

Neurosciences

Robotic  
rehab

5

Management

From middle managers  
to authentic leaders

9

Chemical Engineering

Next-generation tech  
for recycling CO<sub>2</sub>

11

Music Research

Historical keyboards meet  
science and engineering

12

Issue One  
September 2018

# the *Search*

Defence:  
Innovation  
at the  
vanguard



Research at ECU aims to extend knowledge and improve the quality of life for Australians and people across the globe.

The University's research efforts have contributed to policy development, improving professional practice and delivering tangible outcomes.

Under the *Strategic Plan 2017-2021*, ECU is committed to **advancing research and knowledge translation** through:

- growth in research capacity and culture
- extensive research collaboration
- increased knowledge translation
- growth in research training.

**4 School of Nursing and Midwifery**

My Hip Journey – eHealth program to improve patient outcomes



**14 School of Medical and Health Sciences**

Overhauling rehabilitation services to empower stroke and brain-injury patients



**22 Kurongkurl Katitjin**

Knowledge Centre the future of community engagement



# What's:Inside

<b>A message from the Deputy Vice-Chancellor (Research)</b>	<b>1</b>
<b>Research highlights</b>	<b>2</b>
<b>School of Medical and Health Sciences</b> Robotics for neurorehabilitation	<b>5</b>
<b>Building defence capability: Defending the nation through innovation</b>	<b>6</b>
<b>School of Science</b> Working together to solve crime	<b>8</b>
<b>School of Business and Law</b> Effective middle managers fundamental for workplace issues	<b>9</b>
<b>School of Arts and Humanities</b> On bereavement by suicide, stigma and meaning-making	<b>10</b>
<b>School of Engineering</b> Advancing Australia's role in carbon emissions reduction	<b>11</b>
<b>Western Australian Academy of Performing Arts</b> The gift of life for historical keyboard instruments	<b>12</b>
<b>ECU Professorial Research Fellows</b>	<b>16</b>
<b>School of Education</b> Waving not drowning	<b>20</b>
<b>On the rise: Early and mid-career researchers</b>	<b>24</b>
<b>Research for the real world: Innovation and commercialisation</b>	<b>26</b>
<b>Engaging with industry</b>	<b>28</b>
<b>Support services for research staff and students</b>	<b>29</b>

# A message from the Deputy Vice-Chancellor {Research} Edith Cowan University

As part of the vibrant community at Edith Cowan University (ECU), our researchers engage in diverse areas of research focus, with multidisciplinary teams achieving extraordinary outcomes. I am delighted to have joined the University at this exciting time, with its world-quality research that engages with its communities and stakeholders to have real-world impact.

The *ECU Strategic Plan 2017–2021* sets ambitious targets to further develop our research. This priority is reflected in the signs of a positive trajectory in the international university rankings. The 2018 *Times Higher Education* (THE) Young University Rankings position ECU once again in the top 150 under 50. Already in the top five per cent of universities in the world, we expect to reach our target THE rankings of top 100 in the Young University Rankings and to be among the top 500 in World University Rankings by 2021.

Among the significant achievements towards meeting these targets is the commencement early in 2018 of former Air Vice-Marshal Andrew Dowse AO as Director, Defence Research and Engagement. Dr Dowse has been tasked with identifying research areas across ECU with significant defence capabilities, and developing stronger partnerships with the defence sector. A broader range of relevant research will boost ECU's contribution to advancing global defence and national security research efforts.

Our research strength in cyber security evidences ECU's capability to support defence priorities. The federally funded \$50 million Cyber Security Cooperative Research Centre (CRC) officially opened in April at the Joondalup Campus. ECU, along with the Western Australia Government, is a lead partner in the new CRC, which brings together 25 industry, research and government partners to leverage a further \$89 million over seven years.

In a world-first, Professor Mel Ziman and her team at the ECU Melanoma Research Group have developed a blood test capable of detecting melanoma in its early stages, when it is treatable, improving survival rates of the disease.

At the newly opened NeuroRehabilitation and Robotics Laboratory at the Joondalup Campus, neuroscientist Professor Dylan Edwards is helping people who have suffered neurological damage to move with robotic neurorehabilitation.

Professor Edwards is among our esteemed cohort of international Professorial Research Fellows appointed by ECU, as part of the University's commitment to rapidly expand our research activity.



**Professor  
Caroline Finch AO**

September 2018

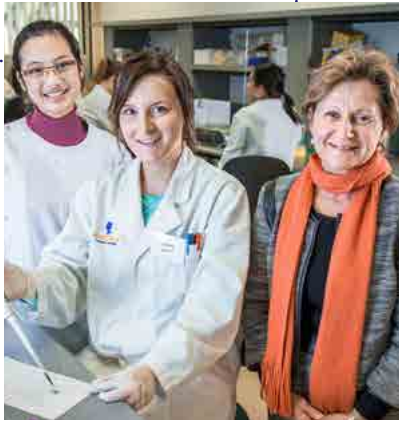
2018 TIMES HIGHER  
EDUCATION YOUNG  
UNIVERSITY RANKINGS  
WORLD'S TOP

**150**  
UNDER  
**50**

We are a young university, committed to growing ECU's research and innovation outcomes through increased research outputs of high quality. Our commitment is evidenced in the exciting research projects featured in this new-look publication, released just in time for ECU Research Week.

Marking its 10th year in 2018, this year's Research Week will focus on how we can link and collaborate with research partners, industry and the broader community. It will be held between 10 and 14 September in celebration of the ways ECU research makes a difference in the community. I invite you to join us during Research Week, and to learn more about our passionate researchers and their world-changing research through the stories inside, which I am proud to share with you.

# Research highlights



Professor Mel Ziman (R)

School of Medical and Health Sciences

## Blood-based biomarkers: diagnosis of melanoma through a blood test

Professor Mel Ziman, Director  
ECU Melanoma Research Group

Melanoma is one of Australia's most common cancers, with 14,000 diagnoses per year and almost 2,000 Australians dying annually because the diagnosis often comes too late. In a world-first, ECU researchers have developed a blood test (MelDx<sup>®</sup>) capable of detecting melanoma in its very early stages. The blood test works by detecting the autoantibodies the body produces in response to the melanoma when the cancer first develops, making detection before it spreads, and when it is still treatable, possible. A three-year follow-up clinical trial is underway, with a blood test anticipated to be in use in pathology clinics shortly afterwards, if findings are successful. The MelDx<sup>®</sup> blood test has been submitted for an international patent. Its development was funded by a \$452,000 grant from the National Health and Medical Research Council (NHMRC). A \$200,000 grant from Tour de Cure Australia will be used to progress this research. Further funding is being sought to develop the blood test into a commercial product.

School of Arts and Humanities

## Crime Stoppers: an agenda for continued improvement

Associate Professor Pamela Henry  
and Nikki Rajakaruna, Sellenger Centre

Crime Stoppers initiatives have developed rapidly across the world. It is a not-for-profit, community-based organisation, overseen by a Board of Directors. The principal objectives are to assist police and the community by providing a vehicle which enables the public to report information about crime anonymously. However, very little research has considered Crime Stoppers' effectiveness as an intelligence-gathering tool. The Sellenger Centre, in partnership with Crime Stoppers Western Australia and the Western Australia Police Force are engaged in research considering the relevance and effectiveness of current Crime Stoppers models across Australia. This will provide the necessary evidence base to support and enact changes to ensure the program's continuous improvement and sustainability. Findings to date show the community trusts the anonymity provided by Crime Stoppers. More than 1,000 reports weekly are made regarding criminal activity, and of those approximately seven out of every ten are deemed valuable for police investigation purposes.

School of Business and Law

## Strategic Asset Management Planning (SAMP)

Professor Kerry Brown, Centre for  
Innovative Practice

Co-investigator: Adjunct Professor Robyn Keast

Public assets are essential to deliver necessary services for the continued advancement, prosperity and overall liveability of communities. However, changing social and economic factors and environmental conditions are challenging current service delivery approaches, and can potentially impact how an organisation's assets are configured to deliver those services effectively. Commissioned by Queensland Government, this research developed a SAMP framework aimed at improving

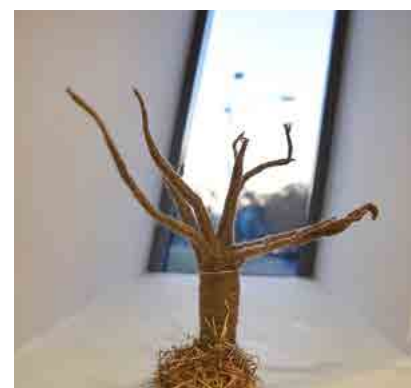
management of Queensland's public assets. By implementing SAMPs at the agency level, the state can achieve its aim to optimise the benefits from its asset investment and better serve the community. The established framework enables this process, informing budget decision-making at agency and whole-of-government levels through a strategic, robust investment prioritisation process to reflect asset needs into the future. It has been endorsed and adopted by the Queensland Government and forms part of the tools for developing SAMPs by Queensland departments and agencies.

School of Education

## Yokayi Waarbiny Wer Malayin Djin-Djin (Celebrating Art and Cultural Spirit)

Dr Julia Morris

The most recent Closing the Gap report shows Indigenous school attendance is still significantly lower than non-Indigenous student attendance; however, mentoring and other programs have made progress to halving the gap in year 12 or equivalent. This research evaluates an existing program offered to Indigenous female students at a WA secondary school, which uses the arts to promote learning about culture and culminates in a public annual exhibition of the students' works. A long-term vision for the program is to improve engagement at school and retention to year 12 through positive arts experiences. Evaluation of student data shows opportunities for collaboration, developing communication skills and relationship-building are key benefits of the program and enhance students' engagement in school more broadly. The ongoing longitudinal evaluation gives Indigenous students a voice in shaping the program to enrich their educational experience.



## School of Engineering

## Wireless sensor networks for environmental monitoring

Professor Daryoush Habibi,  
Associate Professor Iftekhar Ahmad,  
Mr Amro Qandour, Dr Viet Phung

Wireless sensor networks have revolutionised the ways in which we interact with the environment. The aim of this research is to develop a sensor network platform for environmental monitoring applications. These applications can be applied in biosecurity, surveillance in restricted areas, air and water quality and bushfire detection, as examples. The platform covers three major technical aspects: sensing, decision-making and communication. Data from the sensor network can be transmitted to end-users using wired or wireless communication infrastructures, and can be tailored for access from computers, mobile phones or other communication devices. A project funded by Water Corporation will customise the developed sensor network platform for a ground-based surveillance system for its catchments. The customisable platform can be applied more broadly in the public and private sectors.



Michael Lohr

## School of Science

## Wildlife poisoning by rat bait: an investigation of the Southern Boobook owl

PhD candidate Michael Lohr, Centre for Ecosystems Management

Rat baits can be useful in protecting crops, reducing the spread of disease and eliminating rodents from households. They are freely available to Australian homeowners and are used liberally by pest controllers.

However, their toxicity has potentially deadly consequences for native predatory animals who eat rats and mice poisoned by the baits. This research focuses on the lethal poisoning of Australia's smallest and most common owl species, the Southern Boobook owl, from exposure to rat poisons which are restricted in other countries. When an owl, or other predator, consumes a rat or mouse that has fed on bait, they are consuming toxins that will stay in their system for more than 200 days. As more poisoned prey are eaten, the toxic load in the liver increases until the wildlife consume a fatal dose. The research will help inform an ongoing government review of second-generation rodenticides in Australia.

## School of Nursing and Midwifery

## What predicts regression from pre-diabetes to normal glucose regulation?

Lisa Whitehead

*Investigators: Kirsten Coppell, Jeremy Krebs, Tony Merriman, Andrew Gray, Joanna Norton, Kiri Sharp, Trudy Sullivan – University of Otago; Sally Abel-Kaupapa Consulting; Leigh Perreault – University of Denver; David Tipene-Leach – Eastern Institute of Technology*

A diagnosis of prediabetes – a condition highly likely to progress to diabetes if left untreated – is often a shock for people. This research examines factors that predict regression from prediabetes to normoglycaemia (normal blood sugar). It involves a nurse-led dietary intervention to see how best to support people to make lifestyle changes to prevent them developing type 2 diabetes. The study will explore the impact of a dietary intervention, delivered by nurses in the clinical setting, including assessing genetic predisposition, cost-effectiveness and the factors contributing to progression to type 2 *Diabetes mellitus* or regression to normoglycaemia. The three-year collaborative study, awarded \$1.1 million from the Health Research Council of New Zealand (NZ), follows a 2015 pilot funded by the Ministry of Health NZ, which reported a significant decrease in weight following participation in the practice nurse-led intervention.



Dr Stuart James

Western Australian Academy of Performing Arts (WAAPA)

## 3D sonification techniques in virtual reality applications

Dr Stuart James

The potential of 3D sound to offer enhanced virtual reality experiences is an overlooked area currently being investigated by ECU Early Career Research grant recipient Dr Stuart James. This technology is also being applied in the development of commercial products to assist the vision-impaired in 'seeing' and navigating their environment through sound. Leveraging the new sound sonification laboratory set up within ECU, the research aims to develop and refine new audio-visual software solutions that use motion parallax for driving real-time sonification of the immediate physical environment. Dr James's research contributes significantly to WAAPA's research and teaching strengths in composition and music technology, where composer-researchers apply recent technological developments in the creation of new music and sound art. Indicative of this success is WAAPA's hosting of the Australasian Computer Music Conference (6-9 December 2018) as part of the 41<sup>st</sup> Musicological Society of Australia Annual Conference.

# My Hip Journey: eHealth program to improve patient health outcomes



By improving access to information and providing step-by-step support, researchers are hoping to significantly improve health outcomes for patients undergoing hip surgery.

ECU researchers in the School of Nursing and Midwifery are working in collaboration with a multidisciplinary research team at Hollywood Private Hospital to conduct a randomised control trial to compare the outcomes and cost of using an eHealth program to support a patient's recovery from hip surgery, with standard care.

The online program 'My Hip Journey' was developed by a multidisciplinary team of clinicians (nurses, physiotherapists, occupational therapists, dietitians and pain specialists), researchers and consumer representatives. The program delivers resources including exercise videos, fact sheets, forms and activities to support patients undergoing hip surgery in their pre-operative preparation, post-operative care and post-discharge recovery. Patients can access the program any time using personal electronic devices such as tablets or smart phones.

Patients are encouraged to log in daily from two weeks prior to surgery to 30 days after surgery. They can invite family members or carers and community health professionals to also log into the program to learn about their care.

Dr Rosemary Saunders, ECU-Hollywood Private Hospital Research Fellow, who is leading the research says: "It may be difficult for some patients to digest a broad range of information in a single booklet, whereas patients using the My Hip Journey can access relevant information via the eHealth program as they move along their journey, with information provided in text, video and images."

Patients can communicate with the health professional team at the hospital via the platform and can access the program for up to 12 months post-surgery.

Recruitment into the trial commenced in January 2018 and initial results will be available in December 2018. Pending their outcome, the research team hopes to use feedback to improve and further develop the eHealth program.

"If the program is successful, it can easily be adapted to suit other orthopaedic surgeries. Additionally, if found to be effective, the research group will conduct a cost-benefit analysis to understand whether it is feasible for hospitals to invest in the program," Dr Saunders says.

"Building a relationship and collaborating with an innovative industry partner in Hollywood Private Hospital (through Ramsay Health Care) has provided an opportunity for the research to be practical and to have an impact on the broader community.

"It has opened opportunities for research in a number of other areas, and is helping to build future

EXCELLENCE IN RESEARCH  
AUSTRALIA  
(ERA) 2015 RATING

5

WELL ABOVE  
WORLD STANDARD  
NURSING

research capacity at the School of Nursing and Midwifery and Hollywood Private Hospital."

Karen Gullick, Director of Clinical Services at Hollywood Private Hospital, highly values the collaboration with the school and sees it as an important relationship for the future.

"We're excited to launch this trial and hope the program proves to be a valuable tool for patients undergoing hip replacement surgery," Ms Gullick says.

"We look forward to receiving patients' feedback and learning if this type of program enhances their experience.

"Ideally we hope to improve outcomes and create a smoother process for our patients. In the long term, we would like the program to be an example of best practice, and for the My Hip Journey to be rolled out nationally."

# Robotics for neurorehabilitation

Stroke, traumatic brain injury or spinal cord injury can have large impacts on the ability to move independently. Research focusing on the use of robotics for rehabilitation could hold the key to effective treatments.

In a new laboratory at ECU, Professor Dylan Edwards uses robotic therapy to better understand issues of mobility in people who have suffered a stroke, traumatic brain injury or spinal cord injury.

Robotic therapy, he says, is likely to be an effective treatment in the future.

Professor Edwards is Director of the [NeuroRehabilitation and Robotics Laboratory](#), launched early in 2018.

Located at ECU's Joondalup Campus, the laboratory is home to Australia's first KINARM Exoskeleton.

The KINARM – valued at \$300,000 – combines robotics and virtual reality. The robotic machinery allows researchers to study upper-arm voluntary motor control, and quantify and provide a broad range of hand and joint-based information.

“The KINARM allows us to examine how someone is moving in a much more detailed way, allowing us to design more targeted rehabilitation programs for patients,” Professor Edwards explains.

As part of the research, Professor Edwards seeks to develop the understanding of these conditions, which will lead to the design of new interventions that will aid recovery.

“Giving someone even a small amount of movement back after they have suffered neurological damage can be extremely powerful,” he says.

“Helping someone who has suffered a spinal injury to simply turn the pages of a book may not sound like much, but it can make the world of difference to the individual.”

Professor Edwards and his research team at the laboratory are collaborating with St John of God Midland Hospital and Osborne Park Hospital to follow stroke patients through their admission, treatment and recovery.

“Working with the hospitals provides the research team with a great opportunity to track patients throughout their journey, which will lead to better research outcomes,” Professor Edwards says.

The repetition of exercises is critical for patients to regain movement following stroke or spinal injury. The advantage of using robotics is that the robot can repeatedly perform the same, precise exercises with the patient, without making the patient or therapist tired.

Considering the limited effectiveness of current drugs and available devices, Professor Edwards says

ERA  
2015 RATING  
**5**  
WELL ABOVE  
WORLD STANDARD  
NEUROSCIENCES

the use of robotic therapy will be fundamental to the motor recovery of people affected by stroke, brain injury or spinal cord injury.

The initial goal is to provide the services to the Western Australian community, and then more broadly across Australia. Ultimately, patients would travel to Perth to receive neurorehabilitation not available in their home countries.

“This lab will provide a unique service within Australia and would promote Perth as a destination for Australians and internationally for people with neurological impairment to receive highly specialised and cutting-edge treatment,” Professor Dylan says.

The research aims to develop ECU as a leader in robotic neurorehabilitation.

2018 QS WORLD  
UNIVERSITY  
RANKINGS  
TOP  
**150**  
UNDER  
**50**

# Defending the Nation through *Innovation*

Through innovative education and research programs, ECU is strengthening its defence capability in support of Australia's national security.



Universities are a key source of innovation for the Australian Government's \$200 billion commitment to expand and sharpen Australian Defence Force (ADF) capabilities over the next decade.

Specifically so is the government's \$640 million commitment to the Defence Innovation Hub to prototype and integrate innovative solutions for the ADF, and the further \$730 million for emerging technologies through the Next Generation Technologies Fund.

In response, ECU has strategically moved to the frontlines. The University will build on its established reputation for supporting national security and defence objectives through expertise, and research and education programs.

The Defence Research and Engagement team was established at ECU in 2018 to foster innovation and formalise the University's delivery of support to the ADF by developing stronger relationships with the Department of Defence, industry and other universities.

Based at the Joondalup Campus, the team aligns with the objectives of the Next Generation Technologies Fund and Defence Innovation Hub, and with those of Defence West, the Western Australian government body established in May 2017 to secure more defence-related investment in WA.

As one of a few universities nationally to establish an area dedicated to defence research and engagement, ECU is better enabled to more broadly serve the defence sector's needs by identifying areas of research across the University with the potential to support and increase their defence capability.

Leading the push is ADF veteran Dr Andrew Dowse AO.

In a distinguished career spanning almost four decades, Dr Dowse reached the rank of Air Vice-Marshal in his role as Head of ICT Operations and Strategic J6 with the Department of Defence. His prior positions included Director General Strategy and Planning, in the Royal Australian Air Force, and Director General Capability Development with the Department of Defence.

"ECU's core expertise in cyber security, health, maritime systems and conflict studies have been identified for these areas' increased capability and potential to deliver results for the ADF in direct response to its needs, be it through research, technologies, methodologies, advice or education," Dr Dowse says.

"Cyber security is a critical focus area for Defence as reflected in the last two Defence White Papers. From logistics to warfighting, every defence task and operation depends on having information systems that are secure, assured and resilient.

”  
**ECU is already  
 delivering bespoke  
 training  
 for defence.**

"ECU is already delivering bespoke training for defence. Specialised training in cyber security knowledge and techniques for selected serving personnel have been delivered over five years."

ECU's strengths in health sciences are also well poised to support defence efforts in a broad range of human performance areas. These include proactive health management for military personnel, task-oriented strengthening and conditioning, injury prevention, and the multidisciplinary approach to the prevention and treatment of stress-related conditions.

One example is the University's exercise science program, where human movement research could boost fitness training outcomes for Australia's Army.

In maritime engineering, programs of research and education have significant potential to assist in local ship-building and maintenance, in response to the Australian Government's direction for sovereign industry capability in the maritime sector.

Dr Dowse adds that the School of Business and Law is pursuing the establishment of a conflict studies research group, which will be at the core of an associated program under ECU's defence plan.

Further prospective initiatives of relevance to defence include other disciplines in engineering and science research and development, robotics and autonomous systems, and environmental studies.

"These areas are a latent source of additional defence support activities in the future," Dr Dowse says.

"The Australian Defence Force is and will continue to be a small force in comparison with its geography and its ambition to influence regional and global stability. However, it can achieve considerable weight with a comparative advantage in capability through innovative technology and training.

"ECU is well poised to assist defence in this journey."

# Working together to solve *crime*

As technology advances and crimes become more complex, law enforcement organisations are relying on solving crimes through analysing digital trace.

Responding to the difficulty of solving complex crimes in a digital era, Professor Craig Valli and the team at the [ECU Security Research Institute](#) (SRI) have been working with the Western Australia Police Force (WA Police) to apply their research and understanding of technology and systems.

While the partnership with WA Police has been ongoing since 2002, Professor Valli says the significance of cyber-enabled crime is growing.

“We are responding to real-world problems. All crimes have a digital trace, so the Security Research Institute is applying its research and knowledge of systems to assist WA Police,” Professor Valli says.

Work carried out by Professor Valli and his team includes analysing devices and information, disrupting networks, and developing training and curriculum for WA Police staff.

With mobile phones playing a fundamental role in organised crime and often used as evidence, Professor Valli says the SRI applies its knowledge and skills to help WA Police access critical information from these devices.

“Criminals often use new technology to their advantage. Our role is to stay ahead of the game with regards to understanding how these technologies work and how we can apply our research and knowledge to help solve crime,” he says.

“  
We are  
responding  
to real-world  
problems.”

Additionally, the SRI has been supporting WA Police with curriculum development for training purposes.

The relationship between ECU and WA Police has developed over the past 17 years and has evolved into a partnership with mutual benefits.

“It is a synergistic relationship in terms of knowledge exchange,” Professor Valli says.

Through working with WA Police on a range of criminal cases, and on developing training, the SRI has had an opportunity to learn from WA Police’s technical skills and procedures.

In addition to knowledge transfer, the partnership has ensured that the SRI’s research is applied, pragmatic and useful to the broader community.

“Our research is having a real impact on real problems,” Professor Valli says.

Collaboration with a police force and a group with cyber security expertise, similar to the SRI, is beneficial, he adds, because it opens opportunity for further developing expertise and knowledge transfer.

“As the partnership continues to strengthen, our goal is to have more ECU Master and PhD students working on police-related matters, which will provide students with important industry experience,” Professor Valli says.

“While cyber-enabled crime continues to develop, the collaboration between WA Police and the Security Research Institute will ensure both parties are across new technologies and systems, with knowledge and skills shared to benefit the broader community.”



# Effective middle managers fundamental for workplace issues



Professor  
Stephen  
Teo

Middle managers need additional training and resources to better deal with organisational change and negative behaviour in the workplace, says ECU's Professor Stephen Teo.

Problems in the workplace are either avoided or poorly managed, with senior management often pressuring middle managers to handle workplace issues they aren't prepared for.

Professor of Work and Performance Stephen Teo says the best way forward is to build a healthy organisational safety culture and work with employees to develop personal resilience.

Seeking to further understand the causes and impact of negative behaviour in the workplace, Professor Teo conducted an Australia-wide survey of nurses, which found bullying to be a common problem.

However, the results found that this negative behaviour was minimised in hospitals where line managers demonstrated 'authentic leadership' behaviours.

The study, conducted in 2017, highlighted that 59 per cent of the 230 nurses surveyed recounted witnessing bullying in their workplace, while 48 per cent reported being a target.

Of these, 39 per cent experienced bullying now and then, while 12 per cent were affected several times each week.

The study also considered the impact of incivility, which is negative behaviour that is subtler than workplace bullying.

Professor Teo says nurses who witnessed or experienced incivility were 52 per cent more likely to report psychological stress – an issue which can lead to health problems and increased turnover, and impact productivity.

While workplace bullying is unlikely to disappear overnight, Professor Teo says investing in training and resources for middle managers will play a fundamental role in minimising the negative impacts of incivility and bullying.

Results from the study showed that in workplaces where line managers demonstrated authentic leadership, nurses' perception of incivility was 37.5 per cent lower and led to reduced stressed.

"There is a trickle-down effect of supervisors' authentic leadership behaviours as employees model their ethical behaviours at work," Professor Teo says.

"If middle managers had better training on how to deal with negative behaviour and how to better support their staff in being resilient to organisational change and negative workplace events, we should see a positive change in the workplace."

“  
59 per cent of the 230 nurses surveyed recounted witnessing bullying.

Having conducted a range of studies on the cause and impact of negative behaviour and poor management, Professor Teo is now focusing on researching the impact of positive psychology and resilience in the workplace.

"I am interested to find out how much psychological hardiness and a positive organisational safety culture can contribute to how employees deal with negative events in the workplace," he says.

"If we can't prevent all workplace issues, we need to look at behaviours and interventions that will help employees navigate these challenges."

# On bereavement by suicide, stigma and meaning-making

With an increasing number of deaths by suicide each year, Dr Colleen Carlon, from ECU's South West Campus, says it is important society supports the people bereaved by suicide.

Suicide Prevention Australia (SPA) is a national organisation that works to provide leadership and capacity-building for suicide prevention. A central goal for the organisation is to "develop a community that knows how to ask for help and how to give help." Vital to reaching this goal is recognising the value that people's 'lived' experience of suicide brings to the community's understanding of suicide and suicide prevention.

Dr Colleen Carlon's research focuses on the everyday experiences of being bereaved by suicide and seeks to develop understandings of the role stigma plays in meaning-making processes of suicide bereavement. She is drawing on her personal experience of being bereaved by suicide to explore the meanings embedded in our public discussions on suicide.

"Community engagement with suicide prevention is known to support meaning-making processes for people bereaved by suicide," Dr Carlon says.

"My research of the experience of being bereaved by suicide seeks to inform our capacity as a community to talk about suicide and suicide grief."

Dr Carlon commenced research for the project 'The everyday experience of being bereaved by suicide', in January 2017. She presented preliminary findings at the National Suicide Prevention Conference, hosted by SPA, in July 2017.

As a person bereaved by suicide, Dr Carlon used three narratives from her personal experience – two of media reporting of suicide and one of community-based suicide prevention messages – to explore the role societal discourses play in shaping the everyday experience of people who grieve a person's death by suicide.

"The research is about questioning the meanings that society attaches to suicide, to add to the ways in which we can support people bereaved by suicide in their own meaning-making processes," Dr Carlon says.

"Meaning-making for the bereaved is important, and it is critical that society acknowledges this as an ongoing process, an everyday experience, instead of viewing it as something that needs to be treated for a period of time."

“

It is critical that society acknowledges meaning-making for the bereaved as an ongoing process.

Dr Carlon continues to develop ideas of meaning-making and stigma in relation to this experience for a paper that explores the way societal-level meanings of suicide shape an individual's experiences.

She is keen to collaborate with government and industry to ensure the research is relevant and has the potential to improve policy and services.

"I've been approached by a support service provider who may be interested in working together to develop the research further and see how it can benefit the broader community," she says.

For more information visit [Suicide Prevention Australia: \[suicidepreventionaust.org/projects/learning-lived-experience\]\(http://suicidepreventionaust.org/projects/learning-lived-experience\)](http://SuicidePreventionAustralia.org/projects/learning-lived-experience)

*If this article raises personal issues, please telephone [Lifeline Australia](http://LifelineAustralia.org) on 13 11 14 for crisis support and suicide prevention.*

# Advancing Australia's role in carbon emissions reduction



Reducing emissions is a focus globally for environmental and economic reasons and, says ECU's Professor of Chemical Engineering Hongqi Sun, international collaboration will be fundamental to the successful development of renewable energy technologies.

The challenge to develop renewable energy technologies to reduce carbon emissions has been at the heart of research for Professor Hongqi Sun, who began work in 2017 on the Australian Research Centre (ARC) Discovery Project 'Integrated photo and thermal catalysis for economic CO<sub>2</sub> conversion to fuels'.

The project, due for completion in 2019, focuses on cutting-edge technologies to bridge the gap between traditional fossil fuels and renewable energy.

The research project proposes an integrated process for simultaneous photo and thermal catalytic conversion of CO<sub>2</sub> and water vapour to hydrocarbon fuel and chemicals, using solar light and waste heat from flue gas.

"This is the next-generation technology for fundamentally solving the energy crisis and the associated environmental issues regarding the use of fossil fuels," Professor Sun says.

"The proposed outcome is the development of a new process for recycling CO<sub>2</sub> in situ from flue gas into hydrocarbon as a fuel, via the utilisation of solar and waste heat energy as well as catalysis, providing a technology for CO<sub>2</sub> reduction."

While reduction of CO<sub>2</sub> is a significant benefit, Professor Sun says the research will have positive impacts on Australia's economy and the environment.

"The project is likely to advance Australia's leading role in the reduction of carbon emissions, clean energy production and nanotechnology," he says.

As part of the project, Professor Sun is working with Woodside Energy, Curtin University, CSIRO, Monash University, University of Queensland and a number of Chinese partners led by Nanjing Tech University – a collaboration between industry and academia he says will be key to the project's success.

In addition, Professor Sun is developing an Australia–China Joint Research Centre for Sustainable Gas Technologies, which has a proposed timeline of 2019 to 2021.

"Collaborating with international organisations through the proposed research centre is a great way of ensuring the research is relevant and practical for industry at a global level," he says.

“  
This is the  
next-generation  
technology for  
fundamentally  
solving the  
energy crisis.



# The gift of life for historical keyboard instruments

Gifted with a world-significant collection of historic keyboard instruments, the Western Australian Academy of Performing Arts (WAAPA) at ECU seeks to lead the world in historical keyboard instrument teaching and research.

Australian collector Stewart Symonds' keyboard instrument collection is widely recognised as one of the most significant in the world. Symonds gifted the collection to WAAPA in 2016. It comprises 140 pianos, dating from 1736 to 1874.

Significantly, the collection includes the First Fleet Piano – Australia's first piano, which arrived into Sydney on board the First Fleet in 1788.

WAAPA's Professor Geoffrey Lancaster says the collection will help to position the Academy as a hub for collaboration and innovation across disciplines.

While many of the pianos are not in playing order, WAAPA intends to restore and maintain the collection for both teaching and research purposes.

"The collection is of international significance and opens the door to both internal and external research opportunities for WAAPA," Professor Lancaster says.

Working with the School of Engineering, Professor Lancaster says there is a potential collaborative research opportunity to replace components in these earlier instruments through 3D printing.

Developing an archive of CAD (Computer Aided Design) plans to replicate historical pianos using automated manufacturing techniques – like CNC (Computer Numerical Control) machining by pre-programmed computers – is also a possibility.

"We are hoping to research the acoustic and physical properties of damaged or worn components in the instruments, and then work with the engineering team to design and produce an equivalent 3D printed version," Professor Lancaster says.

While the project is in its early days, the cross-disciplinary research is likely to be the beginning of a series of collaborations. These include opportunities for international research collaborations in organology, musicology, acoustics, engineering, conservation, education and design.

There is also potential to research and engineer new materials to replace the baleen and ivory used for components in historical pianos.

"Materials conservation is the intersection of art and science. By using modern technology and combining expertise from engineering and science, we can build on the original design innovations that made them special, and develop the materials that will keep historical pianos alive," Professor Lancaster says.

The Symonds collection at WAAPA provides an outstanding opportunity for students to hear and work with historical instruments. Music students will learn to develop the specialised

techniques necessary to play historical instruments. Scholars from other disciplines will be able to work with the pianos as design objects.

Each instrument has a unique story. Since joining ECU, Professor Lancaster has published two monographs detailing the history and provenance of pianos in the collection, helping to reveal new details about their makers and their economic and social impact.

With WAAPA's stewardship of the collection, ECU is ideally placed to become a major centre for teaching, research and historically inspired performance using the instruments.

Professor Lancaster says ECU will be part of an illustrious network comprising some of the most significant tertiary music institutions in the world, each with important historical keyboard instrument collections.

These institutions include the Royal Academy of Music, in London, The University of Edinburgh, the Conservatory of Amsterdam and Cornell University, in Ithaca, New York.

"The First Fleet Piano is of world significance and the research, teaching and performance opportunities that come with having it and the Symonds collection sitting with WAAPA are very exciting," Professor Lancaster says.

”  
The collection  
will help to  
position the  
Academy  
as a hub for  
collaboration.





Overhauling  
rehabilitation  
services to *empower*  
stroke and brain  
injury patients

Clinical trials seek  
to overhaul  
rehabilitation services  
for patients early in  
their recovery after  
stroke and traumatic  
brain injury.



Regaining independence and the ability to communicate are important milestones for patients recovering from stroke or traumatic brain injury. But with access to rehabilitation services often limited, some patients struggle to regain their quality of life.

Improving rehabilitation services for people following stroke and traumatic brain injury is high on the agenda for Professor Beth Armstrong and her team at the Communication Disorders Research Group at ECU.

Professor Armstrong says ensuring patients feel empowered when they return home and can communicate effectively is critical to reducing depression and withdrawal from society.

As the leader of two research studies into rehabilitation services, Professor Armstrong hopes the research will have a positive impact on the recovery of patients and at a policy level.

The [Very Early Rehabilitation in SpeEch \(VERSE\) Trial for Aphasia after Stroke](#) is a NHMRC-funded research project, which is based on enhancing the natural language and speech recovery processes of the brain.

The project seeks to help the rehabilitation of stroke patients and addresses the principles of 'use it or lose it' and 'use it the right way'.

"We want to change people's ability to communicate early in their recovery so that they don't become dependent on others to communicate for them, and therefore gain more independence," Professor Armstrong says.

Having received additional funding through the Tavistock Trust for Aphasia, and ECU-matched funding to support the clinical trial, recruitment for the VERSE program ended in February 2018, with results to be released in October.

Professor Armstrong and her team have developed a best-practice therapy package that provides upwards of 20 hours of therapy in the early stages of rehabilitation.

VERSE Clinical Director Associate Professor Erin Godecke says: "Traditionally, patients might receive around 14 minutes of therapy in the first few weeks."

Designed so that patients can participate from any location, VERSE's therapy package can be delivered via tele-rehab, with some patients choosing to access the therapy via Skype.

The aim, says Associate Professor Godecke, is to improve service delivery, so it is important the package allows patients to 'up and go' and ensures they receive effective therapy early in their recovery.

"If we can assist stroke patients early in their rehabilitation, they will be less dependent on the healthcare system and not as likely to lose their independence or withdraw from the community," she says.

The communication therapy provided through VERSE heralds a significant change. If the intervention is successful, the team hopes to develop the therapy as best practice and build it into policy at the national level.

With several clinical trial sites in Australia and two in New Zealand comprising 246 participants, at the project's completion VERSE will be the largest trial of this kind in the Asia-Pacific region.

**Building on ECU's Missing Voices project**, Professor Beth Armstrong and her research team received NHMRC funding in late 2016 for their project '[Enhancing rehabilitation for brain injury for Aboriginal Australians: Healing Right Way](#)'.

While VERSE focuses on improving patients' speech impairment through therapy, this research project aims to increase access to rehabilitation services for Aboriginal brain-injury survivors and improve their quality of life.

Professor Armstrong says hospital staff will be trained in cultural security practice surrounding brain injury specifically, and Aboriginal brain injury coordinators will be employed across Western Australia as part of the intervention.

"The Missing Voices project confirmed that Aboriginal patients rarely receive rehabilitation after they've left the hospital," Professor Armstrong says.

"We are hoping the Aboriginal coordinator will act as a bridge between the hospital and community, and will help patients navigate the healthcare system."

With 13 partners and the clinical trial expected to be completed in 2021, the research team anticipates an increased uptake of rehabilitation services. Such increase would lead, it is hoped, the Department of Health and Aboriginal community-controlled health organisations to continue employing liaison coordinators across the country.

If Aboriginal brain injury patients have better access to rehabilitation services, it will not only improve the quality of life for the patient, but also help their family and the broader community to work through challenges with them.

"It's vital we ensure culturally secure rehabilitation services for Aboriginal brain injury survivors across metropolitan, regional, rural and remote areas," Professor Armstrong says.

"As part of our broader program of research, we want to promote improved community participation and quality of life for all brain injury survivors, who are often elusive because of the inherent isolating nature of their impairments."

**“It is important the package ensures patients receive effective therapy early in their recovery.”**

An overhead photograph of three individuals seated around a white table in a study or office environment. The person on the left is wearing a bright yellow-green safety vest over a blue shirt and is looking at a laptop. The person in the center is wearing a black top and glasses, also looking at a laptop. The person on the right is wearing a maroon shirt and is looking at an open book. The table is cluttered with several open books, two laptops, and a blue water bottle. The background is a plain, light-colored wall.

ECU

Professorial

Research

*Fellows*

ECU's Professorial Research Fellows are strengthening the University's dynamic research culture, helping to transform lives and change the world for the better.

Here, they tell us how.



School of Arts and Humanities

## Professor Paul Arthur

Chair in Digital Humanities and Social Sciences  
Director, Edith Cowan Centre for Global Issues

**Research focus:** the transformative impacts of technology in culture and society

*"Digital technologies are fundamentally changing human identity and social behaviours on a global scale, opening new opportunities for advanced research across all disciplines."*



School of Medical and Health Sciences

## Associate Professor Erin Godecke

Clinical Director, Very Early Rehabilitation in SpeEch (VERSE) Trial for Aphasia after Stroke

**Research focus:** very early aphasia recovery; improving outcomes in stroke care; the role of impairment-based aphasia therapy in recovery; complex intervention randomised controlled trials; treatment fidelity

*"My clinical practice inspires all my research. I'm passionate about improving the lives of people with aphasia and teaching allied health professionals that research is within their reach."*



School of Science

## Professor David Broadhurst

Professor of Chemometrics, Machine Learning and Applied Biostatistics  
Director, Centre for Integrative Metabolomics and Computational Biology

**Research focus:** metabolomics and computational systems biology applied to the discovery and monitoring of biochemical mechanisms related to exercise medicine, dietary intervention, sports science and biomarkers of pregnancy and early-life disease progression

*"Our team is eager to make a positive impact on the health and wellbeing of the people of Western Australia, and in global health with our national and international collaborators."*



School of Medical and Health Sciences

## Professor Jonathan Hodgson

Professor of Nutrition and Epidemiology  
NHMRC Senior Research Fellowship to conduct research on dietary approaches to enhance vascular health

**Research focus:** to better understand the impact of particular diets and dietary components on vascular health

*"My research program investigates why and how plant foods provide protection against cardiovascular disease. Outcomes connect several components of fruits and vegetables with better vascular health."*



School of Medical and Health Sciences

## Professor Dylan Edwards

Professor of Neuroscience

**Research focus:** motor rehabilitation after neurological injury (stroke, spinal cord injury and traumatic brain injury)

*"My research uses advanced technologies including robotics and transcranial magnetic stimulation to understand and promote recovery of function after neurological injury such as stroke."*



School of Business and Law

## Professor Sam Huang

Professor of Tourism and Services Marketing

**Research focus:** consumer behaviour in tourism; tour guides and guiding service; China tourism and hospitality issues

*"China is the world's largest international tourism source market. Studying Chinese tourist behaviours will help countries like Australia better harness the benefits of Chinese tourism."*

# ECU Professorial Research *Fellows*



School of Engineering

## Professor Stefan Iglauer

Professor of Petroleum Engineering

**Research focus:** petro-physics and interfacial phenomena, mainly at pore scale with a focus on CO<sub>2</sub> geo-sequestration and improved hydrocarbon recovery

*"In studying nanometre-scaled phenomena in fluid-saturated rocks, my research aims to improve hydrocarbon production and enable CO<sub>2</sub> geo-sequestration to mitigate global warming and reduce energy costs."*



School of Medical and Health Sciences

## Professor John Olynyk

Professor of Translational Medicine

**Research focus:** human liver disease and iron overload disorders

*"My research brings opportunities for new NHMRC-funded projects. These will result in new collaborations and opportunities for higher degree students to work with well-established research teams."*



Western Australian Academy of Performing Arts

## Professor Geoffrey Lancaster AM

Pioneer of the historical performance practice movement and of performance-led research

**Research focus:** historically informed 17<sup>th</sup>, 18<sup>th</sup> and early 19<sup>th</sup> century performance practice; the first fleet piano; curatorial and related studies; curriculum and pedagogy; the role of the piano in society

*"Music and instruments of the past are mirrors to our current values and unveil much truth about the human condition."*



School of Education

## Professor Dawn Penney

Professor of Physical Education

**Research focus:** education and sport policy; curriculum, pedagogy and assessment in health and physical education; equity and inclusion; leadership

*"A significant aspect of my work seeks to involve policy-makers, teachers, coaches and other agencies in rethinking how to best support and enhance participation and learning."*



School of Science

## Professor Pere Masqué

Professorial Chair in Environmental Radiochemistry

**Research focus:** the study of a variety of key global environmental processes in both the present day and geologic past, using a suite of stable and radioactive tracers, either natural or artificial, as novel proxies

*"Most of our research aims to understand the role of the oceans in sequestering CO<sub>2</sub> and helps to devise actions for climate change mitigation and adaptation."*



School of Medical and Health Sciences

## Professor Tom Riley

Professor of Microbiology

**Research focus:** the diagnosis, pathogenesis and epidemiology of infectious diseases in general, including healthcare-related infection, *Clostridium difficile* and 'One Health'

*"My current research focuses on the increase in community-acquired *Clostridium difficile* infection (spore-forming bacterium in the gastrointestinal tract) and takes a 'One Health' approach looking at production animals as reservoirs."*



School of Engineering

## Professor Hongqi Sun

Professor of Chemical Engineering  
Deputy Chair, ECU Radiation, Biosafety  
and Hazardous Substances Committee

**Research focus:** solar energy conversion and utilisation; novel catalysis; nanomaterials and nanotechnologies; advanced oxidation processes; fossil fuels upgrading

*"My research aims to solve the largest issue facing the planet – the future sustainability in energy and the environment, using novel catalysis on nanostructured materials."*



School of Medical and Health Sciences

## Professor Janet Taylor

Professor of Human Neurophysiology  
A Chief Investigator of NHMRC Program  
Grant, Motor Impairment

**Research focus:** the role of the central nervous system during muscle fatigue; plastic changes in the motor pathway with artificial stimulation or voluntary activity; perception of body movements on muscle forces

*"My work aims to understand the neural causes of weakness and fatigue in health and disease, and to identify ways to ameliorate these aspects of motor impairment."*



School of Science

## Professor David Suter

Professor of Computer Science

**Research focus:** computer vision and big-data analysis, specialising in robust statistical fitting, computational geometry and machine learning

*"Intelligent machines are the next industrial/technological revolution: after 'water/wind-driven, steam-driven, petrol-driven, electrical-driven, programmed/computerised machines', the next step is 'intelligent machines'."*



School of Business and Law

## Professor Stephen Teo

Professor of Work and Performance

**Research focus:** strategic human resource management (including human resource roles and effectiveness); change management; job stress and wellbeing; negative workplace behaviours; public management

*"I am leading an interdisciplinary research group on work and performance, which aims to enhance and sustain organisational performance by improving the job design, productivity and wellbeing of employees and managers at work in the domestic and international context."*



School of Medical and Health Sciences

## Professor Dennis Taaffe

Professor in Exercise Gerontology

**Research focus:** exercise gerontology and exercise oncology

*"With the goal to improve quality of life and functional lifespan for older adults, my work to date clearly demonstrates a high degree of residual plasticity in the ageing neuromuscular system, with numerous benefits derived from exercise."*



# Waving *not* drowning



## Research to improve swimming teacher training aims to tackle the grim global drowning statistics.

There were 291 drowning deaths in Australian waterways between 1 July 2016 and 30 June 2017 – a three per cent increase on the prior year. An estimated 685 non-fatal drowning incidents resulting in hospitalisation were also reported.

These statistics from the Royal Life Saving Society Australia's *National Drowning Report 2017* and a commitment to helping all Australians to enjoy safe participation in, on and around water, form the foundation of a collaborative research project between ECU and AUSTSWIM.

AUSTSWIM is a leading national and international provider of swimming and water safety training courses.

Professorial Research Fellow Dawn Penney leads the ECU Industry Collaboration Grant-funded project. Co-funded with AUSTSWIM, the project reflects the organisation's recognition of the need to strengthen the training of teachers and quality assurance (QA) systems.

"The focus of the research is to help AUSTSWIM achieve excellence in their training of teachers of swimming and water safety," Professor Penney says.

"AUSTSWIM understands that parents who entrust their children's tuition to an AUSTSWIM-licensed teacher expect the highest level of quality. This project is designed to help ensure that expectation is consistently met.

"If we're looking to change the drowning statistics, quality education is an important issue, and ensuring that starts with teacher training."

AUSTSWIM has more than 34,000 active registered swimming teachers nationally and abroad, where it operates in numerous countries including several in South-East Asia. It adds 8,000 new teachers annually and is the only aquatic organisation worldwide accredited against the highest ISO accreditation benchmark.

With up to 50,000 active AUSTSWIM-registered teachers expected over the next three years, maintaining QA through the growth is critically important, says AUSTSWIM General Manager of Education and Communication, Craig Halliday.

"To run a decentralised model for remote, regional and international courses when you're not in the same building, we need to develop best-practice systems," he says.

Australian Institute for Teaching and School Leadership standards underpin the research. Early findings reveal that more pre-course training would ensure participants attend the two-day intensive course better prepared.

"It would enable a shift in emphasis from getting through content to how to teach it, how to relate to different learners, what is involved in quality assessment and so on," Professor Penney explains.

She adds that participants need more time to explore real-life contexts and how best to manage specific situations.

Work was recently completed to address possible solutions, following surveys, interviews and focus groups

with teachers and stakeholders. Piloting the changes will take place in September 2018.

"The changes are not tweaks but significant updates that include changing the way AUSTSWIM presenter training operates," Professor Penney says.

"The presenters are teacher educators and are setting the standards and expectations – so we needed to evaluate AUSTSWIM's teacher education courses to get the presenter training right."

The final stage of the 12-months project includes making recommendations directed towards implementing updated courses nationally and internationally between 2019 and 2020. New research will accompany this phase.

Mr Halliday says the improved training of AUSTSWIM teachers and QA systems will lead to better outcomes.

"This research project to benchmark AUSTSWIM independently and evaluate our teaching model is incredibly important to us as an organisation to ensure we have the world's best practice moving forward," he says.

2018 QS  
WORLD UNIVERSITY  
RANKINGS  
BY SUBJECT  
TOP  
**250**  
FOR  
EDUCATION

# Knowledge Centre the future of community engagement

Seeking to boost engagement at the grassroots level, the [HealthInfoNet Alcohol and Other Drugs Knowledge Centre](#) is using digital tools to ensure information is accessible to its diverse user group.

The Alcohol and Other Drugs Knowledge Centre (Knowledge Centre), which is part of the Australian Indigenous [HealthInfoNet](#), aims to improve the health of Australia's Aboriginal and Torres Strait Islander peoples by making relevant research accessible to all staff in the Aboriginal and Torres Strait Islander health sector.

This objective is being accomplished through translational research, or knowledge exchange (KE), which involves making research and other information available in a form that has immediate, practical utility.

Examples of the centre's KE products include comprehensive narrative reviews on specific topics. The information in these reviews brings together relevant evidence, essential contextual information, pertinent policies and a discussion of best practice in the prevention and management of alcohol and other drug issues for Aboriginal and Torres Strait Islander peoples.

The latest KE products boast a range of digital tools including video, eBooks and infographics, which appeal to a wide range of audiences.

Australian Indigenous [HealthInfoNet](#) research team leader Kathy Ride says the Knowledge Centre is used by academics, health and policy workers.

To ensure the centre is accessed more broadly, the research team has developed the Community Portal.

"The research we share through the Knowledge Centre is used by people working in the field to inform their practice and to inform policy more broadly," Ms Ride says.

"We would like to make the information more accessible, and to have members of the community benefit from the research. This could include community Elders and families."

A mobile app created by the Knowledge Centre is one of the digital tools the team has developed to assist the workforce 'at the coal face'.

The app, which is an online directory of national alcohol and other drugs services, can be used without access to the Internet.

In addition to the portal, mobile app and videos, the Knowledge Centre has created a webinar series to share information and interact with the community.

"We develop five webinars a year, which provide information on relevant projects and issues of interest," Ms Ride says.

"The webinars act as a great method of linking organisations and communities. We can have anywhere from 50 to 140 people listening to a webinar."

While the research will be of interest mainly to practitioners and policy-makers, Ms Ride says most information, if made accessible and practical, will be of benefit to the majority of people who work in the health sector or are part of Aboriginal and Torres Strait Islander communities throughout Australia.

"The plain-language eBooks and short videos are a great way of sharing information. The Knowledge Centre is focused on developing these in the future, having seen the impact of these platforms," she says.

"As we continue to develop our use of digital tools, we hope to boost engagement levels further and find other ways to connect with these communities."





# Giving to ECU. Developing art and culture in WA.

**Founding Pianos. ECU has become the custodian of the most important collection of historical keyboards in the world, donated by Australian collector Stewart Symonds and enhanced by David Forward.**

This collection comprises rare instruments, some of which are the last remaining of their kind in the world, identified for their historical and cultural significance.

One such instrument is the **First Fleet Piano**, which arrived in Australia on board the First Fleet flagship vessel HMS *Sirius* in 1788.

Founding Pianos is a multi-phase fundraising project to establish the Centre for Piano Performance, Culture and Innovation at the Western Australian Academy of Performing Arts.

The centre will house one of the world's finest and most comprehensive collections of keyboard instruments and join the ranks of only a few illustrious tertiary institutions worldwide – the Royal Academy of Music, London and the Cité de la Musique in Paris among them.

It will become a hub of research, music-making, learning and artistic enrichment that will firmly establish its presence through teaching programs, fellowships, concerts, recordings, conferences and research publications.

The total funding requirement of \$5 million is phase one in the establishment of the centre and will enable:

- restoration of flagship instruments (\$475,000)
- acquisition of further instruments (\$600,000)
- Professorial Chair (\$1.25 million)
- scholarships (\$580,000)
- visiting artists (\$200,000)
- keyboard restoration scholarships (\$300,000)
- ongoing conservation (\$800,000).

**The collection offers an unparalleled snapshot of the progression of keyboard instruments throughout history and positions ECU to become a world leader in historical keyboard research and learning.**

**Contact:** [Office of Development and Alumni Relations](#)

[Donate now →](#)

[Find out more →](#)

[Founding Pianos →](#)



**waapa**  
Edith Cowan University





# On the Rise: Early and Mid-Career Researchers

Across the University, early and mid-career researchers (EMCRs) are excelling in their field. Here we meet eight EMCRs, who form part of ECU's vibrant research culture and are making their mark with leading-edge research.



School of Nursing and Midwifery

**Dr Ma'en Zaid Abu-Qamar**  
Lecturer

**What is your area of research?**

Identifying environmental causes of injuries sustained to people with diabetes' feet, and suggesting a prevention protocol considering the cultural context.

**What prompted you to become a researcher?**

My personal interest, and wanting to contribute to efforts to reduce the consequences of diabetes on patients, families and the healthcare system.

**To whom is your research important?**

Policymakers, clinicians, patients and families.

**What excites you the most about your research?**

Working with experts in this area and enhancing patients' and families' contributions to the prevention of these injuries.



School of Medical and Health Sciences

**Dr Elin Gray**  
Senior Research Fellow  
ECU Melanoma Research Group

**What is your area of research?**

Melanoma research and cancer blood biomarkers.

**What prompted you to become a researcher?**

A curiosity to know how things work and how we can use that knowledge to help people.

**To whom is your research important?**

People affected (directly or indirectly) by cancer, government, and the pharmaceutical industry.

**What excites you the most about your research?**

Finding new markers that reflect or predict the clinical outcome of patients, and being able to nurture postgraduate students through the first steps of their career.



School of Arts and Humanities

## Dr Kwadwo Adusei-Asante

Senior Lecturer, Social Science

### What is your area of research?

Understanding how programs and policies are designed and the manner in which they impact different demographic groups contextually.

### What prompted you to become a researcher?

The need to present contextualised viewpoints on issues and debates.

### To whom is your research important?

Governments, corporate leadership and minority groups.

### What excites you the most about your research?

Uncovering counterfactuals and insights that challenge or disrupt conventional and normative perspectives



School of Business and Law

## Dr Saiyidi Mat Roni

Lecturer, Accounting

### What is your area of research?

Understanding the trade-off between security and convenience for online transactions.

### What prompted you to become a researcher?

Curiosity and having to be able to understand the obvious that many only see.

### To whom is your research important?

Financial institutions and those who use online financial transactions.

### What excites you the most about your research?

Research enhances the existing knowledge and reveals astonishing dynamics of the new. This excites me.



School of Engineering

## Dr Iftekhar Ahmad

Senior Lecturer, Engineering

### What is your area of research?

Developing green communications techniques for next-generation communications networks, and applying digital sensor technology to solve practical problems.

### What prompted you to become a researcher?

The opportunity to transform critical and creative thinking into something useful.

### To whom is your research important?

Mobile phone users and the relevant industry.

### What excites you the most about your research?

Working with fellow researchers and developing new ideas.



School of Science

## Dr Oscar Serrano Gras

Postdoctoral Research Fellow  
Centre for Marine Ecosystems Research

### What is your area of research?

Reconstructing the history of coastal ecosystems over millennia, identifying baseline conditions and the time-course of ecological change driven by human and natural forces.

### What prompted you to become a researcher?

A fascination and curiosity for the natural history of the oceans and their inhabitants.

### To whom is your research important?

Scientists, by improving their capacity to understand, predict and manage ecological change.

### What excites you the most about your research?

Spending time outdoors discovering new nature insights and the interaction with colleagues who share my passion.



School of Education

## Dr Graeme Gower

Senior Lecturer

### What is your area of research?

The application of Indigenous cultural competency in research and educational contexts.

### What prompted you to become a researcher?

Wanting to improve educational outcomes for Indigenous Australian students and best practice in Indigenous research.

### To whom is your research important?

Government, educational institutions, researchers, Indigenous Australian communities.

### What excites you the most about your research?

Making a difference through improved outcomes.



Western Australian Academy of

Performing Arts

## Dr Lindsay Vickery

Senior Lecturer | Composition and Music  
Technology Program Coordinator

### What is your area of research?

Screen-based music reading and the expansion of music notation and representation.

### What prompted you to become a researcher?

An interest in the possibilities for the coordination of music performance afforded by new technologies.

### To whom is your research important?

Composers, performers, music analysis researchers and theorists, and music students.

### What excites you the most about your research?

Improving the efficiency, effectiveness and delivery of music notation and representation.



# Research for the real world: *Innovation* and Commercialisation

Innovation is the cornerstone of ECU research. Through strategic partnerships, collaborations and opportunities to commercialise outcomes, the University fosters research that translates successfully to practice and innovation.

## The Joondalup Innovation Hub

The Joondalup Innovation Hub (the Hub) at ECU began operation in early 2018, on the back of the Western Australia Government announcement to headquarter the facility at the University's Joondalup Campus.

The Hub will house the WA AustCyber node of the [Australian Cyber Security Growth Centre](#).

AustCyber is an industry-led organisation which brings together businesses and researchers to provide a foundation to develop next-generation products and services for living and working securely in an increasingly connected world. It is one of six 'growth centres' identified and funded by the federal government under its [Industry Growth Centres Initiative](#), which aims to drive innovation, productivity and competitiveness.

The Hub will receive \$800,000 as part of the state government's \$16.7 million [New Industries Fund](#) – a program focused on job creation through innovation. The Hub will bring together the public, private and research sectors at the Joondalup Campus. Stakeholders will also use facilities throughout the Joondalup area, in recognition of ECU and the City of Joondalup's longstanding collaboration to attract, build and support innovative businesses through the award-winning THE LINK initiative (see page 28).

**Contact:** [innovation@ecu.edu.au](mailto:innovation@ecu.edu.au)

## Cyber Security CRC

The federally funded \$50 million [Cyber Security Cooperative Research Centre](#) (CRC), which officially opened in April 2018, is among the world's leading centres in the fight against cyber criminals. With the Western Australia Government, ECU is a lead partner in the new CRC, which brings together 25 industry, research and government partners to leverage a further \$89 million over seven years.

Headquartered at ECU's Joondalup Campus, the Cyber Security CRC focuses on ensuring the security of critical infrastructure by developing innovative solutions to predict, prevent, detect and respond to cyber threats from nation states and individuals.

The CRC works to ensure that industry and the community can access online services with confidence, and to grow Australia's reputation as a safe and trusted place for business. The centre works with its strategic partners to neutralise cyber threats – and to train the next generation of cyber professionals.

*Industry partners: Australian Federal Police, Australian Taxation Office, Attorney-General's Department, ActewAGL, AARNet, CERT Australia, Cisco, Datacom, Department of Defence, Data61, Jemena, Penten, Quintessence Labs, and Singtel and Optus.*

*Academic partners: ECU, Adelaide University, Charles Sturt University, Deakin University, University of New South Wales and Queensland University of Technology.*

ECU is one of only two (with the University of Melbourne) Academic Centres of Cyber Security Excellence in Australia. The University will receive almost \$1 million in federal funding to address the skills shortage in cyber security professionals.

## Commercialisation

ECU seeks to engage with external partners to commercialise research outcomes into marketable products and services for the real world.

In partnership with academia, business, industry and investors, commercialisation at ECU benefits communities and aims to secure attractive long-term returns for reinvestment in ECU research.

The University boasts strengths in IP protection, strategy development, identifying commercialisation opportunities and translating research innovations.

**Contact:**  
[commercialisation@ecu.edu.au](mailto:commercialisation@ecu.edu.au)

## **SAPIEN**

Australian spinout company Sapien Cyber is the result of research at ECU.

Sapien Cyber formed in November 2016 in Perth, WA, through a partnership between Jindalee Partners and ECU to deliver leading-edge cyber security and threat intelligence solutions to operational technologies.

The company combines open-source technologies and proprietary IP that transcends traditional threat detection and system vulnerability assessment to facilitate secure operation in an increasingly insecure and hostile cyberspace.

Services at Sapien Cyber include cyber security monitoring, reporting, resilience and advisory services in ICS environments. These services are fundamental to the safe operation of civil and defence infrastructure, on which the economy and security rely every day.

The company's research and development is powered by ECU's renowned cyber security research team, located within the [Security Research Institute](#) (SRI) at the Joondalup Campus.

The SRI's continual platform development intelligence positions Sapien Cyber at the leading edge of dynamic and near real-time ICS threat detection.

**sapiencyber.com.au**

# Growing business through research, *innovation* and connections

## THE LINK

**THE LINK** is a strategic collaboration between the City of Joondalup and ECU. The LINK team is committed to developing connections among industry, business, government and ECU researchers to enable business growth. The digital portal provides opportunities for collaboration, business support services, corporate and professional development courses and professional learning services through ECU's School of Business and Law and School of Education.

Contact [THE LINK team](#) to find out more about research opportunities and how THE LINK can support your business: [thelink@ecu.edu.au](mailto:thelink@ecu.edu.au) or phone (08) 6304 2211.

The **ECU Watermark GetLINKED! Series** delivers presentations and practical workshops for industry, entrepreneurs and researchers alike, followed by purposeful networking sessions. Established in 2016, its aim is to link the business community with academia. RAC and Microsoft are among the organisations to have presented to date for this exciting initiative.

The **Innodate™** program, led by THE LINK team and developed in 2017, involves a cross-disciplinary approach to solving business problems. A range of businesses have pitched their problems, and several projects to investigate a solution have been instigated.

The innovative **iPREP WA** program, developed at ECU in 2015, involves interdisciplinary teams of PhD candidates in the late stages of their studies participating in a six-week project with an industry partner to solve an authentic workplace problem. A range of projects with

small and large organisations in the private and government sectors have been designed to suit a wide variety of disciplines. iPREP WA is an inter-university collaboration between ECU, The University of Western Australia (UWA), and Curtin, Notre Dame and Murdoch universities.

### iPREP WA successes

"The iPREP experience broadened my professional and personal networks, and helped to develop my career planning beyond academia."

*Mayyada Mhanna  
PhD, Arts and Humanities, ECU*

"The iPREP program is a great opportunity for PhD candidates to apply research skills into real-life projects, and collaborate with researchers from different fields."

*Dawn Dickinson  
PhD, Biological Sciences, UWA*

"iPREP has been a great opportunity to apply research and organisational skills developed during my PhD to an industry context."

*iPREP participant  
PhD, Murdoch University*

"iPREP helped me to network and build a relationship with industry, and gain new skills in project management and multidisciplinary problem-solving."

*Zafu Assefa Teferi  
PhD, Environment and Sustainability, Curtin University*

# Support services for research staff and students

The **Graduate Research School** offers master and doctoral candidates and their supervisors with support and development services including training, resources, seminars, academic events and networking opportunities.

Contact: [grs@ecu.edu.au](mailto:grs@ecu.edu.au)

**Soar (Support–Opportunities–Advice–Resources) Centre** is a free, peer-to-peer support and information service open to all higher degree by research and honours students, with a focus on research skills training and career development.

Contact: [SOAR@ecu.edu.au](mailto:SOAR@ecu.edu.au)

**eResearch** provides cross-disciplinary research technology platforms (e.g. motion capture) and assistance in developing research programs using these digital technologies.

Contact: [eresearch@ecu.edu.au](mailto:eresearch@ecu.edu.au)

**Research Development Advisers** assist with developing research ideas including identifying suitable funding sources and collaborators, developing a research plan, and working with researchers through stages of a project, from pilot data collection to application submission.

Contact: [research@ecu.edu.au](mailto:research@ecu.edu.au)

**Research Administration Officers** are the informed point of contact for researchers applying for research grants and tenders and associated tasks.

Contact: [research-preaward@ecu.edu.au](mailto:research-preaward@ecu.edu.au)

**Research Contracts and Funding Officers** are responsible for providing ongoing advice to research staff on all post-award administration and requirements of research grants for internal and external awards.

Contact: [research-grants@ecu.edu.au](mailto:research-grants@ecu.edu.au)

**Research Contracts Support** advises and organises agreements relating to research, from confirmation of project details with researchers and preparation of draft agreements, to signing and recording agreements and organising any variations to original agreements.

Contact: [research-contracts@ecu.edu.au](mailto:research-contracts@ecu.edu.au)

**Research Analytics, Systems and Performance** provides information and assistance regarding ASPIRE, ECU's research performance measurement scheme; oversees and manages data from ECU's research administration systems for external reporting; and provides internal reporting and other analytics.

Contact: **Research Management System:** [rms@ecu.edu.au](mailto:rms@ecu.edu.au)  
**Research Activity System:** [ras@ecu.edu.au](mailto:ras@ecu.edu.au)

**Research Ethics Team** provides information about research ethics and related enquiries, including advice to complete an ethics application and review prior to submission, and liaising between researchers and Ethics Committees.

Contact: [research.ethics@ecu.edu.au](mailto:research.ethics@ecu.edu.au)

ECU's growing research community of staff, students and industry and community partners is supported by the University with a variety of services.

## Community advocacy

**The Consumer and Community Health Research Network** provides consumer advocacy at ECU to support researchers, consumers and community members to work in partnership to make decisions about health research priorities, policy and practice. This includes assistance with grant applications and existing or new involvement activities.

Contact: [ben.horgan@ecu.edu.au](mailto:ben.horgan@ecu.edu.au) or phone (08) 6304 3537.

## Research collaboration and funding

ECU actively supports researchers through various initiatives that assist to develop their research programs and collaborations. These include developing research projects with industry partners such as start-ups, small-to-medium enterprises, not-for-profit organisations and large corporations.

The **Industry PhD Scholarship** provides a pathway for PhD candidates at ECU to link with industry partners, community organisations and government agencies who work collaboratively to develop a PhD project that delivers creative solutions for real-world problems. Scholarships are typically awarded for up to 3.5 years.

Contact: [grs\\_strategic@ecu.edu.au](mailto:grs_strategic@ecu.edu.au)

**Contact ECU**

134 328

**Contact Office of Research  
and Innovation**


(08) 6304 2721

**For calls outside Australia**

(61 8) 6304 0000

[ecu.edu.au/research](http://ecu.edu.au/research)

**Find us at**

 [research.ecu](https://www.facebook.com/research.ecu)

 [ecuresearch](https://twitter.com/ecuresearch)

**Edith Cowan University  
Office of Research and Innovation**

Building 34, Ngoolark

Joondalup Campus

270 Joondalup Drive

Joondalup WA 6027

theSearch is published by Edith Cowan University (ECU) through the Office of Research and Innovation and distributed biannually via PDF at [ecu.edu.au/centres/office-of-research-and-innovation/research-profile](http://ecu.edu.au/centres/office-of-research-and-innovation/research-profile)

Every effort has been made to ensure that the information contained in this publication is correct at the time of production. The views expressed in theSearch are not necessarily endorsed or approved by the University. The University accepts no responsibility for the content or accuracy of information published. Articles or portions of articles may be reproduced only with permission from the Office of Research and Innovation or as otherwise provided for in the *Copyright Act 1968*.

ECU is committed to implementing strategies and technologies that minimise waste of resources and demonstrate environmentally sensitive development, innovation and continuous improvement.

ECU acknowledges and respects the Aboriginal and Torres Strait Islander peoples as the traditional custodians of the land. ECU acknowledges and respects its continuing association with Nyoongar people, the traditional custodians of the land upon which its campuses stand.