the initiative, said the vision is for STEM XR to become the go-to place for quality, curriculum-mapped STEM immersive reality content for educators, meeting the growing market demand for eduTech nationally and internationally.

“Currently, teachers struggle to bring the STEM curriculum to life,” Ms Price said.

“Ineffective STEM education has led to student disengagement and poor STEM literacy and is an area of concern and of government focus, not only in Australia but globally.”

Virtual and related immersive reality – collectively extended reality, or XR – technologies present an opportunity to enhance secondary STEM teaching and learning.

“Demand from educators for learning experiences that can create tangible links between STEM curriculum subject matter and the application of these STEM skills to real world challenges are present and growing,” Ms Price said.

“STEM XR is providing an education solution by offering immersive reality content built from real STEM research stories and applications.”

A previous iteration of VR learning by Ms Price is the Virtual Plant Cell program, which gives students an in-depth look at the inner workings of a plant while connecting them with how global agricultural challenges can be tackled through science innovation.

Virtual Plant Cell experiences are offered along with astrophysics and other STEM-related content as part of multiple learning modules included in STEM XR.

Across the nation, primary and secondary education has undergone strong reform to bring more digital technologies into the classroom and Penrhos College are working with UWA to bring STEM XR to the school.

Will Horwood, Head of Library and Digital Literacy at Penrhos, said the college had evolved its use of virtual reality technology over recent years and he was now excited to learn what added value a dedicated platform like STEM XR could bring.

“Having grown our use of virtual reality over the last four years, it is clear that it helps promote class engagement and enthusiasm, enabling students to retain information better,” Mr Horwood said.

Partnering with digital platform provider, Facilitate, and VR consultancy company, LuminaVR, UWA has ensured support for schools as they introduce STEM XR.

In the **frame**

Connected: our alumni, staff and students snapped at UWA events this year.
Stay in touch or update your details at:
alumni-update@uwa.edu.au

WELCOMING OUR **INTERNATIONAL STUDENTS**

YOUNG ALUMNI **MEET AND MINGLE**

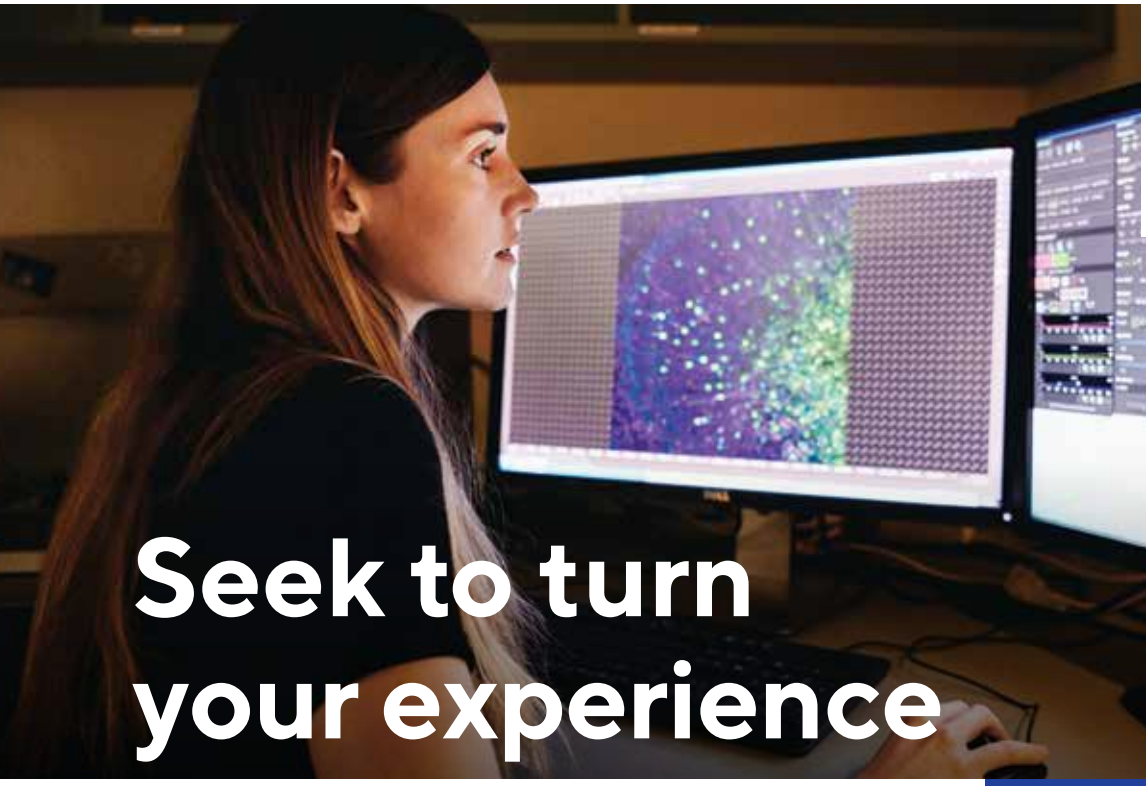
UWA SPECSAVERS PARTNERSHIP **LAUNCH EVENT AND OPENING OF THE CLINICAL OPTOMETRY ROOMS**

This event was to acknowledge and celebrate the partnership between UWA and Specsavers and officially launch the clinical rooms containing state-of-the-art equipment, optical supplies and educational materials, all generously donated by Specsavers to support Optometry students.

GRADUATION **HIGHLIGHTS**

MEDICAL SCHOOL MENTOR **THANK YOU EVENT**

GRAND CHALLENGES **SUMMIT**



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Wisdom

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