

**AUSTRALIAN  
TECHNOLOGY  
NETWORK**  
OF UNIVERSITIES

# Case Studies on Research Impact.

Real World Meaning with  
Real World Impact



Curtin University



University of  
South Australia



**RMIT**  
UNIVERSITY

# About this book

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The universities that make up the Australian Technology Network of Universities (ATN) are the engine room of new ideas that will shape Australia's prosperity for years to come.

At the ATN, we believe that research is not simply an end in itself. It is the means to better outcomes for Australian society.

Our Universities have a key focus on ensuring that the work they do has real world meaning with real world impact. That is why we place such importance on our collaboration and partnerships with industry.

This publication shows that across ten separate industry sectors, the hard work of our academic staff is not just of a sufficient quality to gain publication in academic journals, but with the necessary practical benefit to make our kids smarter, ensure our economy is strong and that our health system is first class.

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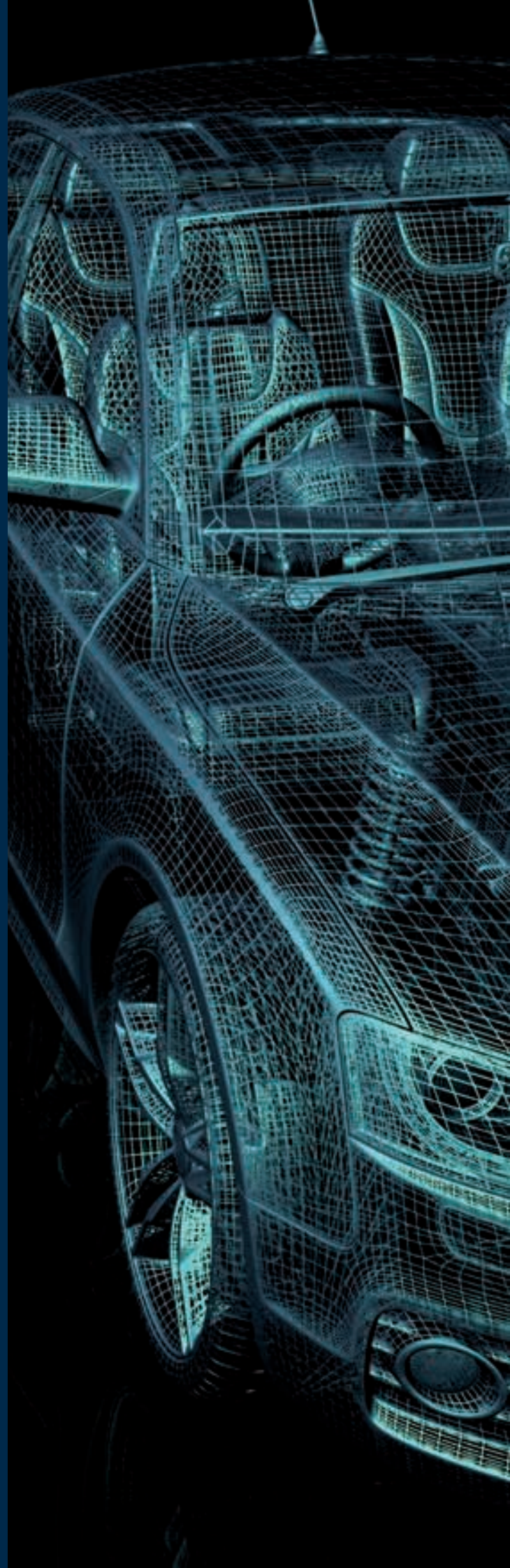
# Advanced Manufacturing and Transport

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With the departure of the automotive industry and other manufacturing supply chains from around Australia, state and federal governments are desperate for advanced manufacturing to take off. A thriving advanced manufacturing sector will allow for yesterday's workforces to join tomorrow's industries.

But this will not happen without successful, cutting edge research with real world application. Thankfully, researchers at ATN's universities around the country are at the forefront of industry efforts to develop the next wave of manufacturing jobs in Australia.

From the development of driverless car technology, to the manufacturing of automotive components in delivering better practical and environmental outcomes, as well as the establishment of a photonics capability making improvements in defence technology possible, atn research is leveraging insights across academic disciplines including mathematics, information technology and chemical sciences to be a key enabler of Australian industry competing in this sector.



## Laser ablated car seat covers for safer and more effective airbag deployment

### Adapted seat covers deliver safer cars

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## Building future automotive manufacturing capability or an automotive industry in Australia

### Hi-tech manufacturing gives automotive workforce new hope

A new plastic side mirror is transforming the automotive industry and creating workforces of the future following a partnership between UniSA and a global manufacturer.

Samvardhana Motherson Reflectec (SMR) had unsuccessfully sought to create a plastic side mirror before seeking the assistance of UniSA. A joint project team comprising of materials

scientists, physicists and engineers came up with a product with significant advantages over glass competitions. For starters, the plastic version is safer, owing to its shatterproof properties, whilst the lighter weight means reduced fuel costs and greenhouse gas emissions. The product has been an enormous success, with more than 1.7 Million mirrors sold and revenue exceeding \$170 million within five years.

The success of the unisa-smr joint venture has led to the creation motherson innovations, a spin-off company dedicated to developing high value-add manufacturing opportunities not just in the automotive industry, but for medical devices as well.



## Creating the technology for connected autonomous vehicles and driverless cars for economic, environmental and health benefit

### Making travel faster and safer

Connected autonomous vehicles have put UniSA's researchers at the forefront of the automotive industry through reducing road trauma and traffic congestion.

UniSA researchers have developed a new software system that has allowed cars to connect with each other – drivers would be able to see around corners, where they are without GPS and interact

with traffic infrastructure seamlessly in real time. The technology has been deployed in over 60 per cent of world trials and will shape the future of driverless car technology.

Cohda wireless is a world leader in Connected Autonomous Vehicle (CAV) technology. It was formed in 2004 on the back of research and IP generated by UniSA's Institute for

Telecommunications Research (ITR).

Major road trauma and avoidable traffic congestion is costing Australia \$37 billion a year. UniSA's real world research could expect to reduce traffic congestion and reduce crashes by up to 85 per cent.



## Building an integrated photonics capability for Australia

### Manipulating light

Photonics – the science of the manipulation of light – has been rapidly advanced in Australia thanks to the work of Professor Arnan Mitchell of RMIT University. The potential of photonics lies in overcoming power and capacity limitations in high speed electronics – particularly in defence technology.

Up until recently, photonics manufacturing hubs have

been suitable only for mass production of photonics chips, with long lead times and high manufacturing costs. But for the photonics industry to reach its potential in developing new applications, it needs standardised processes and tools. That capability gap has been met through the establishment of Australian Silicon Photonics (ASP) within RMIT University's Micro Nano Research Facility.

ASP, which has aligned with global players in the photonics industry, has enabled faster innovation of products by cutting turn-around times for prototypes and significantly reduced the costs of manufacturing such prototypes.





## Innovative driver advice systems save energy, improve safety, reduce wear and tear, and keep trains running on time

### Improving the energy efficiency and on-time performance of rail networks

Rail network operators have reduced their energy costs by up to 20 per cent per year thanks to a ground-breaking driver advice system that has now been deployed on more than 4,000 trains worldwide since its inception in 2012.

Energymiser® was developed in partnership between Unisa's Centre for Industrial and Applied Mathematics and TTG Transportation

technology. Based on GPS and mathematical algorithms, it advises train drivers when to apply power, when to maintain speed, when to coast and when to brake, taking into account factors such as gradients, speed limits and the train timetable.

The software can be displayed on an iPad within the driver's cabin and ensures passengers have a smoother and more

reliable ride, with reductions in braking of up to 30 per cent and on-time performance lifted by 10 per cent following the deployment of Energymiser®.



University of  
South Australia

## Optimising automated vehicle technology – making Australia's container ports more productive

### Robots as wharfies

A partnership between Patrick terminals and UTS has enabled the deployment of robots known as autostrads at two Australian ports.

Unlike other robot models, a fleet of 75 autostrads located between Port Botany and Brisbane are able to pick up, place and transport shipping containers through a port terminal. They were developed following extensive

collaboration between UTS and Patrick, and rely on a software package driven by mathematical models and algorithms. The software is able to coordinate the movement of containers safely and in real time, whilst avoiding adverse events such as collisions and congestion.

The key benefit of the deployment of the autostrads is markedly greater

productivity. Patrick's two Australian ports are seen as the international benchmark for automated container operations, with the ability to achieve 8 to 14 moves per hour, compared with 4.5 To 8 at the world's largest ports operating with manual equipment.



UTS

# Crime and Cyber Security

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Academics across a diverse range of fields of research have contributed to new ways to detect and fight crime in ATN universities.

The Centre for Forensic Studies at Sydney's UTS have pioneered a world-leading technique for fingerprint detection; Curtin University in Perth is the home of new smart surveillance technology utilising artificial intelligence to detect crime as it happens; and Melbourne's RMIT University has had its research influence the recommendation of Victoria's Royal Commission into Family Violence and ultimately, law reform in Victoria.

The impact of this work is not just seen within Australia, but around the world. The fingerprinting technique has been critical to the work of Israeli Police; and iCetana, Curtin's smart surveillance system, has been rolled out in the United States and the United Arab Emirates.



## Development and validation of new fingerprint detection techniques for a more effective law enforcement and criminal justice system

### Lifting a finger to catch criminals around the world

Detecting crime around the world has become more effective as a result of improved fingerprinting techniques developed at the Centre for Forensic Science (CFS) at UTS.

The centrepiece of CFS research has been what has become known as the 'Australian formula', a solution used to detect fingerprints on paper and porous surfaces,

which had previously been impossible. A collaboration with the Australian Federal Police and the University of Canberra led to the addition of zinc into a solution that had previously shown to be inconsistent in its reliability.

In addition, CFS work has been integral to integrating fingerprint and DNA analysis and increasing the speed at which fingerprints can

be analysed. The worldwide impact of the CFS can be seen in an analysis of INTERPOL reports, which suggests that the CFS was responsible for nearly one quarter of the most relevant international research relevant to fingerprint detection.



## iCetana: Smart surveillance software a paradigm shift for public safety

### Smart surveillance software cuts costs and saves lives

A new state of the art surveillance system is revolutionising the way in which organisations respond to high-risk situations.

iCetana, developed by researchers at Curtin University, is an algorithm-based surveillance system that detects abnormal movements and behaviour in a particular location. The system reports unusual behaviour across the

network in real time, reducing operator fatigue and enabling faster responses to incidents.

When deployed at Curtin University following a spate of bicycle thefts, the machine-learning capabilities of the system meant that it recognised thieves approaching a bicycle rack with bolt cutters as an abnormal occurrence. Other users of iCetana around

the world report that it has reduced security personnel costs and prevented an incident that may have led to a fatality.

The commercialisation of the system has been an incredible success, with the first year profit of the venture equivalent to the total capital investment.



## Opportunities for early intervention: Bringing perpetrators of family violence into view

### Enabling early intervention in family violence

There has been a fundamental shift in the way Victorian authorities deal with perpetrators of family violence after serious deficiencies were unearthed by RMIT University's Centre for Innovative Justice (CIJ).

Historically, when perpetrators of family violence came in contact with the justice system, punishment was meted out, but there was

not the necessary effort put towards changing their future behaviour. As a result of the CIJ's work, this has now changed. The justice system now seeks to ensure perpetrators are not just punished for their actions, but provided with the requisite tools to change their ways. This includes the provision of crisis accommodation to tackle risk factors in family violence such as alcohol and substance

abuse or mental health issues.

The CIJ's report was endorsed by the Royal Commission into Family Violence and is now considered one of the catalysts for family violence law reform in Victoria.



## Designing out Crime

### A safer environment in Sydney

New solutions to complex crime problems have been developed thanks to the work of researchers at UTS.

Their work is highlighted by the rollout of greater service provision in the antisocial behaviour hotspot of Kings Cross. With crowds of 30,000 frequenting the area on weekends, crime was through the roof and the area had a disagreeable reputation.

The Designing Out Crime Research Centre (DOC) at UTS promulgated a multifaceted strategy to improve the situation. It included a first aid tent, free water, additional public toilets, better connected public transport and a smartphone app providing real-time information on transport, food options, queues to get into licensed venues and more.

Whilst the infamous Sydney lockdown laws ultimately had a major impact in changing the nature of nightlife in Kings Cross, the work of DOC clearly impressed the City of Sydney, which rolled out their work in other nightspots such as Town Hall and Darling Harbour.







# Food, Water and Agribusiness

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Australia has a deserved reputation for clean, green produce that is the envy of the world. With strong environmental regulation, ideal conditions for various forms of farming and an agricultural sector considered an integral part of the nation's culture, demand for our produce is enormous. As countries in our Asia Pacific region continue their remarkable economic growth, this demand is likely to increase yet further.

But to maintain that competitive advantage, Australia must keep innovating to maintain its competitive advantage. Increasing drought frequency and severity is posing challenges for water conservation and recycling in order to ensure our farms have the water they need for crops and livestock, whilst we must continue to be vigilant in ensuring our exports are free from harmful chemicals.

In recent years, ATN universities have worked to maintain Australia's reputation in this area. Two significant water conservation exercises would not have been possible had it not for the input of academics from Curtin University and UTS respectively – the Beenyup water recycling plant in Perth and various water asset management strategies for authorities around Australia.

Finally, new tests that ensure the health of fresh seafood were developed at UTS, helping to ensure the safety of consumers and maintaining the reputation of Australia's seafood industry.



## Community-centric approaches to increase water productivity and profitability of small-scale irrigation systems in Sub-Saharan

### Increasing produce. Reducing water usage

Research has addressed the failures of irrigation systems in Mozambique, Tanzania and Zimbabwe. UniSA researchers have partnered with African and Australian universities as well as local African agencies to solve problems collaboratively.

The irrigation management tool that UniSA researchers have developed have show results across six irrigation

schemes. Yields have doubled while using half as much water, with land utilisation increasing from less than 40 per cent to near 100 per cent.

Funded by the Australian Centre for International Agricultural Research more than 1700 farmers were directly involved in the project now leaving formerly unused land flourishing and new communities growing.

ATN universities deliver a strong global presence where collaboration across the international stage delivers research and policy outcomes which solve real world problems and have a real world impact.



## Monitoring marine biotoxins to protect Australia's multi-million dollar seafood Industries

### New tests protect seafood consumers from dangerous food poisoning

Australian seafood consumers are the main beneficiaries of new methods of monitoring two dangerous marine biotoxins.

Tests for saxitoxin and ciguatoxin were developed by researchers at UTS. Both biotoxins are invisible to the naked eye, odourless, tasteless, and heat-stable, meaning they cannot be destroyed through cooking. They also have the

potential to cause fatalities in humans.

The test for saxitoxin has already reaped benefits for the seafood industry. Over a two year period, it detected two emerging algal bloom events in Tasmania, giving farmers sufficient time to move production to safer sites. Without the test, the predicted loss would have been in the order of \$13 million,

not to mention the danger to consumer health.

Meanwhile, the tests for ciguatoxin and associated research have driven changes at the Sydney Fish Market, including the banning of ungutted Spanish mackerel, based on an assessment of various risk factors.



## The brains behind Australia's first full scale groundwater replenishment scheme

### Wastewater to drinking water: securing Perth's water supply

A new water recycling plant in Perth is helping to secure Perth's water supply after decades of falling rainfall. The Beenyup Advanced Water Recycling Plant is now operational, following successful research conducted by the Curtin Water Quality Research Centre in collaboration with industry and government partners.

Wastewater at the plant is

treated through a three step process. First, ultra filtration removes dissolved materials. Second, reverse osmosis works to remove materials up to 100 times smaller than those removed through ultra filtration. Finally, ultraviolet disinfection ensures any remaining traces of micro-organisms are removed from the water before it is committed to Perth's groundwater drinking supplies.

Groundwater supplies are the source of about half of Perth's drinking water. The wastewater process developed at Beenyup is a superior environmental outcome to other water recycling options, given it utilises about half of the power of desalination.



Curtin University

## Reform, risk, reality: Working with industry and government to transform water management during Australia's worst ever drought

### Securing Australia's water supply after our worst ever drought

Water security research undertaken by the Institute for Sustainable Futures (ISF) at UTS has been critical in managing water assets and developing demand-side controls to preserve water supplies following Australia's worst ever drought.

ISF's work is best exemplified by its collaboration with the Sydney Water Corporation to develop an integrated strategy

to handle unpredictable weather events. It involved integrating both supply side and demand management measures in the 2004 Metropolitan Water Plan, later updated in 2006. ISF's recommendations have led to annual water savings of 120 million cubic tonnes by 2011 – equivalent to 25 per cent of water used each year.

The ISF also worked to develop water supply strategies for water providers and governments in locations including Perth, Canberra, Melbourne, Alice Springs, the NSW north coast, south east Queensland and Goulburn.





## Using social research to improve government policy and regulatory decision-making

### Customer feedback drives down water prices

For the first time, a NSW utility provider has recommended a price decrease to the independent pricing regulator following holistic research conducted by UTS.

Sydney Water, which had historically made pricing decisions based on economic models, took the radical step of asking consumers what they were willing to pay. Using the UTS to conduct the research,

it also sought feedback on pricing structures. The research ultimately resulted in Sydney Water recommending a price drop for residential consumers of nearly 15 per cent – more than \$100 per year for each household – whilst suggesting savings of up to nearly 40 per cent for non-residential customers.

The unprecedented move has set new benchmarks in the

way governments and utility providers engage with their customers and respond to their demands, ultimately fostering greater trust in an era where scepticism of large institutions is widespread



## From sewage to safe: A better approach to managing wastewater risk

### Getting more from our water

Groundbreaking research into the survival of pathogens in sewage has led to savings in the water industry of more than \$1.5 million. It has also prevented 87,000 kilograms of greenhouse gases from entering the atmosphere at South East Water's Boneo and Somers plants, located south-east of Melbourne.

For years, biosolids – the major end product of treated

wastewater – have been used in agricultural fertiliser as a rich nutrient source. For health reasons, this only occurs after the biosolids are stored and dried for three years to ensure all pathogens have been destroyed

Now, thanks to research conducted by RMIT University, the Victorian Environmental Protection Authority has cut minimum storage times to

12 months. In addition to the benefits to industry and the environment, residents living nearby are the big winners, with biosolid stockpiles now significantly reduced in volume – and smell.



# Mining Equipment, Technology and Services (METS)

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Mining has long been one of Australia's iconic and productive industries since the time of the gold rush in the 1800s. In more recent times, China's growth has led to extraordinary demands for Australian resources such as iron ore, dramatically increasing national income and swelling government coffers on the back of increased tax revenue.

As the mining boom has ended, Australia's focus has increasingly turned to leveraging its expertise to develop new mining, equipment and technology for use around the world. Much of this has been made possible through ATN expertise.

With the world's resources becoming more depleted, industry is having to dig deeper into the Earth's core. RMIT University scientists have developed enhanced sensors to find the next wave of mineral deposits, whilst UniSA has continued AMIRA P260, a project spanning 30 years to assist in sorting minerals extracted from the Earth.



## ARMIT sensors re-invent mineral discovery

### Digging deeper – with a little help

A collaboration between RMIT University and mining exploration company Abitibi Geophysics has resulted in the development of a new, state-of-the-art sensor that has aided mining exploration efforts in six countries around the world.

The ARMIT sensor is constructed with nanomaterial, more commonly used in the medical industry. The biggest

advantage of the ARMIT sensor is that it is able to detect all minerals of interest, whereas older technology required separate sensors for the detection of different minerals. Additionally, ARMIT is cheaper to manufacture, safer to use and easier to transport because of its size.

With the depletion of the Earth's resources continuing, minerals are increasingly found

deeper below the surface. ARMIT is able to find these minerals in spite of interfering geological formations that may sit between the Earth's surface and the mineral deposits.



## Thirty year sustained impact for mineral processing – AMIRA P260 Flotation

### Making mining more efficient

Mining industries across the world are reaping the benefits of improvements to mineral sorting developed by a consortium managed by UniSA over the past thirty years.

AMIRA P260 has successfully improved the process of mineral flotation, which separates desired minerals from other substances such as slurry based on how they interact with water. More than 100 companies across

fields such as mining, mineral processing and technology providers have benefited from the project, delivering benefits independently valued at more than \$1.2 billion – more than 22 times the value of the investment. But the positives go beyond the economics: there are a number of environmental benefits, including a reduction in energy and water consumed.

More than 25 UniSA

researchers and 50 PhD students have contributed to AMIRA P260. Their knowledge has contributed to long-term knowledge transfer into the sector across industry and academia around the world.



## **A better understanding of groundwater quality leads to better risk assessment for unconventional gas extraction**

### **Following the evidence on fracking and groundwater**

The impact of unconventional gas exploration on groundwater supplies has long concerned farming communities. Yet given that fracking is a relatively new method of gas extraction, little was understood about the impact on groundwater supplies one way or another.

RMIT University scientist Dr Matt Currell developed a methodology for assessing

the likely impact of coal seam gas exploration on groundwater supplies that ultimately informed a Victorian Government decision to permanently ban unconventional gas exploration. His methodology considered the risks to groundwater in various parts of Victoria. Whilst some areas were considered low risk, he found that the risk from coal seam gas in the Gippsland

Basin was moderate to high.

Currell's work was repeatedly cited in a Parliamentary Committee report that led to the Government ban and is an example of how research can support sound evidence-based decision making on critical issues of public policy.









# Medical Technologies, Pharmaceuticals and Health

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Australia's medical research is world-renowned for its quality. It advances medical sciences for the benefit of its own population as well as exporting new solutions in medicine, pharmaceuticals and allied health around the world.

The work of medical and health science academics at ATN universities has led to better health outcomes in the Asia-Pacific region, through improved processes for lower limb prostheses construction being made available in Vietnam and the supervision of a program delivering more midwives in Papua New Guinea to address the horrifyingly high maternal death rate.

Back on Australian soil, the biggest step change in public health reform in has undoubtedly resulted from the work of Professor Mike Daube, whose research led to the introduction of the world's toughest laws on tobacco marketing with the mandating of plain packaging.

For cancer patients, huge advances have been made in radiotherapy technology at RMIT University and faster diagnoses of rare genetically-linked cancers have been made possible by scientists at UniSA.

Finally, Australia is recognised at a world leader in pharmaceuticals. The impact of ATN research on the industry has included a start-up company formed by UniSA expediting clinical trials for new medicines, of critical importance for both industry and prospective patients.



## Luminescent Material

### A chance discovery breathes new life into medical diagnostics

Cellular diagnostics have taken a step forward thanks to a collaboration between Curtin University and UniSA. Curtin, with expertise in luminescent compounds, teamed up with UniSA who were seeking to develop better methods of cell imaging.

The initial focus of the collaboration was how luminescent compounds could be used as protein

markers in cellular imaging. However, during this process, an unexpected discovery took place. One of the compounds produced by Curtin successfully stained lipids. Traditionally, lipid staining could only be performed using a toxic agent, preventing its use on live tissue samples. A non-toxic compound was subsequently developed that can be used on live cells.

The breakthrough has significant potential in diagnosing various illnesses, including cancers, metabolic disorders and obesity, immune disorders and heart disease. The intellectual property has since been licensed to a start-up company, ReZolve Scientific, which has since introduced five products to the scientific reagents market.



## Achieving system change to improve health outcomes for rural Aboriginal Australians

### Healthier Australia

A new model of diabetes clinic has been developed through UniSA research teams delivering improved health outcomes for Aboriginal communities fighting obesity, type 2 diabetes and cardiovascular disease. The research has seen reduced hospitalisation rates for type 2 diabetes and has seen savings of over \$140,000 along with improved monitoring and universal screening of diabetes in pregnancy. This transformative breakthrough in research has so far benefited

over 1570 women and has been adopted by Queensland Health.

The model delivers results through practical community-based best-practice health systems. Through institution-level strategies that prioritises engagement with Aboriginal end-users and long-term partnerships with Aboriginal communities, this model delivers a sustainable approach for Aboriginal communities.

The research stems from UniSA's 'Crossing the Horizon 2020' strategy, which aims to promote social justice, reconciliation with Aboriginal Australians, and social cohesion through equitable education access and research that aims to improve quality of life. The research has since seen evidence-based improvements for the Aboriginal population totalling 17,000 through an 86 per cent increase in fruit and vegetable purchases.



## **Molecular Diagnostics – Revolutionising the detection and treatment of disease-causing parasites**

### **Busting gut parasites**

Gut parasites are being detected at greater rates through advancements in molecular diagnostics, enabling patients to get the care they need, health costs to be cut and treatment to be improved.

The most common gut parasites, *blastocystis hominis* and *dientamoeba fragilis*, often went undetected by traditional microscopy. Advancements in

molecular diagnostics, driven by a collaboration between UTS and Sydney's St Vincent's Hospital, have ensured that tests are now picking up the presence of these parasites at greater rates. The technology has meant ten or more separate tests are replaced with one, driving cost savings for the health system and faster results and treatment for patients.

Doctors now consider that these parasites may be the root cause of misdiagnosed irritable bowel syndrome, whilst the test results also reveal a greater public health problem than previously realised.



## **Healthier, safer and more productive workplaces: Minimising the Costs of work stress**

### **Improving workplace environments**

Based on interviews of over 7000 employers, UniSA researchers have delivered better health outcomes for over 420,000 employees. Untreated depression and anxiety cost Australian businesses \$10.9 billion a year in reduced productivity increased absenteeism and WorkCover claims. UniSA's research into psychological factors underlying workplace stress led to best-practice surveillance methods for

monitoring and promoting mental health in the workplace. The research has shaped national and international surveillance frameworks, earning endorsement from the World Health Organisation (WHO). UniSA researchers have over 20 years of expertise in the psychological factors of work stress. Together in partnership with government and industry, researchers have driven the uptake of assessment tools to monitor

and protect employee wellbeing.

Leveraging WHO-designation as a Collaborating Centre of Occupational Health, UniSA researchers have extended their reach nationally and globally, working with government agencies, unions and healthcare providers to integrate evidence-based findings into policy and practice across Asia Pacific workplaces.





## Transforming the health care workforce in png for maternal and child health

### Transforming maternal and child health in PNG

A humanitarian crisis in maternal and child healthcare in Papua New Guinea (PNG) has been somewhat ameliorated by a project led by UTS Professor of Child and Maternal Health, Caroline Homer.

Health outcomes in PNG need significant improvement. Strikingly, the country's maternal death rate is over 100 times worse than Australia, most strikingly

illustrated by a maternal death rate more than 100 times worse than Australia.

The Maternal and Child Health Initiative (MCHI), involving the PNG Department of Health, AusAID and the WHO, sought to upskill the resident midwife population whilst also boosting their numbers. This included substantial work on recognising, respecting and incorporating cultural traditions. A new midwifery

school was established and subject matter experts were embedded in midwifery schools to boost the quality of instruction.

The positive results of the MCHI include a doubling of the number of midwives in PNG and the placement of a qualified midwife in every health centre to be on hand to address complications arising from childbirth.



## Beating Big Tobacco: A 40 year crusade

### From sewage to safe: a better approach to managing wastewater risk

The genesis of Australia's world leading tobacco plain packaging legislation was founded in research conducted by Curtin University's School of Public Health.

Professor Mike Daube, a leading public health researcher, explored how tobacco advertising influences tobacco use through sophisticated branding and point of sale displays. As

a result, Australia's plain packaging legislation dictates that cigarettes and other tobacco products must be sold in brown packaging and contain health warnings with graphic images.

It is estimated that the tobacco plain packaging legislation was responsible for approximately one quarter of the decline in smoking prevalence in Australia.

Professor Daube's work has been lauded worldwide and in 2014 he was appointed as an Officer of the Order of Australia (AO).



Curtin University

## Enhancing Australia's capability to care for cancer patients

### Enhancing Australia's capability to care for cancer patients

Medical physicists at RMIT University have solved some pressing challenges in cancer treatment for the 60,000 Australians a year requiring radiotherapy.

The advancements in radiotherapy have included a new device to improve the treatment of prostate cancer, enhancing the preparation of leukaemia patients for bone marrow transplants and

more accurately determining optimum doses of radiation therapy.

The medical physics program at RMIT is tightly integrated with hospitals, driving greater knowledge sharing and collaboration in tackling challenges in radiotherapy treatment. As a result of this work, troublesome side effects for men suffering from prostate cancer have

diminished as a result of better targeting of cancerous cells. Leukaemia patients awaiting a bone marrow transplant are better prepared through improvements to Total Body Irradiation, which suppresses a patient's immunity prior to the transplant. And improved calibration protocols for radiotherapy equipment means greater certainty in the doses given to cancer patients.



## A pressure-casting system for prosthesis in remote and under-developed regions

### A giant step forward in lower limb prostheses

A new method of developing prosthetic limbs is making huge improvements to the lives of amputees.

Traditional methods of prosthetic limb manufacturing are costly, take time and their success is highly dependent upon the skill of the prosthetist to fit the device to a residual limb. But thanks to the development of the pressure-cast (PCAST) system, these

problems are beginning to be overcome.

Developed by researchers from RMIT University, the PCAST system works by wrapping the residual limb in a plaster wrap, before water pressure ensures that a prosthetic limb is shaped perfectly to fit the patient.

This new technique is particularly useful in developing countries such as Vietnam, where the lasting impacts of war, landmines and Agent Orange have left the population with high rates of lower limb amputation or defects. It is also hugely beneficial for children, whose growing bodies require frequent adjustments to their prostheses.



## Data-driven quality management of medicines improves patient outcomes and lowers healthcare costs

### Preventing the cure from becoming the problem

A new software program developed by UniSA is working to prevent unnecessary hospital admissions triggered by the inappropriate use of medicines.

More than 230,000 hospital admissions Australia-wide result from medicines not being taken as prescribed or because of complex interactions between diseases, medications and devices. The UniSA software seeks

to prevent such occurrences by combining bio statistical and behavioural psychology approaches with clinical evidence to ensure that policymakers, regulators, health professionals and consumers have the requisite information to ensure medications and medical devices are used appropriately.

The impact on Australia's veterans has been particularly positive. Through a partnership

with the Department of Veterans' Affairs, the software provided feedback to medical practitioners on specific patients at risk of medication-specific issues, whilst also providing veterans with targeted educational material.

The software is now being extended in Australia and rolled out in other jurisdictions, including New Zealand.



## Accelerating drug development for health and economic benefits

### Getting new medicines to hit the market faster

New medicines are going to market faster thanks to a UniSA spin-out company that is expediting their approval by regulators for clinical trials.

The pharmaceutical industry is quite rightly subject to enormous regulation. But this impacts upon the approval times for new life-saving medications, which can often take years, compromising the commercial viability of

businesses and delaying treatment for patients.

CPR Pharma Services (CPR), set up by UniSA in 2009, was created in direct response to the need for an Australian-based organisation that could assist smaller biotech and pharmaceutical companies with clinical trial services. The results of its establishment include a 50 per cent improvement on approval times

for human trials compared to other competitors. CPR has also contributed to a return on investment of public funds in South Australia's bio-innovation sector ten times over. As a result, CPR is now seen as a leader in its field in the Asia-Pacific region.



## Statistical science to support evidence-based decision making – a trial of vein visualisation technology for the Australian red cross blood service

### Statisticians save Red Cross Blood Service half a million dollars

A 2014 trial saved the Australian Red Cross Blood Service (ARCBS) more than \$500,000 in unnecessary outlays on vein visualisation technology (VVT).

VVT helps locate peripheral veins and assists in distinguishing blood vessels from surrounding tissue – the idea being that it guides needle insertion. ARCBS used UTS statisticians to test the

hypothesis that using VVT would improve the experience of blood donors by reducing the risk of complications such as vein damage and patient anxiety, thus encouraging donor retention and ultimately resulting in a larger store of blood for use in medical emergencies.

The high quality trial of 900 donors concluded that VVT did not improve the donation

experience, the chances of accurately piercing a vein, nor donor satisfaction or retention. This ultimately saved the taxpayer-funded ARCBS from investing in a capital upgrade that would not have delivered improved outcomes for donors or recipients.



## Genomic mapping technologies lead to faster diagnosis and targeted treatment for rare diseases and cancers

### Rare illnesses: faster diagnosis, quicker treatment, reduced costs

Patients suffering from rare diseases and cancers are being diagnosed faster and starting treatment sooner as a result of world-first diagnostic methods developed between UniSA researchers and the Centre for Cancer Biology (CCB).

The methods test for these conditions with genetic links, which are one of the biggest killers of infants and account for one third of hospital

admissions and 50 per cent of hospital costs. Based on whole-exome sequencing, which allows for 20,000 genes to be examined in a single test, the new technique reduces the need for lengthy, complex investigations into the underlying cause of a patient's illness.

Diagnostic rates have improved dramatically following the development,

rising from 10 per cent to 50 per cent across 3,000 patients. This has delivered savings to the health system of an estimated \$34 million and directly influenced World Health Organisation classification standards.



## Transforming government communications policies and practices in Australia and the UK to improve engagement with citizens

### Smarter communication driving increased cancer screening

Breast screening rates amongst NSW women from culturally and linguistic diverse (CALD) communities has risen more than 25 per cent on the back of research into the effectiveness of communications strategies.

UTS research has found that organisations that engage in genuine two-way communication are more likely to be successful in building

trust with those that they are communicating with. The report concluded that traditional communication methods that sought to persuade through one-way, 'top down', messages tended to drive distrust and disengagement.

The NSW Ministry of Health commissioned the UTS researchers to assess how communication with CALD

communities could improve, given breast screening rates amongst some CALD demographics were as low as 5 per cent. An assessment revealed that a top down approach had typically been utilised. A more 'culturally competent' communications strategy that recruited 'community champions' to the campaign was deployed, ultimately improved screening rates by 25 per cent.



## A problem shared: Addressing vicarious trauma in the interpreting industry

### Interpreters no longer left behind

For too long, interpreters have been the poor cousin of trauma professionals. An RMIT University study found that just 30 per cent of interpreters received any support to help them address vicarious trauma – the negative transformation that can occur following empathetic engagement with trauma survivors. Interpreters are needed when trauma survivors do not speak the language of a service provider

such as a doctor.

Whilst the onset of vicarious trauma is concerning enough, it is additionally problematic given it has been found to impede an interpreter's ability to do their job. However, thanks to the RMIT study, there is not only now an increased awareness of vicarious trauma amongst interpreters, but a suite of practical measures to promote their wellbeing.

Interpreters now have greater access to professional development sessions on vicarious trauma throughout Australia that have long been made available to hospital staff such as doctors and nurses.



## What type of drinker are you? Classifying drinker types to curb harmful habits

### Better understanding drinking behaviour

The drinking behaviours of Victorians are now better understood following research by RMIT University.

The fundamental product of RMIT's work was the profiling of four drinker types: Initiators, Followers, Moderators and Protectors. Each drinker type has certain characteristics in addition to their consumption behaviour, such as how they communicate about alcohol

and the influences on each group that lead to over-consumption.

These behavioural insights have delivered greater clarity on social and cultural assumptions and practices about alcohol and have transformed public health messaging on alcohol consumption. VicHealth, a Victorian Government agency dedicated to promoting

healthy lifestyles, significantly adjusted their strategy to minimise alcohol consumption as a result of the research and shortlisted RMIT's work for the 2013 Victorian Health Promotion Foundation Awards.





# Building Design and Construction

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Innovation in the building construction and design industries is increasingly driving improvements to productivity, safety and environmental outcomes, driven by contemporary the work of ATN university staff.

Two residential developments in different parts of Australia, informed by research conducted at Curtin University and UniSA, have showcased the possibilities of carbon neutral households. White Gum Valley in Fremantle, Western Australia, and Lochiel Valley in Adelaide, South Australia, are developments at the cutting edge of energy efficiency, with measures in place to harvest rainwater and ensure solar panels are the sole power supply. Additionally, at White Gum Valley, residents have the ability to share energy between homes as required.

Research into the building and construction sector at ATN universities has also had led to safer workplaces, following the development of protocols that ensure safety is considered at every step of the design and procurement process and ensuring humans are spared hazardous cleaning roles on the Sydney Harbour Bridge, with the introduction of robot technology to blast clean the famous steel landmark.





## The robotic future of abrasive blast cleaning – Keeping maintenance workers safe

### Maintaining the Sydney Harbour Bridge with greater efficiency and better safety

Maintenance of the Sydney Harbour Bridge (SHB) is now being done in a safer and more efficient fashion thanks to the advent of robotic blast cleaners.

The steel surfaces of the SHB require continual maintenance. Traditionally, this has been done through manual blasting of the surfaces in order to remove rust and scale. Given the physical demands, workers

would require continual breaks and the risks to health from blasting meant full protective gear was needed.

Seven years of intensive research and development undertaken by UTS led to the world's first autonomous grit-blasting robots that are now deployed on the SHB, reducing worker exposure to health risks such as lead particles by up to 90 per cent. The amount

of particles being released into the environment has also been reduced. Unsurprisingly, the robots are also able to cover far more of the SHB surface than workers in any given period of time, delivering cost savings and productivity increases.



## The carbon-positive living lab: White Gum Valley

### Lowering our energy footprint without compromising

A new development in Fremantle, Western Australia, was built with a mission to demonstrate that a lower energy footprint was possible in a residential housing environment without compromising on quality of living.

White Gum Valley, a residential infill development, has been described as a 'carbon positive living laboratory'.

Homes are fixed with solar panels, batteries are used to store energy and residents even have the potential to share energy between homes as required. Water usage is minimised by harvesting storm water, which is then used to irrigate public and private gardens via a community bore.

The research conducted by the Curtin University Sustainability Policy (CUSP) Institute

underpinned the design and implementation of White Gum Valley. CUSP has also played a major role in the monitoring and evaluation of the implementation, impact and ongoing resident experience of the development



Curtin University

## Sharing responsibility for a safer construction industry: Advancing a national priority

### Fewer fatalities and serious injuries: making construction sites safer workplaces

RMIT University has developed a better way to manage safety on construction sites through improved processes that have delivered fewer fatalities and serious injuries.

RMIT developed the Model Client Framework in 2008, which addressed deficiencies in the way safety issues on construction sites were managed. Whilst builders are

ultimately responsible for the occupational health and safety of sites workers, traditional procurement processes prevented them from engaging in the planning and design phases of the work. Builders were often left with plans that lead to unsafe work practices for which they were not responsible, but liable for their consequences.

As a result of the framework, safety is now considered and integrated into all phases of a project. Victoria's Regional Rail Link incorporated the framework and achieved outstanding safety results – measured by injury rates and lost time – that were well below the industry average and set new benchmarks for similar projects.



## Low carbon living: making the desirable possible

### Adelaide's Lochiel Park

UniSA's Barbara Hardy Institute drew together researchers across a range of disciplines to inform the development of Lochiel Park, a residential community in Adelaide constructed with the aim of having carbon emissions close to zero.

With a 7.5 star energy rating, Lochiel Park's features include the use of solar power,

energy and water-efficient appliances and the harvesting of rainwater. This has enabled a reduction in potable water consumption by 78 per cent and energy use by 66 per cent compared to state averages across the development's 100 homes. Households are saving \$25,000 in energy costs alone across the life of each home.

The impact of Lochiel Park extends beyond the benefits to residents. Its success with Lochiel Park informed the Garnaut Climate Change Review and has set the standard for similar residential developments across Australia.



## Energy efficient materials and performance evaluations for buildings

### From the lab to a construction site: energy efficiency and building materials

UTS research has been the catalyst for the development of a swathe of new energy efficient products that are transforming the way residential and commercial buildings are conceived, fabricated and rated for energy efficiency.

Collaborating with chemical and component manufacturers from around the world, UTS

physicists have led the development of ground-breaking new products. One such product is a new 'cool' paint, developed using optical polymer technology, that makes buildings more energy efficient by repelling solar radiation whilst also improving roof durability. Developed in collaboration with Sydney-based SkyCool, the paint has delivered a huge financial

benefit for Melbourne Airport through lower air conditioning costs and reduced maintenance requirements. UTS physicists have not only been at the forefront of the development of energy efficient building materials, but their work has also led to national star rating systems and emerging building standards.



## Modelling of surface coating contributes to an innovative steel product

### Australian chemistry for Asian conditions

Iconic Australian steel manufacturer BlueScope has a higher quality flagship product thanks to research conducted by RMIT University.

BlueScope's COLORBOND® steel range is a multilayered paint coating system for steel used in both residential and

commercial building products. However, such products are prone to discolouration in South East Asia – a major BlueScope market – due to atmospheric pollutants.

RMIT University conducted nanoscale modelling that tested the interaction of

atmospheric pollutants and the surface of the painted steel products. The research enabled changes to the surface of COLORBOND®, enabling BlueScope to offer a five year warranty from discolouration.



## Evidence-based management of community buildings

### Better budgeting for infrastructure maintenance

A new cloud-based asset management system developed by RMIT University is helping local councils in Victoria maintain facilities such as gyms, community centres and homeless shelters by making data-driven decision making on future maintenance costs.

The Council Asset Management System (CAMS), developed by Professor

Sujeeva Setunge, has proven to be a superior tool in forecasting maintenance requirements, which local councils had historically been underestimating by 40 per cent. CAMS predicts future maintenance costs by analysis various factors such the age of buildings and their degree of utilisation.

Fundamentally, the software is driving more prudent financial

decision-making by councils on their maintenance budgets. When CAMS was adopted by the Melbourne City Council, it was used to analyse 200 council buildings. Decisions were then taken to demolish and refurbish two of them whilst optimising the future maintenance budgeting for the remainder.







# Education

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Educational research in Australia is producing improved outcomes in school education and student resilience at a time when the education systems of Australia's neighbours are advancing in performance and outcomes.

Technology is being leveraged to deliver superior learning outcomes thanks to the work of researchers at UTS; the teaching of multiplication and division has experienced an enormous step change following the work of RMIT University staff; and student feedback has transformed the teaching styles of educators through a program developed by Curtin University.

But the positive outcomes aren't just limited to academic results. Curtin University's Aussie Optimism program has led to better coping skills amongst kids, delivering noticeable improvements in levels of anxiety and depression. With concerns abounding at the mental health of school-aged children, this is an extremely pleasing development.



## Technology-enhanced learning to improve and increase the use of digital technologies in school education

### Enhancing student learning with digital technology

School classrooms are now hives of technological activity after the development of High Possibility Classrooms (HPC), an educational framework centred on technology-enhanced learning (TEL) and iPAC, a framework for the use of mobile devices.

The key to the deployment of devices such as laptops and tablets in an educational context is the confidence and skills of teachers to

leverage them to achieve superior learning outcomes. The frameworks developed by UTS gave teachers a greater understanding of the possibilities of TEL and instilled the requisite confidence to teach lessons using digital devices.

The feedback from schools on the frameworks has been overwhelmingly positive. Whilst most teachers are personally familiar with such technology,

their ability to use it in a teaching context is relatively poor in the absence of training.

The impact of HPC and iPAC extends beyond Australia, having been used by researchers at Georgia Southern University and incorporated into schools in Norway.



## Effective school improvement program: Measuring the pulse of Aussie classrooms

### Improving school performance through student feedback

A new program developed by Curtin University enables schools to be more responsive to student needs, improve the skills of their teachers and deliver better educational outcomes.

The Effective School Improvement program (ESI) is based on three questionnaires that assess students' perception of the classroom

learning environment; how inclusive a school feels to its students; and the perceptions of teaching staff. The key to the ESI program is not the surveys themselves, but how schools respond to the data generated in order to improve learning outcomes and school culture.

Feedback from schools is that the program has empowered

teachers to develop successful strategies to improve the learning environment in their classrooms. Insights into student wellbeing have also sharpened pastoral care outcomes, in turn leading to a greater level of persistence amongst the student cohort, resulting in improved NAPLAN and year 12 results.



## An effective strategy for improving multiplicative thinking in school students

### Better teaching methods lead to better maths skills

Students in years five to eight have improved their multiplication and division skills following the implementation of a new framework within the mathematics curriculum developed by RMIT University.

The framework breaks down multiplicative thinking into eight zones, with progression of students represented by advancement across each

zone. This enables teachers to assess the skill levels of students against each zone and provide tailored lesson plans that meet the specific needs of individual students.

The results have been excellent. Data from nearly 2,000 students saw an improvement 50 per cent higher than the accepted natural improvement levels. Feedback from teachers has

also been extremely positive. They have observed improved student behaviour; increased interest in mathematics class; and better reasoning skills in subjects beyond mathematics. Teachers themselves are also reaping the benefits of the new framework, with job satisfaction up and their own teaching skills sharpened.



## Aussie optimism: The positivity program that's helping Aussie kids help themselves

### Aussie Optimism: The positivity program that's helping Aussie kids help themselves

Despite the explosion in mental health problems amongst school-aged children, a program developed by Curtin University is delivering good news on the issue.

Aussie Optimism is a one hour a week program delivered over one term that is "helping children to reappraise things in a more accurate and usually more

positive manner", according to Professor Rosanna Rooney. It develops the emotional and mental resilience of children to enable them to withstand the inevitable pressures of life, such as peer pressure and the transition to high school. The program is endorsed by leading mental health group BeyondBlue and fills a gap in WA schools, as there had previously been no similar

program run on a universal scale.

Ultimately, it is the results of the program that are most pleasing. Children and pre-adolescents who have participated have reduced symptoms of anxiety and depression and demonstrate better family functioning and social skills.





## Seeing it from their perspective: A young person centred workshop has reduced the road toll

### Young drivers taking responsibility for road safety

A new approach to delivering the road safety message to young people has proven far more effective in changing driver behaviour and reducing the road toll.

The Fit to Drive program (F2D) was developed out of concerns that young driver education programs were failing. Instead of young drivers being lectured to by authorities, F2D empowers

young drivers to reflect on their own driving habits and take responsibility for their actions. Working in groups, participants define what constitutes risky driver behaviour and identify strategies to use in dangerous driving situations. It was backed by VicRoads in 2014 after a Coronial Inquiry into a road fatality recommended compulsory and consistent road safety education for young drivers.

Between 2011 and 2016, F2D was delivered to more than 130,000 secondary school students. Its impact can be seen in Transport Accident Commission data, which in 2014 showed a reduction of 20 percent in young driver casualties.



## Using children's voices to build better worlds

### Children's Voices Research Project

UniSA's Children's Voices Research Project (CVRP) seeks to elevate the importance of children being actively involved in decision making that affects their lives.

The premise of the CVRP is to elevate the importance of Article 12 of the United Nations Convention on the Rights of the Child, particularly

when it comes to government action.

One example of the impact of the CVRP can be seen in the approach of the Campbelltown City Council in New South Wales, which directly engaged with children concerning the construction of a playground. The children organised a petition to appeal for the

playground to go ahead, successfully convinced the council of its merits and were involved in consultations with the landscape architect to influence the playground's design. A similar outcome was also achieved with changes to the design of a skate park and youth precinct in Gawler, South Australia.



# Economics, Commerce and Public Policy

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Whilst the repercussions of research at ATN institutions are predominately focussed in applied sciences, our institutions are well and truly having influence on economics, commerce and public policy at a state, national and international level.

Research significant for its impact within Australia includes a review of a Medicare scheme by UTS staff that led to a substantial redesign of the program, as well as reforms made to laws governing assisted reproduction on the back of work also undertaken by UTS.

On international issues, economists at RMIT University have taken a leadership role in fostering closer ties amongst Asia-Pacific economies in order to promote trade and investment, whilst Curtin University revealed a fascinating study into how consumer preferences impact upon the counterfeit luxury goods market in China.



## Enhancing the investment environment in Asia-Pacific economic cooperation and association of Southeast Asian nations economies

### Enhancing the investment environment in Asia-Pacific economies

RMIT University's Australian APEC Study Centre (AASC) has facilitated the establishment of an organisation tasked with improving investment flows and strengthening economic development in APEC and ASEAN economies.

The Regional Investment Analytical Group (RIAG), consisting of key economics regulators from across the

region and investment experts from around the world, was convened for the first time in 2015. Since then, it has been highly influential in promoting the investment environment in the Asia-Pacific region.

RIAG has developed various quantitative benchmarks to assess progress in investment policies, which have in turn informed public policy decisions in each country.

RMIT's AASC has been critical to the supply and interpretation of the data that enables these assessments to take place. RIAG's importance can be seen through the significant endorsement received from business and government leaders, APEC leaders and heads of state in the Asia-Pacific region.



## Helping brands grow, evidence-based global marketing

### Reshaping marketing practices

UniSA's Ehrenberg Bass Institute (EBI) is the world's largest marketing science centre. The centre's marketing science research has transformed the way international and domestic organisations manage their brand – maximising returns, boosting efficiency and driving growth.

EBI has worked with major multinational firms, building an

evidence based on effective brand management that has fundamentally reshaped marketing practices and impacted profitability, market share and business strategy.

UniSA's marketing science centre has collaborated with international companies including PepsiCo, Nestle, News America, Carlton and United Breweries, Coles, ESPN, Fonterra, General Mills, Proctor

and Gamble, Unilever, Uber, and Mars Inc.



## Gender pay gap exposed by BCEC report

### New insights on the gender pay gap

A landmark report into has revealed ground-breaking insights into the dimensions and impact of the gender pay gap in Australia.

The report, prepared by the BankWest Curtin Economics Centre in partnership with the Workplace Gender Equality Agency, was based on an

exclusive dataset of 4 million Australian workers across 12,000 employers. It revealed that the cumulative impact of discretionary payments such as superannuation, overtime and bonuses increased the gender pay gap by 4.4 per cent.

When launched in 2016, the report reached more than

2.1 million Australians using traditional media channels – an impact that would have cost in the order of \$550,000 using paid advertising. The report has since been used to inform policy responses and wider education of the public in relation to the issue.



## A more equitable, efficient and sustainable health care system: Evaluation and reforming the medicare safety net

### Reforming the Medicare Safety Net

A highly considered piece of economic research conducted by UTS led to reform of the Extended Medicare Safety Net (EMSN) in order to deliver greater equity and better value to taxpayers.

The UTS review found a number of flaws with the EMSN. They included cost blowouts for the taxpayer; benefits accumulating to doctors and providers rather

than reduced costs for patients; and significantly more support for wealthier patients. As a result of these findings, the then-Government legislated a number of reforms to the scheme. Caps were placed on 71 Medicare items, limiting the financial benefit to patients and ensuring price signals operated for both patients and providers.

A review of these reforms found that these changes had had a positive effect – the cost of the EMSN had reduced, particularly in wealthier areas. UTS estimates that the intervention saved taxpayers nearly \$5 billion in the six years to 2016.





## Assisting refugees in Sydney to establish a business in the first three years of settlement: A research partnership between UTS business school and Settlement Services International

### From refugees to entrepreneurs

A landmark program transforming the lives of newly arrived refugees in Australia by providing tailored support to establish new businesses is now being taken around the world with the support of UTS.

Settlement Services International (SSI) developed Ignite, a three year pilot that assisted refugees on all aspects of starting a new business. SSI facilitates loans, web and logo design,

accountancy and market advice and introduces clients to potential customers.

The impact of Ignite is outstanding. A UTS evaluation report found that humanitarian entrants into Australia had created 61 businesses within three years of arriving in Sydney in 2014, not only delivering benefits to themselves and the wider economy, but also to the Australian taxpayer.

These businesses are estimated to have generated an extra \$1 million in tax receipts and resulted in reduced welfare payments of approximately \$3 million. A program based on Ignite will be launched in three Canadian cities in 2018.



## Reforming child protection policy and practice

### Protecting our children

UniSA's ACCP has designed the world's first model for nations to use in responding to the impacts of child abuse and neglect. Application of evidence and research informs policy and supports strategies and programmes in child protection.

UniSA's research has build sector capacity by cultivating

close working relationships with over 100 organisations and 5000 practitioners working in child protection. The ACCP has overseen more than 150 projects in the field of child welfare, undertaking a multi-million-dollar programme of research into the prevention of and response to child abuse and neglect.

For the past fifteen years, UniSA has informed every significant Australian inquiry into the child protection system and reform efforts. This research has allowed UniSA to identify priority action areas and subsequently develop indicators for monitoring progress.

## The fight for the right to work

### The fight for the right to work

Australian Government immigration policy was changed following a sustained campaign in favour of the working rights of asylum seekers, including a research report produced by Curtin University academics.

In 2012, asylum seekers released into the Australia community on a bridging visa were prevented from working.

This limited their income to no more than 89 per cent of the Newstart allowance (i.e. the 'dole'). A qualitative research report interviewed a number of asylum seekers and highlighted the financial hardship and mental anguish of those affected by the change.

In 2014, the government reversed the decision, enabling asylum seekers awaiting

determination of their asylum claim to work, which ultimately assists in their integration into Australian society. The Refugee Council of Australia, who had earlier endorsed the university's work, said that the report was influential in achieving policy change on the issue.



## Friend or Faux? Inside the counterfeit trade

### The Devil wears (Counterfeit) Prada

Curtin University's Luxury Branding Research Centre has been at the centre of a fascinating report into the preferences of Chinese consumers when it comes to counterfeit goods.

Professor Ian Phau and Dr Min Teah travelled to China to interview Chinese consumers for their report, Devil Wears (Counterfeit) Prada. It found that the principal drivers

of those who purchased counterfeit goods was status consumption, whilst the biggest factors against purchasing such products was the desire to adhere to the law and maintain personal integrity. Their research gained significant media attention not just in China and Australia, but around the world, with The Economist publishing the findings.

Whilst the opaque nature of Chinese politics makes it hard to discern the reasons for government policy changes, subsequent to the report's release, penalties for repeat offenders were increased and statutory damages increased six-fold as a means of discouraging the counterfeit trade.



## Regulation of assisted reproduction and surrogacy

### Improving IVF

Patient experience on assisted reproduction techniques such as IVF has been markedly improved as a result of influential research conducted by UTS, leading to legislative reforms and policy development across multiple jurisdictions.

More than 200,000 Australian children have been born as a result of IVF, with more than 73,000 cycles undertaken

by 39,000 women in 2016 alone. Whilst it often delivers incredibly positive outcomes for patients, its success is not guaranteed. UTS research findings are reflected in significant legislative changes in Australia that allow extended and more flexible periods for people to make decisions about their fertility treatment. These include longer gamete and embryo storage limits in NSW; changes to

storage limits and donation rules in Victoria; and updated regulator practice guidance in Western Australia.

Donor identification and sharing rules were also updated in both NSW and Victoria following UTS research and eligibility rules for surrogacy being broadened in South Australia in 2015.



## Safeguarding the elderly from abuse and neglect

### Protecting the vulnerable

In an Australian-first, researchers from UniSA have developed a safeguarding unit with investigatory powers that will protect vulnerable adult and elderly South Australians. Aged-care has been an issue close to the heart for many Australians. Families, friends and loved ones are often in

the dark or feel helpless about potential elderly abuse and neglect.

The research has spurred a \$15 million investment for new services and is characterised by strong partnerships with the aged care sector, peak advocacy groups and

government. This genuine collaboration has had a profound and long-standing impact – including legislative change, better urban planning, and lasting engagement with the aged care sector.

## Creating economic, environmental and socially sustainable communities

### Restoring, protecting and optimising social, cultural, economic and environmental resources

Communities are now more sustainable as research delivers methods associated with social science to meet challenges and deliver environmental benefits in communities. UniSA research have developed strategies and solutions to restore, protect and optimise social, cultural, economic and environmental resources to solve sustainability issues in communities.

Research teams have impacted seven major urban housing developments and over 52,000 residents across Australia. Impacting over 20,000 households, reduced energy and water usage have net benefits of \$25,000 over the life of each home.

The Department of Climate Change and Energy Efficiency (DCCEE) commissioned UniSA to lead research into changing

minimum standards for energy efficiency in all new houses and apartments, leading to revisions in the thermal comfort standard.







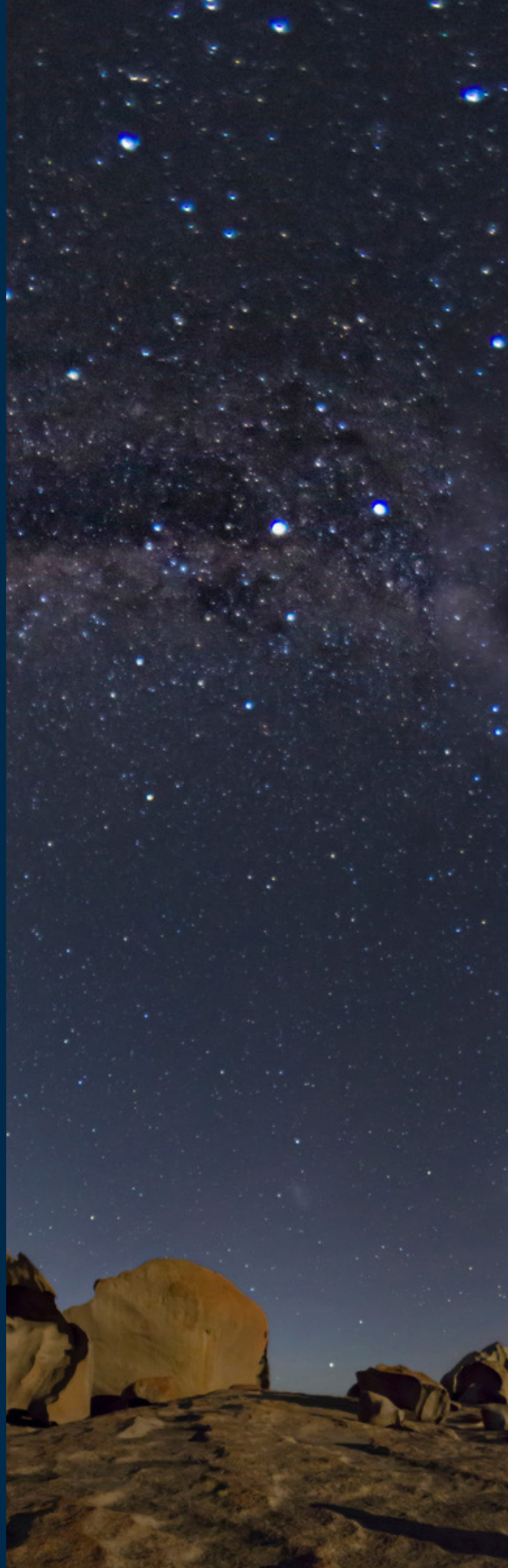
# Environment

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Australians are increasingly considerate of the impact of their daily lives on the environment. Public pressure has recently led to the phase out of single use plastic bags in major supermarket retailers. Considerable work continues to be undertaken amongst ATN universities in not just identifying environmental problems, but coming up with solutions to those problems.

From a new wastewater plant in Perth to minimum water flows in the rivers of New South Wales, environmental science has been at the forefront of government decision making. The impact of similar research can also be seen in the mining towns of Port Pirie and Broken Hill, as well as the decision of the Victorian Government to ban unconventional gas exploration.

The significance of ATN research on environmental issues is not just limited to better controlling those matters that can be controlled, but having a better understanding of phenomena that cannot. Two fascinating pieces of work have emanated from Curtin University in this regard. Weather forecasts are now more certain thanks to the work of a Curtin mathematician, whilst the trajectory of meteorites can now be tracked through the sky via a smartphone app developed by planetary geologist Professor Phil Bland.



## Fire and Flora: A relationship 100 million years strong

### Looking into the DNA of our fauna and the effects of fire

New research into the adaptability of plant life to fire has the potential to boost public confidence in prescribed burning programs.

A landmark examination of plant DNA, carried out by Curtin University, has shown that rather than destroying plant ecosystems, fire has been integral to the survival of Australian flora over millions of

years. After analysing species and subspecies of the Banksia family, it was determined through statistical probability that genetic traits related to fire – the storage of seeds in the canopy and retention of dead florets – were present tens of millions of years ago. Scientists then conducted experiments to show that such traits were indeed the product of fire, and not other

environmental factors such as drought.

For fire agencies, this is important in convincing the public that prescribed burning is based on robust scientific evidence, as critics have often claimed that no such evidence exists.



## Radio occultation technology improves weather forecasts

### The weatherman now gets it more accurate, more often

Twenty five million Australians can now plan their everyday lives with greater certainty as a result of more accurate weather forecasts enabled by the research of Professor Kefei Zhang of RMIT University.

The integration of GPS-based radio occultation (RO) data into Bureau of Meteorology forecasts in 2012 immediately

improved the accuracy of three to five day weather forecasts by ten hours – in other words, an accurate forecast was reached ten hours sooner. GPS RO works by instantly calculating atmospheric profiles of temperature, pressure and moisture more accurately than other methods such as weather balloons.

For fifth generation Wimmera wheat grower Phil Koschitzke, improved weather forecasts are critical to the success of his business, as some herbicides require rainfall to be effective, whilst others need dry conditions. “I check the 3-5 day weather forecast at least five times a day.”



## Desert fireball network: unearthing the secrets of the solar system

### Fireballs in the Sky

Amateur astronomers worldwide are now able to track asteroids through a smartphone app, Fireballs in the Sky. The app enables anyone to trace a fireball with their smartphone until it either disintegrates or meets its resting place.

The app is the product of Curtin University's Desert Fireball Network (DFN),

comprised of 50 observatories located across the Australian outback. Each observatory is fixed with a 36-megapixel DSLR camera and GPS module. The DFN enables the origin of meteorites to be tracked, filling a void in human knowledge: of the 50,000 meteorites exhibited in museums worldwide, the orbit paths of only 0.04 per cent are understood.

This has seen the recovery of two meteorites in remote parts of Australia

The app has also opened up educational benefits by enhancing STEM learning in the classroom. It now forms the basis of an Earth and Space Science unit consistent with the Australian curriculum.



## Saving lives, saving soil, saving sites: Transforming the way the world deals with contaminated environments

### Science improves public health outcomes and cuts costs for business

A more accurate means of assessing the health risks posed by contaminated land has saved industry hundreds of millions of dollars in remediation costs and led to strategies to improve public health outcomes.

Prior to the ground-breaking work of an interdisciplinary team of UniSA researchers, there was no accurate

means of testing land for contamination – instead, every site was assumed to be a risk to humans.

What UniSA delivered was a method of testing land contaminants and a model for predicting risks to public health. As a result, remediation costs have been slashed by a quarter of a billion dollars and strategies have been

developed by government authorities to address health concerns at specific sites. These includes a plan to reduce blood lead levels in residents of Port Pirie, South Australia and the commencement of research on lead contaminants in Broken Hill, New South Wales.





## Optimising environmental flows to improve river health

### Regulation of assisted reproduction and surrogacy

Environmental flows are a controversial public policy issue in Australia. Irrigators and environmentalists are often at loggerheads on the matter, with the former arguing that evaporation makes flows above a certain threshold pointless. However, the UTS research on algal blooms in particular has helped policymakers set minimum flows.

Optimal water flows have a number of benefits. They ensure communities have safe and reliable water supplies with reduced salinity and algal blooms; support industries such as farming and tourism; and ensure the continuity of a healthy ecosystem.

The UTS research has had significant impact, with both New South Wales and Commonwealth water

authorities using its findings in developing water policy.



## Computers capturing Co2: Improving estimates of land use change using satellite image processing and machine learning

### Tracking land use change using satellite image processing and machine learning

Artificial intelligence is being used to help measure Australia's carbon emissions by processing changes in land use detected by remote satellites.

Deforestation has a significant impact on carbon emissions given the well-understood role of plant life in absorbing carbon dioxide. By combining satellite imagery, computer-

based models and artificial intelligence, researchers at RMIT University were able to develop a system that accurately measures Australia's carbon dioxide emissions under the National Carbon Accounting System (NCAS) as a result of land use change. NCAS is a critical tool in meeting Australia's reporting obligations under the Kyoto

protocol.

The system is far superior to traditional methods of tracking land use change, and was further improved in 2014 when new means of assessing natural disturbances such as bushfires were incorporated into the model.



# Arts and Indigenous Affairs

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ATN's strengths in technology, scientific research and industry collaboration are complemented by uplifting stories from research in the field of Arts and Indigenous Affairs.

Most prominent of these is the story of the Wilomin Noongar project, which has sought to enliven the understanding of Indigenous languages and promote cultural tourism. Led by Indigenous research Kim Scott at Curtin University, the project led to the publication of a series of storybooks on the Wirlomin Noongar people of southwestern WA.

Meanwhile, at the other end of the country in East Arnhem Land, Indigenous students are benefitting from a new tool that delivers mathematics education in Indigenous languages, which has been credited with a significant uplift in numeracy rates.



## Reclaiming memories lost: The wirlomin noongar project

### "Two of the most significant publications of the year"

The Wirlomin Noongar Language Project, led by Indigenous researcher Kim Scott at Curtin University, has led to the revival and knowledge of the ancestral cultural heritage of the Wirlomin Noongar people of southwestern WA.

The project has seen the publication of a series of storybooks, two of which were labelled by the literary critic of The Australian as "two of the

most significant publications of the year". The books, which are Noongar language resources, are supported by multimedia that include audio recordings of the stories being read in both Noongar and English.

Scott's work has been credited for sparking interest in Indigenous languages and contributing to tourism in the Albany region. Information boards along the Mamang trail

in the Fitzgerald River National Park include illustrations and text from Mamang, one of the critically acclaimed storybooks published as part of the project.



## Sonic placemarkers: Audio ecology of the Kimberley and Antarctica

### Just like being there: soundscapes of the Kimberley and Antarctic

The sounds of remote Australian locations are being made accessible to the masses through the work of a sound artist from RMIT University, Associate Professor Philip Samartzis.

Samartzis' work composes soundscapes of the Australian Antarctic Territory and the Kimberley region of North-West Australia. Presented

in various forms of media such as exhibitions, radio programs and audiobooks, the soundscapes allow listeners to gain an appreciation of these incredible locations that they would otherwise never experience.

The soundscapes have helped to increase awareness of the pristine Antarctic environment and the importance of

maintaining it, whilst recordings of the Kimberley have cultural significance to the indigenous Warmun community. Samartzis and Warmun community leaders worked together as co-creators of a soundscape featuring the sounds most important to Warmun people.



## Flipping the script on Aboriginal media representation

### A balanced view from the media

Two academics from Curtin University have taken credit for a change in the editorial stance of mainstream media between two Aboriginal tent embassy protests that took place three years apart.

Dr Thor Kerr and Dr Shaphan Cox critically analysed coverage of the Nyoongar tent embassy in 2012 with a book that provided counterbalancing information

to what had appeared in news reports. The book became required reading for journalism students at Curtin University.

A 2015 protest covering the tent embassy was noted for its markedly different coverage – and in the eyes of the Curtin academics, a more balanced appraisal of the complex issues at hand. They consider that the 2015 coverage was different given its emphasis

on the peaceful nature of the protests, as well as providing greater attention to the reasons and stories behind those congregating.



## Changing language learning and establishing intercultural understanding in national curricula

### Intercultural understanding

Research has transformed the way languages are taught and learnt through the development of intercultural orientation to language learning. “Intercultural understanding” will now be included as one of seven General Capabilities and has changed learning for all Australian Students. UniSA research has been

incorporated into professional standards and in practice by more than 10,000 teachers in Australia.

UniSA have collaborated with state and federal governments to deliver this body of research and has provided the conceptual base for development of the national curriculum for 14

languages and the framework for Aboriginal languages.

Australia is a multiracial country and ATN delivers innovative teaching pedagogy in language through research and has allowed Australian universities to be mapped competitively on the international stage.













