

SUSTAINABLE DEVELOPMENT GOALS



UNIVERSITY OF NEWCASTLE
PROGRESS REPORT 2021





ACKNOWLEDGMENT OF COUNTRY

The University of Newcastle acknowledges the traditional custodians of the lands within our footprint areas: Awabakal Nation, Darkinjung Nation, Biripai Nation, Worimi Nation, Wonnarua Nation and Eora Nation. We also pay respect to the wisdom of our Elders past and present.



A BETTER FUTURE FOR ALL

The University of Newcastle looks to a better future for all, guided by the United Nations Sustainable Development Goals. We are committed to this call to action, being accountable for our impact, and supporting our community to achieve their sustainability goals.

Last year, we were honoured to be ranked 1st in the world for Partnering for a Sustainable Future in the THE Impact Rankings, and 12th in the world for overall impact. This year, we have conducted more research, founded additional partnerships and spearheaded new projects to find solutions to the world's biggest problems. Our *Looking Ahead Strategic Plan 2020-2025* promises to serve our regions by taking research that matters to the world and bringing our global expertise home. This aim aligns with our commitment to the Sustainable Development Goals, and provides a pathway to a more responsible, accountable, and innovative University culture.

In this report, you'll read about how our students, staff, research centres, start-ups and alumni are changing the world for the better. Despite the challenges of COVID-19, our committed researchers have achieved great success. We have also made strong progress towards sustainable modes of production and consumption.

But we're committed to doing more. Each new avenue of research opens up opportunities to make positive change at all levels. Working together with our communities to achieve these 17 Sustainable Development Goals inspires us to continually improve, and to face the challenges of the climate crisis with innovation, forward-thinking strategies and responsible practices.

I hope you enjoy reading these positive stories of real-life impact. We're proud of our people and what they have achieved. Their energy and dedication underpins our aspiration to be a world-leading sustainable institution in 2022 and beyond.

Professor Alex Zelinsky AO
Vice-Chancellor and President



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Ranked No. 1

in Australia and 3rd in the world for
Affordable and Clean Energy 2021

Ranked No. 5

in Australia for Life on Land 2021
THE Impact Rankings

OUR GOALS

The University of Newcastle is committed to aligning our strategic priorities to the United Nations Sustainable Development Goals. Our values of Excellence, Equity, Engagement and Sustainability set the standards that we nurture in our staff and they guide our decisions and actions.

Our University has been building upon our Environmental Sustainability Plan and we are working toward carbon neutrality by 2025 and zero waste. We are committed to being a driving force for broader and better education. We ensure our students develop life and career skills that will make them competitive in the workforce, and we are strongly supported in their physical and mental well-being.

We are determined to find relevant research solutions to local, national and global problems, particularly in the areas of healthier living, connected communities, next generation resources and growing industries.



1 NO
POVERTY



NO POVERTY

CHANGING THE SYSTEM

Inspired to disrupt the system perpetuating global inequality, Master of Social Change and Development alumna (2011) [Monika Goforth](#) has dedicated her life to finding and promoting innovative, real-world solutions to break the cycle of poverty and underdevelopment. Now acting as Executive Director of the Appropriate Technology Collaborative (ATC), Monika has worked with rural communities in Guatemala since 2014, partnering with local leaders to design and implement innovative green technology projects. In 2021 Monika was awarded the University's International Leadership Award.

“It has always concerned me that the majority of the world’s population is living in poverty and we’re allowing a system like this to continue. What I learned at the University of Newcastle was about that system and how difficult it is to shift it. That’s why I’ve been focusing on grassroots development that empowers people to find local solutions.”

— Monika Goforth

FREE FOOD

In April 2021, the University’s student association, UNSA, launched the [Food Pantry Project](#), to provide healthy and tasty groceries for students facing hardship. Staff and students make sealed donations to the pantry, which are then sanitised and made available to those in need. Drop-off bins are located at the Central Coast and Callaghan campuses.

UNSA also instigated ‘[Free Food Fridays](#)’ in partnership with OzHarvest, Australia’s leading food rescue organisation. Every week, OzHarvest rescues over 100 tonnes of quality surplus food from more than 3,000 food donors (including supermarkets, restaurants, cafes, hotels, airports and food outlets) and delivers it directly to more than 1,000 charities and non-profit groups...including us!

AFFORDABLE HOUSING

The University’s Student Living branch offers a range of [affordable housing](#) for international and domestic students. From self-contained flats to shared apartments and single studios, the on-campus options cater to all at a manageable price. Students are also able to get assistance with off-campus accommodation, and homestay accommodation with family meals is available for international students.

FINANCIAL SUPPORT

The University offers a range of loans, grants and scholarships to help students who are doing it tough. There are easily accessible pathways to Student Hardship Vouchers, Student Placement Grants, Student Textbooks, Student Loans and Work Development Orders (WDO). There are also a range of scholarships for students experiencing financial hardship, as well as scholarships specifically for Indigenous and international students. The [Shaping Futures Hardship Fund](#) provides crucial assistance to students facing emergency situations such as a personal crisis, natural disasters including bushfires and floods or those impacted by COVID-19. The fund provides support through \$500 hardship grants, \$750 laptop grants and \$100 food vouchers.

“I struggle to put into words how much this grant means to me during this time...”

— Shaping Futures Hardship Fund recipient

“I’m so thankful to the donors who have empowered me to give 100% to my studies and chase my dream. I’m living proof you can go from being vulnerable and disadvantaged to smashing barriers and breaking stereotypes. It’s my time to make a difference.”

— Harry, Bachelor of Social Science (Human Services) student and Singapore Alumni Scholarship recipient

18.5%

18.5% of students receiving financial aid, and, 1 in 4 domestic undergraduate students from low socioeconomic backgrounds

1 in 4

1 in 4 domestic undergraduate students are from low socioeconomic backgrounds



The University helps to ensure all its students have access to the technology they need for their studies, with \$750 laptop grants available to students facing hardship



2 ZERO HUNGER



ZERO HUNGER

URBAN FARMING

University of Newcastle alumnus David Sivyer started his first urban farm on a small plot of land by simply asking the owner if it was okay to 'start a farm'! Since then, his circular economy start-up Feedback Organic has scaled up to a large parcel of land, allowing the team to recycle over 1.5 million litres of food waste and create 18 tonnes of sustainably produced food. [Feedback Organic](#) participated in Integrated Innovation Network's (I2N) Validator program, and the University has recognised David for his important work, awarding him Student Entrepreneur of the Year 2020.

RESEARCHERS FOR FOOD PRODUCTION

In March 2021, the University of Newcastle opened its newest Doctoral Training Centre (DTC), the [Food and Agribusiness DTC](#), at the Central Coast campus. As the first centre of its kind in the area, the centre will provide a platform for inter-disciplinary research and training in an industry that foregrounds the sustainable and efficient production of food, and is committed to collaboration and innovation through education and research.

The centre is working to improve attitudes towards and methods of food production in four key areas: Product Science, Climate Resilience and Sustainability, Advanced Technology, and Market Access.

REMOTE NUTRITION ADVICE

Final-year students of the Bachelor of Nutrition and Dietetics program are delivering nutrition and diet advice to the community under a [new telehealth program](#), providing the public with continuity of care during times when face-to-face contact is restricted. The free service, offered under the supervision of an Accredited Practising Dietitian, gives a comprehensive assessment of food and nutrient intake and eating behaviours, whilst providing students with valuable practical skills in dietary consultations and the emerging field of telehealth.



Telehealth clinics enable continuity of care when face-to-face contact is restricted

FUTURE FOOD CONFERENCE

A team of University of Newcastle academics led the [2021 Sustainable Future Food Conference](#) at our Central Coast campus in June. The conference brought together leading researchers, students, and local industry professionals in the food science and nutrition space to showcase current research efforts developing the next generation of sustainable food and nutrition services. The expert community shared ideas of how to bring accessible and sustainable food into everyone's future.

RESEARCHING FOOD INSECURITY

School of Medicine and Public Health PhD candidate Tabassum Rahman has been working with the Centre for Development Economics and Sustainability at Monash University, investigating food security as a result of and during COVID-19. The researchers are aiming to get ahead of COVID-19-related food insecurity before it worsens for disadvantaged communities across the world.

7258

7,258 research citations

1.5 tonnes

1.5 tonnes of food delivered to on-campus students during COVID outbreak



University of Newcastle alumnus David Sivyer shows off the organic produce from his start-up, Feedback Organic





GOOD HEALTH AND WELL-BEING

HEALTH ACROSS THE WORLD

The world's most published and cited dietitian researcher, [Laureate Professor Clare Collins](#), neuroscientist [Professor Michael Breakspear](#) and Internationally recognised infection control professional and researcher, [Professor Brett Mitchell](#) are looking for solutions to some of the world's most critical health problems, supported by more than \$8.3m in National Health and Medical Research Council (NHMRC) Investigator grants. In collaboration with the University's strategic partner Hunter Medical Research Institute, these researchers will explore mathematical models of brain disorders, personalised nutrition support, and strategies to prevent 'neglected' areas of infection prevention — paving the way to help millions of people around the world live better, healthier lives.

AT THE FOREFRONT OF SURGERY

Australia's first Aboriginal surgeon and highly acclaimed ear, nose and throat surgeon, the University of Newcastle's NHMRC Investigator [Dr Kelvin Kong](#) from the School of Medicine and Public Health, was awarded the prestigious 2020 Menzies Medallion and the 2021 Australian Society for Medical Research Medal for his work. A proud Worimi man from Port Stephens, the breadth and depth of Associate Professor Kong's work is vast and impacts the poor educational outcomes for children and higher unemployment rates in adults that can come from hearing loss.

WOMEN SHAPING HEALTH

University of Newcastle researchers have helped create the [largest and longest-running women's health study](#) in Australian history to find solutions to many ingrained societal problems. With more than 20 years of insights already in hand and a long track record of impact, the team are recording the lifelong health implications of violence and abuse, the impact of multiple chronic conditions, housing and residential care for older women, the prevalence of endometriosis in Australia, the impact of COVID-19 on women specifically, and more. Australian Longitudinal Study on Women's Health (ALSWH).

“The ALSWH provides an evidence base for both policy and practice, and is a significant national resource.”

— [Professor Deb Loxton](#)

[An additional \\$8.5 million](#) in funding from the Australian Government, announced in late 2020, will finance the program into 2023, as well as a project to improve the representation of Australian women from South East Asia, North East Asia and Southern Asia in the survey.

GETTING KIDS MOVING

Australian children are some of the least active in the world. University of Newcastle researchers are addressing this head on with a range of innovative school — and family — based programs that are getting our kids moving. Over the last 15 years, Professor David Lubans and his colleagues in the [Priority Research Centre for Physical Activity and Nutrition](#) have worked with hundreds of schools and school communities to increase the quality and quantity of physical activity in our kids.

Following the success of the group's whole-of-school intervention SCORES program (Supporting Children's Outcomes using Rewards, Exercise and Skills), the University of Newcastle partnered with the NSW Department of Education and the Australian Catholic University to roll out an adapted program known as iPLAY. The popular program has so far been rolled out to more than 160 primary schools in NSW and reached over 2,500 teachers, and was made available to primary schools across the country from 2020, through Sport Australia's Exemplary School Program.

The research group have also developed a number of other exciting ways to increase kids' physical activity while at school, with the 'Thinking While Moving', 'Resistance Training for Teens' and 'Burn to Learn' programs.

79,742

79,742 citations

33.8%

33.8% of all graduates are in health professions

No.1

No. 1 in Australia for overall satisfaction in postgraduate Medicine



Professor Brett Mitchell's research is tackling the looming global threat of microbial resistance and emerging infections

TRACKING FLU OUTBREAKS

Dr Craig Dalton's award-winning FluTracking program started in the NSW Hunter region with 400 participants. Today, it collects data from more than 150,000 people across Australia and New Zealand, which helps health officials determine the onset of influenza and better understand the burden and severity of the disease, and [has been used in the COVID-19 outbreak](#) to determine how many people with symptoms present for testing. Dr Dalton and his team are working to expand FluTracking to South East Asia, and to adapt the tool to monitor and better understand other acute events, including thunderstorm asthma outbreaks and water contamination events.

PERSONALISING MEDICINE

In a win for the nation's personalised healthcare capability, the University of Newcastle's School of Creative Industries [FASTLab](#) has been announced as a key partner in the establishment of a new \$24 million Australian Research Council (ARC) Research Hub led by the University of New

South Wales to personalise medicine and reduce its impact on people's day-to-day experience. Combining research, industry knowledge, design and entrepreneurship with a focus on transformative health care, the new Hub for Connected Sensors for Health will aid the development of innovative medical technologies (MedTech), such as inobtrusive medical jewellery and smart fabrics, designed to fit with ease into people's everyday lives.

TACKLING BRAIN CANCER

The Mark Hughes Foundation has committed \$7.5 million to fund a [dedicated brain cancer team](#) to drive critical research, education and health care improvements for brain cancer patients and their families. Brain cancer kills more Australians under 40 than any other disease. It is the most complex cancer, yet it is the most under-studied and survival rates have hardly changed for 30 years. The generous philanthropic commitment to the University of Newcastle will scale up Australia's brain cancer research over the next five years in an effort to significantly improve treatments and patient outcomes for the goal of Good Health and Well-being.



4 QUALITY EDUCATION



46.7%

46.7% of new students are first generation

QUALITY EDUCATION

TRANSFORMING TEACHING

University of Newcastle education researchers have transformed teaching practices and student outcomes in more than 2,500 schools — and they're just getting started! Developed by [Laureate Professor Jennifer Gore](#) and Associate Professor James Ladwig, the Quality Teaching model provides teachers with a tested conceptual framework for articulating, assessing and refining their own and each other's practice. It features three dimensions that are linked with improved student outcomes: intellectual quality, quality learning environment, and significance. The ultimate beneficiaries of QTR are students: at the end of 2016, clear correlations had been found between teacher participation in QTR and student performance on NAPLAN, and the benefits continue to grow.

CHILDREN'S UNIVERSITY

[Children's University Newcastle](#) engages children in learning in its broadest sense. Participating children, between 7 and 14 years, are encouraged to discover new learning experiences outside of the classroom, in their local and regional community and on campus. Participants that reach 30 hours of learning, collected in their Children's University Passports, are invited to attend a formal graduation ceremony to celebrate and acknowledge them (and their supporters) and their commitment to learning. Children's University Newcastle is a member of Children's University Australasia, and represents the University's support of multifaceted learning at all ages.

SHARING KNOWLEDGE

The [Looking Ahead Lecture Series](#) allows our communities to be part of the University's journey toward an equitable and sustainable future. Keynote lectures and panel discussions from researchers into the challenges of contemporary life open the doors to the great thinking and innovation that goes on at our university—important work that is locally and globally relevant.

PATHWAYS TO LEARNING

According to the Department of Education Higher Education Statistics (2019), the University of Newcastle is the largest provider of pathways programs in Australia, with [Open Foundation](#) the largest and oldest. Open Foundation puts the student at the heart of the curriculum and teaching methods, with a strengths-based approach that takes students from the known to the unknown by applying concepts and skills to everyday life and interests. With this philosophy, Open Foundation enabled over 95% of 2020 completing students from low socio-economic backgrounds to access a degree.

SUPPORTING SCHOOLS

With a vision to be a world-leading university for our region, the University of Newcastle has a proud tradition of working with our communities and being deeply engaged with our local and regional schools. With programs like the student [Science and Engineering challenge](#), the Science, Maths and Real Technology (SMART) outreach program, High Performing Students program and Friends on Campus, school students are supported in their studies and any potential transitions to further education.

No. 1

No. 1 alternative entry provider in Australia

75%

75% of completing enabling students go on to study an undergraduate degree at the University of Newcastle

Top 6

Top 6 Ranked English Language Centre in Australia for Learning



Children explore learning outside of the classroom with Children's University





GENDER EQUALITY

WOMEN IN STEM

[HunterWiSE](#) is an initiative that establishes mentorship avenues for women in STEM throughout the Hunter region, promoting positive collaboration and sharing of experiences. This project builds on a partnership between The University of Newcastle, Glencore, Newcastle Coal and many other organisations, and features two key interlinked actions aimed at increasing the number of girls and women participating in STEM: a targeted school intervention, and a series of networking events for female STEM professionals across the Hunter.

GOING FOR GOLD

Having attained [Athena Swan Bronze](#) status in 2018, the University is now progressing towards Silver status. The five key barriers to attraction, retention and promotion for women, particularly those in STEM, have been identified and the University is putting funding and resources towards strategic and innovative solutions to reduce or remove the barriers. The process also takes an intersectional lens, to identify where barriers particularly impact certain sub-groups and tailor solutions accordingly.

RESEARCHING GENDERED VIOLENCE

A team at the University, involving Professor Penny Jane Burke, Dr Julia Coffey, Felicity Cocuzzoli and Dr Stephanie Hardacre, has launched a [new research agenda](#) to explore the impact of gender based violence on access to and participation in higher education.

The research commenced in 2021 with a pilot study to map the different forms of gender-based violence students have experienced throughout their life, and in-depth interviews to explore the impact these experiences have on students' access to and participation in university study.

“We, and they, hope that bringing their voices forward will enable real social and cultural change.”

— Dr Julia Coffey

A series of art workshops offered to participants as part of the research pilot offer supportive spaces for connection between participants, and they receive access to university and community services.

FEMALE FOUNDERS PROGRAM

In August 2021, applications opened for the inaugural intake of the [Female Founders Program](#), which was delivered by the University of Newcastle's Integrated Innovation Network (I2N) in partnership with the City of Newcastle. Senior Manager of I2N Operations and Innovation, Siobhan Curran, said the Female Founders Program offered a springboard to empower Newcastle women to navigate their start-up journey with confidence. Recent research found that start-ups co-founded by women are reported to have received just 27 percent of venture capital funding in Australia to date in 2021.

“The I2N's Female Founders Program aims to level the playing field for female innovators and entrepreneurs in the Newcastle region giving participants the necessary skills and access to a network of mentors to jumpstart their start-up.”

— Siobhan Curran

TARGETED SCHOLARSHIPS

The University offers [a range of scholarships for women](#), including the Lord Mayor's Scholarship for Women, the Females in STEM Scholarship, the Women in Master of Business Administration (WiMBA) scholarship, and Women in Engineering Scholarship. Local organisations are often keen to philanthropically support these scholarships both as a way of supporting the community and helping to grow a diverse workforce of the future.

58.5%

58.5% of commencing students are female

71.1%

71.1% of graduating Medicine students are female

WGEA

WGEA Employer of Choice for Gender Equality



High school students conduct a chemical analysis of a sports drink on their visit to the University as part of the HunterWISE Outreach Program

ALLIES FOR GENDER AND SEXUALITY

The University's [ALLY Network](#) aims to create a more inclusive culture at the University by promoting greater visibility and awareness of those who are diverse in their sex characteristic, gender and/or sexuality. This includes: lesbian, gay, bisexual, transgender, intersex, queer, asexual, agender, aromantic; + other diverse sexual orientations and gender identities. The Network offers professional development and training to staff and student leaders who are prepared to advocate on behalf of diverse members of the University.

FAMILIES AT THE UNIVERSITY

The University recognises that family commitments can sometimes make it difficult to meet work responsibilities. We offer [flexibility and a range of benefits](#) to help staff with their family responsibilities, including carer's, parental, partner and surrogacy leave, parenting rooms, and childcare centres on campus. The University Counselling Service also offers a [Support Group for Parents](#), for students who are also juggling the demands of parenting, and all staff are entitled to a number of free counselling sessions for themselves or their immediate family members.

WOMEN IN ENGINEERING

The College of Engineering, Science and Environment supports its female students in many ways, including hosting activities to assist in the establishment of support networks, and to communicate opportunities in engineering as a course of study and career option. [Newcastle University Women in Engineering \(NUWiE\)](#) is a student run society which was founded in 2014 by a group of female students in the faculty. They organise social events such as trivia nights, game nights, support sessions and BBQ lunches.

FROM RESEARCH TO PRACTICE

[The International Network on Gender, Social Justice and Praxis \(the Network\)](#) is a cross-trajectory, interdisciplinary, and geographically diverse network. The Network brings together leading scholars and practitioners who are prepared to take intellectual risks to respond to the significant challenge of translating research into practice in order to develop innovative approaches that impact on the educational inequalities that exist around the globe. In the long term, the Network aims to be a global think tank that provides scholarly input into an international agenda focused on gender and social justice within education.





CLEAN WATER AND SANITATION

DRONES PREVENTING WATER LOSS

With leaking and burst water pipes costing water authorities and consumers time and money, as well as wasting a precious resource, researchers at the University of Newcastle have been [developing drone technology](#) to help predict which areas, and even which specific pipes, are at risk of water loss through corrosion. Associate Professor In-Young Yeo and Professor Rob Melchers, from the University of Newcastle School of Engineering, along with PhD student David Bretreger, have developed LiDAR (Light Detection and Ranging) — a remote sensing method that uses a pulsed laser to measure ranges (variable distances) to the Earth. Differences in laser return times and wavelengths can then be used to make digital 3D representations of the landscape and indicate the amount of water in the ground. The University's LiDAR, soil moisture and corrosion investigation is part of a larger 'Innovative smart water management' project coordinated by NSW Smart Sensing Network (NSSN) and led by Sydney Water. Associate Professor In-Young sees these emerging techniques being used for monitoring wetlands and managing irrigation.

HACKS FOR WATER SECURITY

The [New Futures Hackathon for Water Security](#) in October 2021 saw seven teams learn from water security experts from Hunter Water, City of Newcastle, Hunter H2O, and the University of Newcastle before embarking on a 10 hour "hack" to evolve ideas for a viable, technological solution to water scarcity. Everydrop, a mobile-based application that gamifies water consumption for households, was awarded the Best Tech Solution. The winning team — Daniel Smith, Gabriella Maughan, Liam Scanlan, and Thomas Courtney — was comprised of multi-disciplinary University of Newcastle graduates in business and entrepreneurship, law, e-commerce, and software engineering. They were awarded \$3,000 and each received a three-month residency at the University's I2N Hub Honeysuckle with specialist mentorship to continue development of their idea.

WASTE WATER TREATMENT

The University stays aware of where its [water](#) goes! Waste water for the University's Callaghan Campus is treated by Hunter Water. The nearby Shortland Wastewater Treatment Works treats the waste, and all biosolids are used for mine site rehabilitation and agricultural pasture improvement projects. Effluent is sent to the Kooragang Island Water Recycling Scheme, and our new and refurbished plumbing and drainage systems are energy efficient, fit-for-purpose, made from durable and quality materials, contain no or minimal environmentally harmful substances, and are cost efficient to operate and maintain.

WATER RESEARCH ROADMAP

In 2020 the Newcastle Institute for Energy and Resources (NIER) introduced the [Water Research Roadmap](#) to support and enhance research into the critical impact of water resources and their management. Research teams contributed evidence-based knowledge, enabling technologies and improved management tools to optimise water resources for environmental, social and economic benefit, and to further the water-based SDGs. The roadmap encourages researchers to look for innovative solutions in four main areas: regional water security, coast and catchment water management, water utilisation, and water recovery.

“Delivering enabling technologies and integrated solutions for greater water efficiency and productivity to support diverse industries, vibrant communities and healthy environments”

— Water Research Roadmap

286,000m³

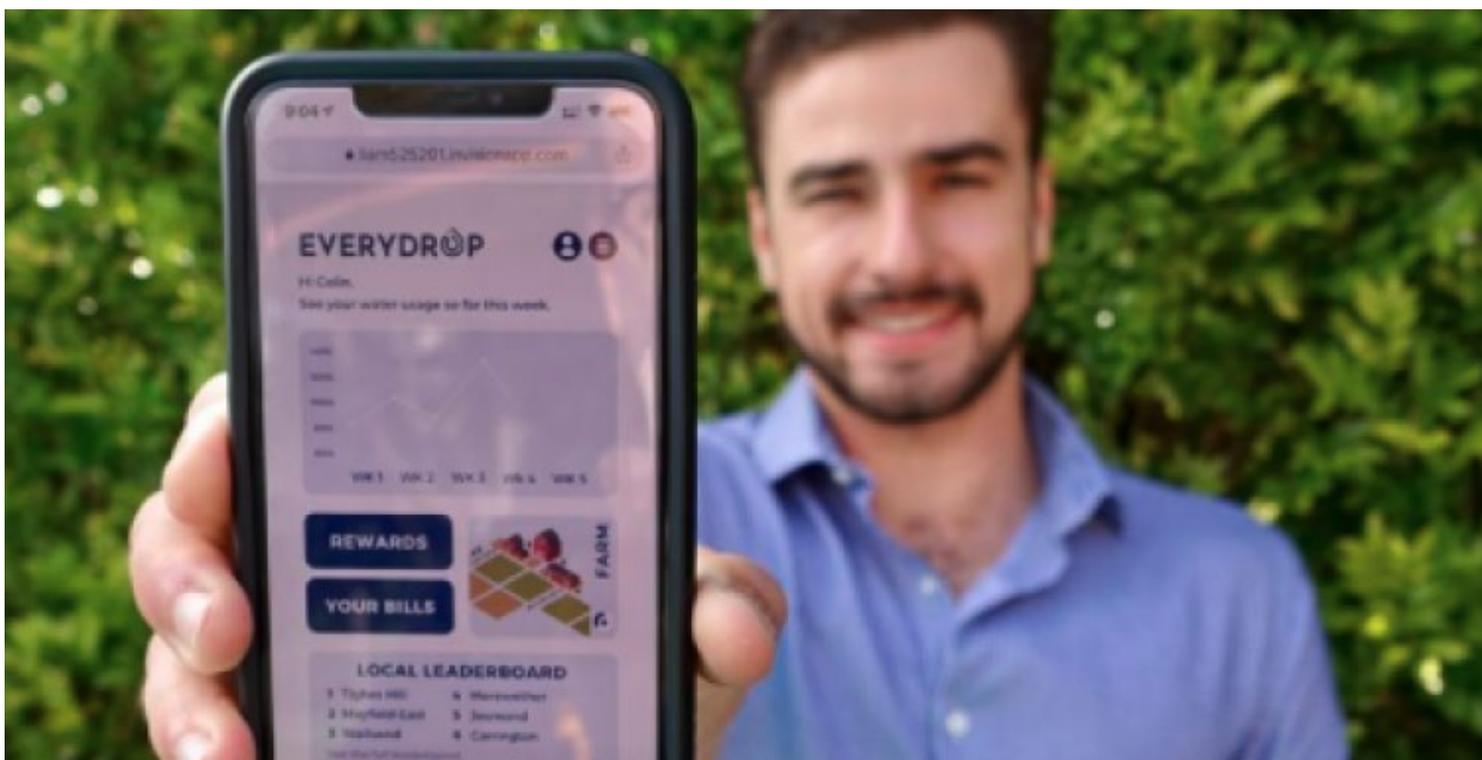
286,000 m³ water comes into campus

15%

15% reduction in mains water usage by 2025

30%

30% reduction in total water consumption in 2020



Daniel Smith demonstrates the prize-winning app Everydrop at the New Futures Hackathon for Water Security

INDIGENOUS WATER STORY

The University collaborated with Hunter Water and the Awabakal and Worimi communities to create a story that draws on traditional wisdom and practices of caring for our land and waterways. The story was written by ten Aboriginal students from Newcastle High School, with guidance from Hunter Water's Education Coordinator Kristy Ratcliffe, Professor Ruth Deakin-Crick, local Aboriginal educator Deirdre Heitmeyer and Aboriginal artist Saretta Fielding. The illustrations and book design were produced by Creative Industries students from the University of Newcastle. [Where's Our Water?](#) will assist Hunter Water in educating young people in the Lower Hunter about the value of water and the role we all play in ensuring we have enough now and into the future.

WORKING TOGETHER

The Wollotuka Institute has been working with Hunter Water to [share Indigenous knowledge and values](#) around clean water availability and protection. This has involved interviews with Aboriginal people from the region to educate Hunter Water on dreaming stories about water, particular places of value, natural markers related to water and climate, and to seek their views on specific options like recycled water, desalination and dams.





AFFORDABLE AND CLEAN ENERGY

REDUCING METHANE EMISSIONS

Professor of Chemical Engineering Behdad Moghtaderi leads a 30-strong research team at the world-class Newcastle Institute for Energy and Resources. His major project has been to [develop new methods to manage ventilation air methane \(VAM\)](#) generated by underground coal mines. As a by-product of underground coal mining, VAM accounts for more than 60 percent of all greenhouse gas emissions from the coal mining sector.

Professor Moghtaderi spear-headed a multi-pronged, \$30 million research program designed to develop and rollout new technologies. Funded by partners such as the Australian Department of Industry (Innovation and Science), the Australian Coal Association Low Emission Technologies, Glencore, BHP Billiton and South32, this program has the potential to reduce fugitive methane emissions from underground coal mining operations by up to 90 percent, thereby reducing Australia's greenhouse gas inventory by about 3 percent.

SOLAR ENERGY ADVANCES

Material engineers Dr Heber Sugo and Professor Erich Kisi received \$515,000 from the Australian Solar Institute to create [a new device](#) that converts solar energy directly into electricity.

“Our device will comprise materials used to power the electrical systems of spacecraft, and will reach temperatures of up to 1,500 degrees Celsius.”

— Dr Heber Sugo

“Being able to work at higher temperatures allows a more efficient conversion of heat into electricity, thereby reducing production and environmental costs. More efficient energy conversion means that smaller solar arrays can give the same energy yield.”

WORLD-FIRST STORAGE SOLUTION

[Miscibility Gaps Alloy \(MGA\)](#) are thermal storage blocks, stackable like LEGO® and capable of receiving renewable energy, storing it cheaply and safely as thermal energy, then using it to run steam turbines at power stations instead of burning coal. Proved in partnership with Swiss-based E2S Power Ag and patented by a team of engineers led by [Professor Erich Kisi](#) at the University of Newcastle, these blocks can be added or removed to scale the system up or down to meet market demand and, importantly, can be retrofitted to retired power plants or introduced to existing power plants to help them transition from fossil fuels to renewables. The ground-breaking technology was awarded the Australian Financial Review's Research Commercialisation Prize in November 2021.

PRINTED SOLAR CELLS

In a significant step toward commercialisation of the University of Newcastle's printed solar cells, the ultra light-weight, ultra flexible, recyclable and cheap to manufacture renewable energy technology was [tried for the first time](#) in a public setting at Lane Cove Council's new urban space 'The Canopy'. The installation allowed Professor Paul Dastoor and his team from the College of Engineering, Science and the Environment to test the performance and durability of the product and prompted further renewable energy discussion as the Federal Government considered submissions to its Technology Investment Roadmap.

50,000

50,000 energy efficient LEDs to be installed across all campuses

5-star

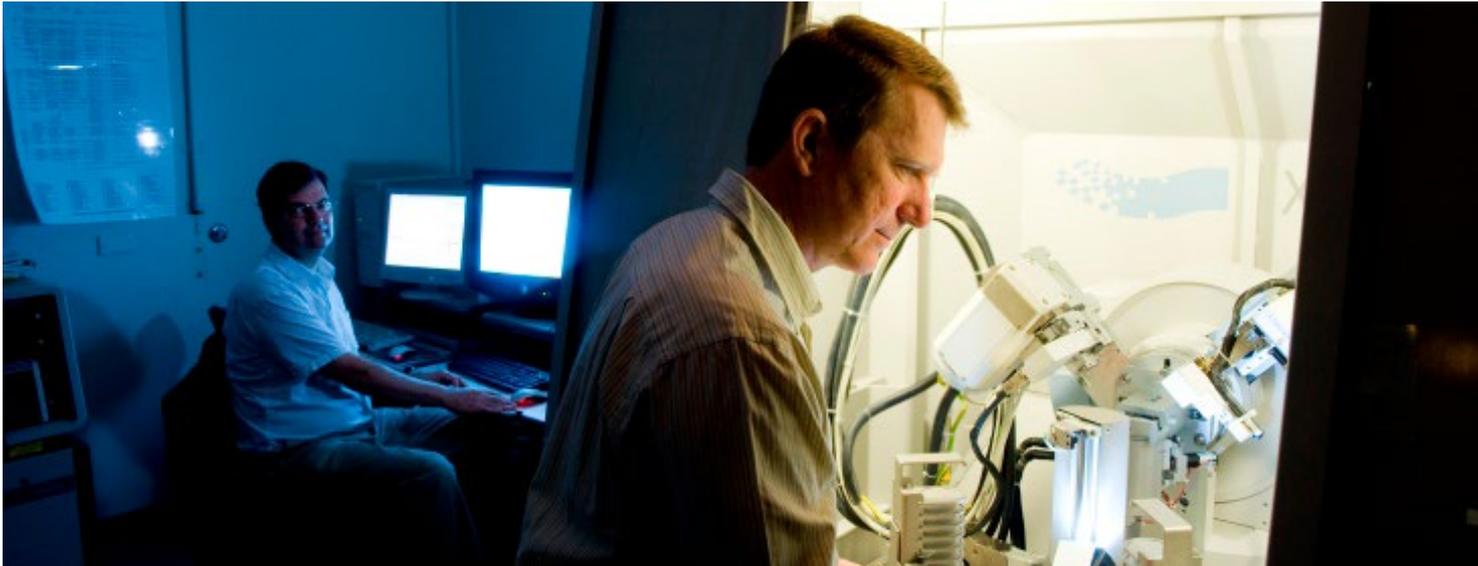
Five-star Green Star rating plan across all refurbishment projects

100%

100% carbon neutral by 2025

3500+

3,500+ on-site solar panels



De Heber Sugo and Professor Erich Kisi are changing the way we think about solar

DIFFUSE ENERGY TURBINES

University of Newcastle-born start-up, [Diffuse Energy](#), secured more than \$920,000 in funding contributions to deploy its small wind turbine technology in remote locations across Australia. Unlike a traditional open-blade wind turbine which may be as large 160 metres in diameter, their invention spans less than a metre. Ten Diffuse Energy turbines are set to be installed on a variety of remote telecommunications sites, converting the setup from diesel power generation to renewable-hybrid. Suitable for the toughest off-grid environments in Australia, the scaled-down, lightweight turbines plug into existing telecommunications infrastructure, enabling rapid setup of turbines onto towers in hard-to-service locations, and converting them from diesel power generation to cheaper, more environmentally friendly wind-power.

INVESTIGATING GREEN HYDROGEN

Australia's deepwater global gateway, Port of Newcastle, is partnering with Macquarie Group's Green Investment Group and the Commonwealth Government's Australian Renewable Energy Agency (ARENA) to support [the development of a hydrogen economy](#) in the Hunter Region, and the University of Newcastle has signed on as the project's Research and Development

Partner. Our feasibility study into the initial 40MW hub will determine a broad and comprehensive range of potential use cases for green hydrogen in the Hunter which build on the region's strong industrial heritage. These include mobility, bunkering, energy production and industrial uses at the scale necessary to position the Hunter at the centre of the emerging global green hydrogen opportunity, and would support the creation of local jobs during construction and operations, foster the development of new industries and contribute to Australia's long-term economic and energy security.

CARBON NEUTRAL BY 2025

The University's [Environmental Sustainability Plan 2019-2025](#) outlines our plans to achieve carbon neutrality by 2025. The University has a 100% renewable electricity supply agreement which will slash our total carbon emissions by 70%, from 52,000 tonnes to approximately 12,000 tonnes. We have installed 1.1 Megawatts of onsite photovoltaic solar (over 3,500 panels) to generate our own electricity across multiple buildings. A site wide LED lighting upgrade continues across our 50,000 light fittings to drive overall energy consumption down by 20%. We are humbled and proud to have been recognised and made into a case study by Green Gown Awards Australasia.





DECENT WORK AND ECONOMIC GROWTH

WORK WITH BENEFITS

The University of Newcastle offers a [wide array of benefits](#) for its staff, including up to 17% superannuation, generous annual and personal paid leave, 26 weeks paid parental leave, flexible work arrangements and more. Our campuses house a range of services available to staff, with dentists, banks, medical centres, post offices and sporting facilities. Extras like access to Fitness Passport, our corporate wellness program, free flu vaccinations and discounted health insurance (to name only a few) enhance staff experiences in the workplace, and represent the value we place on supporting staff members.

PROFILE: DR DAVID FARRUGIA

[Dr David Farrugia](#), a member of the Newcastle Youth Studies Network, is a sociologist whose work addresses issues of unemployment, labour and labour force formation from the perspective of identity. His work demonstrates how young people's identities contribute to the creation of economic value, and how the formation of labour forces emerges from young people's identity practices.

Dr Farrugia is leading an Australian Research Council project titled 'Young Hospitality Workers and Value Creation in the Service Economy' which shows that youth identities are critical sources of value in the hospitality industry and not necessarily because of their work skills, but more due to their 'cool' youthful attributes. He is motivated by understanding the relationship between youth identities and broader social and economic processes, including industrial transformation, the emergence of new forms of work (including interactive work and digital work), and globalisation.

INDIGENOUS EMPLOYMENT

We are proud to be a sector leader in Indigenous employment, education, and research with a commitment to innovation and engagement, and recently launched our [2020-2025 Maligagu Aboriginal and Torres Strait Islander Employment Strategy and Action Plan](#). Central to our plan is the establishment of an Indigenous Employment Pathway in each Faculty and Division. We are also proud of our Indigenous Cadets, who we have placed in employment related to their undergraduate studies as a Work Integrated Learning experience with 12 weeks equivalent guaranteed income per year. Our Yarning Circle, cultural leave, Indigenous Language Allowance and pre-employment assistance are important steps in building our support structure for Indigenous employment, and we endeavour to attract, recruit, development, and support our Indigenous academic and professional staff at all levels across our University to achieve career success.

SUPPORTING LOCAL TOURISM

As a response to COVID-related impacts on local businesses in 2020, Newcastle Business School Associate Professor Tamara Young's [Hometown Holiday](#) project incentivised Newcastle residents to experience the city as a tourist to provide an economic stimulus for local industry sectors hardest hit by the pandemic. Through a social media campaign, community members won \$500 vouchers to spend at participating Hometown Holiday businesses, including local accommodation, attractions, tours, restaurants, bars and retail outlets.

Funded by the City of Newcastle City Taskforce Industry Response Program, the Hometown Holiday project built on previous research by the Tourism Research Group in the University's Newcastle Business School.

92.2%

92.2% of graduates find employment within four months of graduating

23,000

23,000+ Work Integrated Learning experiences delivered each year

68.1%

68.1% of staff on 24+ month contracts



Sociologist David Farrugia is examining how youth identities are created through the dynamics of work in contemporary societies

CULTURE BREEDS GROWTH

The new [Lake Macquarie Multi Arts Pavilion \(MAP\)](#) opened on October 23 with its inaugural exhibition EMERGE. The pavilion was designed in collaboration with the University of Newcastle's School of Architecture and Built Environment, and will attract engaging, experimental and unusual works and public programs from local, national and international artists. Lake Macquarie Mayor Cr Kay Fraser said MAP, Australia's first purpose-built multimedia arts pavilion, would attract up to 45,000 additional visitors to the city annually, and increase local tourism revenue by an estimated \$2.5 million a year.

CENTRE OF FULL EMPLOYMENT AND EQUITY

The [Centre of Full Employment and Equity \(CofFEE\)](#) promotes research aimed at restoring full employment and achieving an economy that delivers equitable outcomes for all. CofFEE undertakes basic and applied research to improve employment and equity in areas such as macroeconomics, monetary systems, regional and urban economies, applied time series and spatial econometrics. CofFEE researchers, led by Professor Bill Mitchell, are among the original developers of Modern Monetary Theory and the concept of employment buffer stocks (Job Guarantee).





\$13,256,911

\$13,256,911 in 2019 STEM research income

INDUSTRY, INNOVATION AND INFRASTRUCTURE

INNOVATION IN THE REGIONS

In September, the University [announced new partnerships](#) with two Hunter industry leaders to drive forward the region's innovation ecosystem.

Port of Newcastle and patent and trademark attorney firm, Davies Collison Cave (DCC), are the inaugural Gold Strategic Partners in the University's Integrated Innovation Network (I2N), an initiative that champions the region's innovators and entrepreneurs through enterprise skill development, entrepreneurship, venture creation and scale-up support. With the support of these industry giants, I2N will be able to offer even more opportunities for forward-thinking start-ups.

PROTECTING MARINE VESSELS

A team led by Professor of Engineering Rob Melchers received a \$650,000 Australian Research Council Linkage grant to develop computer modelling to [simulate the deterioration of maritime vessels](#) subject to corrosion, fatigue and extreme ocean conditions. The collaborative research team of UNSW Sydney, the Defence Science and Technology Group and Pacific Engineering Systems International is working to improve our understanding of the economic, safety and environmental impacts of deteriorating maritime vessels and structures. Professor Melchers explains that the research will lead to

“safer structures and lower risks to the environment, removing the risk of the potential for vessels to crack, break and cause damage to the marine environment around them.”

The research will also assist our national defence preparedness and reduce downtime of vessels due to repairs.

HUNTER INNOVATION FESTIVAL

The University of Newcastle was proud to partner with the [Hunter Innovation Festival](#) in 2021. The festival connects people in the Hunter that produce, invest or consume innovation in any way. It provides the local community with the opportunity to connect with other people, new ideas and be inspired to take the next step.

Our Integrated Innovation Network (I2N) hosted a number of events including Startup Stories with Medtech star Jennifer Holland, Funding Roadmap with AusIndustry and various supported events as part of the 2021 program.

I2N INGITES BUSINESSES

As of 2021, the Integrated Innovation Network (I2N) has accelerated and incubated 104 teams, raised over \$18 million in funds, offered 34 mentors, and supported a community of almost 5000 entrepreneurs. The new [I2N Hub Honeysuckle](#) has been purpose-built to support enterprise skill development, new venture creation, and scale-ups. It offers free co-working spaces and meeting rooms, flexible event spaces, networking events and training for entrepreneurs.

THINKING BIG ON THE CENTRAL COAST

The University of Newcastle's [Central Coast Clinical School](#) is a nation-leading health, medicine and well-being teaching and education facility, operating alongside the Central Coast Research Institute. Launched in 2021, these facilities focus on integrated healthcare, medical education, research and innovation in addressing the health needs of the local population. Clinical School spaces incorporate state-of-the-art experiential learning facilities, wet and dry labs, practice consult rooms, tutorial rooms and individual and group study spaces.

\$200 million+

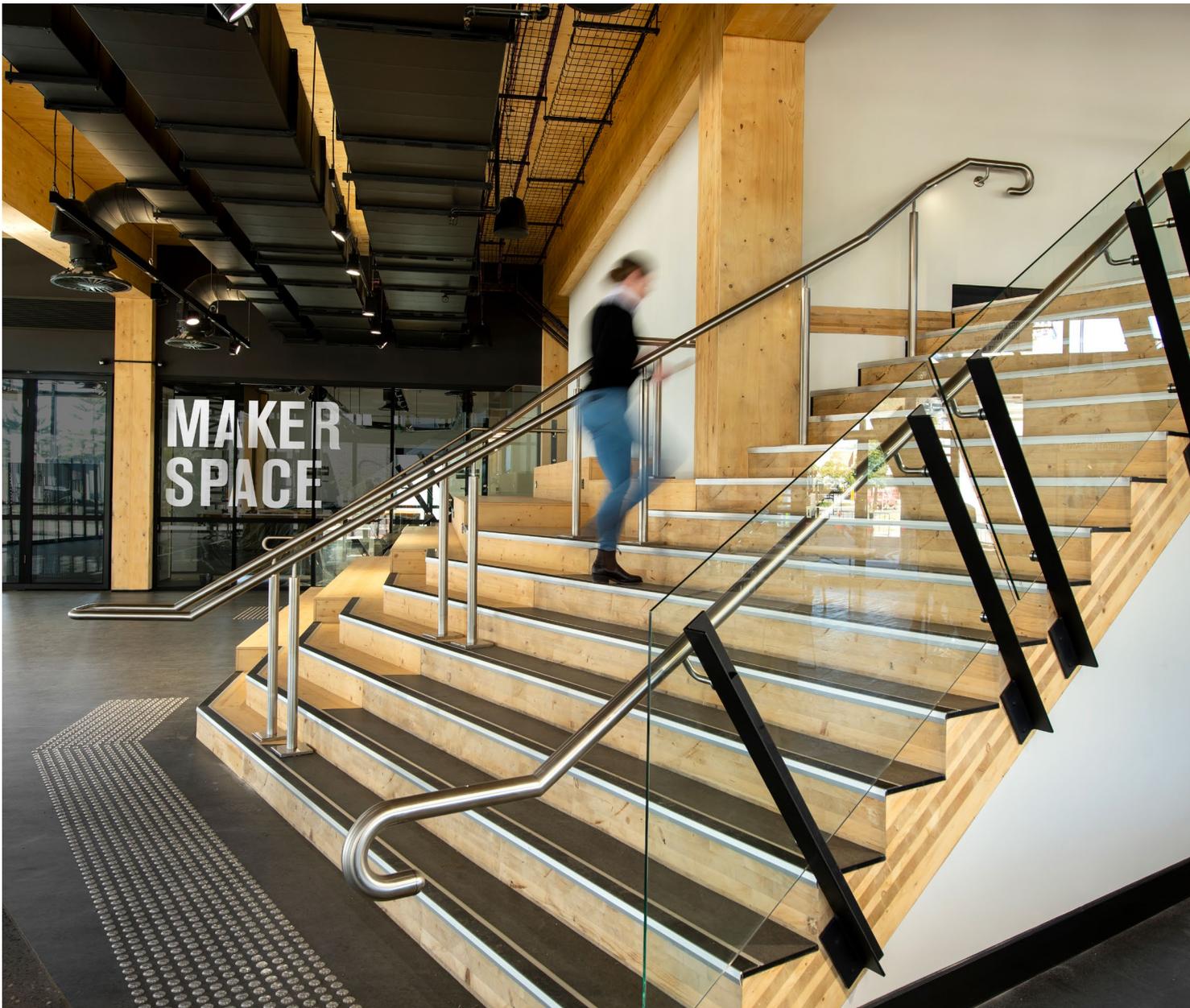
\$200 million+ investment in the future of STEMM

No.1

No. 1 University in Australia for industry collaboration

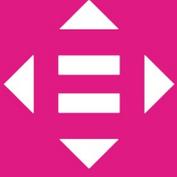
5000+

5000+ entrepreneurs supported by I2N



The I2N Hub Honeysuckle offers a variety of spaces and opportunities for innovators





REDUCED INEQUALITIES

LIVE, LEARN, GROW

The University's [Live, Learn, Grow](#) program supports students with an Out of Home Care experience to access and actively participate in higher education by offering support in areas that are known to present challenges. It was the first program in Australia and internationally to provide students from a care experience, such as foster or residential care, with a range of tailored support services.

The program was developed in consultation with a range of stakeholders across the sector to ensure the program responded to some of the known barriers that prevent care-leavers from accessing higher education, such as accommodation and employment.

RECLAIMING MY PLACE

An eight-week arts-informed program, delivered in partnership with community-based services and learning partners, [Reclaiming My Place](#) supports creative exploration and opportunities for engagement in women's lifelong learning. The program, developed by the Centre of Excellence for Equity in Higher Education in 2018, was initially rolled out across Newcastle sites in collaboration with women's homelessness service NOVA for Women and Children, The Canopy's Child & Family Services, and community learning partners. The project since expanded, in partnership with Singleton Family Support Service, to include sites in Singleton and Cessnock, and is supported by a NSW Minister for Women NSW 'Investing in Women' grant.

RESEARCHING AND WRITING EQUITY

The University of Newcastle, Australia in conjunction with Sheffield Hallam University, UK and the Office for Fair Access, UK, have developed a writing program to enhance the relationship between equity and widening participation practitioners and academics. The [Researching and Writing the Field of Equity Program for Practitioners](#) workshops cover some of the important methodological approaches underpinning equity practice and the process of producing and disseminating a research paper from start to finish, with an aim of increasing and diversifying research on equity.

NO BARRIERS TO MEDICINE

To support a medical workforce that reflects the broader community, the University introduced the [Excellence through Equity Pathway to Medicine](#) pilot. As of 2021, up to six places in the University's Medical Program are earmarked for students who have overcome major life challenges, with the idea that health services and approaches to care are developed and provided with the full diversity of the population. This new enabling pathway to the Bachelor of Medical Science and Doctor of Medicine (Joint Medical Program) strengthens the University's commitment to equity across our degree programs.

PROFILE: PROFESSOR PENNY JANE BURKE

[Professor Penny Jane Burke](#) is the Director of the Centre of Excellence for Equity in Higher Education, and Global Innovation Chair of the Equity Centre of Excellence for Equity in Higher Education. Through her important work, Professor Burke has generated over \$3,500,000 in research funding and has published extensively in the field of equity and social justice in education. In 2019, she received funding from the Department of Education for the International Review of Equity in Higher Education and continues to pursue the goal of Reducing Inequality in an education context.

THE WOLLOTUKA INSTITUTE

The Wollotuka Institute is committed to the [advancement and leadership of Indigenous education](#) at a local, national and global level. As of 2019, the University of Newcastle was ranked No. 1 in Australia for Indigenous enrolments, which is testament to the work of the Institute in facilitating pathways to education for Indigenous students, and removing the barriers that have historically allowed inequality to persist in our universities.

Over 100

Over 100 Indigenous doctors graduated

113

113 countries represented in our student body

5 Star

5 star maximum rating for Social Equity



The Excellence Through Equity Pathway to Medicine program now has enhanced admission through Open Foundation and Newstep

ACCESSIBLE TO ALL

The University's [AccessAbility support services](#) help students to achieve their education goals regardless of any disability or medical condition. They offer personal services such as exam, assessment and lecture support, Auslan interpreters, and advocacy, and assist with setting up adaptive technology to meet the needs of the student. Mobility assistance is available on campus, and the University offers a temporary mobility parking permit to access convenient parking.





1000

1,000 average passengers using daily campus shuttle

SUSTAINABLE CITIES AND COMMUNITIES

TURNING TRASH INTO TREASURE

A new partnership between the University of Newcastle and Newcastle city's first five-star hotel, Crystalbrook Kingsley, will put students, researchers and waste to work in a bid to drive sustainability in our community and reduce waste in the hospitality industry. The partnership will see an annual \$5,000 [Crystalbrook Kingsley Environmental Scholarship](#) granted to a University of Newcastle student with a passion for practical solutions to improve environmental sustainability. Crystalbrook Kingsley will also donate restaurant and bar waste to the University of Newcastle's Food Science Research Group in a collaboration that will see waste upcycled into new products for use in the hospitality industry.

SUPPORTING CREATIVE INDUSTRIES

The Hunter region historically has not been recognised at state and national levels as a significant hub of creative industries, which has impacted the region's ability to leverage potential economic and social benefits. Researchers at the University of Newcastle are changing opinions, and therefore the future of the Hunter, by systematically [mapping the significance of creative industries](#) in the Newcastle and Hunter regions of NSW. As a result, Hunter-based creative industries are now being recognised and will be considered in any policy planning and funding emanating from state government.

NEWCASTLE WRITERS FESTIVAL

The University of Newcastle is a founding sponsor of the [Newcastle Writers Festival](#), which is in its ninth year and is regarded as the city's premier cultural event. The College of Human and Social Futures contributes essential funding to the annual festival, and our academics contribute program ideas, participate in panel discussions and facilitate sessions. The festival also creates exciting real-world learning opportunities for our creative writing students. Students have participated as panellists and volunteers; they have also had opportunities to attend masterclasses hosted by guest writers such as Charlotte Wood and Stephen Armstrong.

COMMUNITY FEEDBACK

Over the course of 18 months in 2020 and 2021, University of Newcastle anthropologist Dr Hedda Askland and Dr Alfonso Arranz from the University of Melbourne have worked with residents of the Hunter, Illawarra and Far West to [hear their thoughts on energy transition](#) as we pursue a carbon neutral future. The study recognised the role that the local community's perspectives on employment and environment must play in our energy future. Their results were presented through three online webinars in November 2021, and may help build strategies and policies for the Hunter's energy transition.

NAME NARRATE NAVIGATE

A significant funding boost announced in 2021 will expand learnings from the [Name.Narrate.Navigate \(NNN\)](#) pilot program — a preventive-intervention program developed to address the significant, yet underserved, issue of youth violence. Supported by Westpac's Safer Children, Safer Communities initiative, the NNN project team has secured \$600,000 over three years to deliver specialist training for practitioners in regional, rural, and remote Australia where preventive interventions for young people who have been both victims/survivors and perpetrators of harm are lacking but sorely needed.

HOUSING ALTERNATIVES

A project investigating the benefits of housing cooperatives in Australia received an Australian Research Council (ARC) Linkage grant worth over \$590,000. In partnership with Australian Cooperative Housing Alliance, the project, led by [Dr Sidsel Grimstad](#), will capture an evidence base of what works in cooperative housing to provide rationale for growth of socially beneficial housing in Australia.

\$30 million+

Over \$30 million expenditure on arts and heritage

\$100 million+

Over \$100 million invested into the Newcastle city campus over five years



Q Building is a pre-certified 6-star Green Star building in the heart of the city, incorporating advanced clean energy technology

SUSTAINABLE SPACES

The University's Honeysuckle-based [Q Building](#) is pre-certified to become the first 6-star Green Star building for sustainable development in regional NSW. The planning and development of the building has taken sustainable practices to the next level, prioritising energy retention and production with a world-class user experience. Q Building

features a concrete core, with its remaining internal structure built using sustainably sourced, cross-laminated timber. The facility is encased at the north and west in 344 Sage thermal glass panels — the largest installation of this highly technical and environmentally friendly material in the southern hemisphere. The glass tints according to the intensity of the sun, and retains our design principles of openness and transparency.





RESPONSIBLE CONSUMPTION AND PRODUCTION

STAFF HAVE 'GREEN IMPACT'

Staff across the University championed a greener, more sustainable campus with 21 teams registering to take part in the inaugural [Green Impact program](#). More than 140 staff completed over 290 actions to reduce our carbon footprint across our campuses, including reducing and diverting waste from landfill, increasing recycling, conserving energy, adopting active travel, increasing awareness and engagement in sustainability and planting native seedlings around our campuses.

BAGS TO BENCHES

The University's Environmental Sustainability Plan aimed to achieve a 70% recycling rate for general solid waste generated across the University by 2021. Soft plastics traditionally have very low rates of recycling and are a significant contributor to landfill volumes. Over 2020 the University trialled a [Bags to Benches](#) program in partnership with Plastic Police to turn soft plastics into benches providing added outdoor seating across campus.

SAYING 'NUP' TO CUP LANDFILL

A recent University audit found that coffee cups account for 3% of general waste and 2% of recycling. To help prevent this, the University has [collaborated with Simply Cups](#) to recycle disposable coffee cups on campus and divert them from landfill. These recycled cups are then used to make reusable coffee cups — the rCup — a world first reusable coffee cup made from recycled coffee cups and other products.

SUSTAINABLE FOOD RESEARCH

The [Sustainable Food Future Conference in June 2021](#) featured world-leading researchers and innovators delivering presentations on ways to improve and update nutrition and consumer science, food waste and sustainability, functional foods, postharvest technology, circular economy and wine production. The two-day event, which brought together researchers, students and local industry professionals, also featured food stalls showcasing products from local food industries and guided bush tucker and facility walks.

COMMUNITY GARDEN

The University's [Community Garden](#) at Callaghan campus grows a seasonal range of fruit, vegetables and herbs. The garden is sustainable, featuring two water tanks, a compost bin, solar pump and six raised beds. All students and staff are welcome to be part of the events and activities that take place across the year, and are encouraged to use the garden as a space to relax in. Activities range from working bees and clean-ups to planting days and harvests, and there's also a weekly watering roster.

COMPOSTING ON CAMPUS

Forty to 60% of the University's waste is diverted from landfill, and as part of our Environmental Sustainability Plan targets, we have committed to driving this up to 70% of our general waste. Food scraps are diverted into [organic collection bins](#). The waste is treated in a specialised industrial food waste disposal facility. This facility turns food waste and compostable packaging into fertiliser and green electricity through a process called anaerobic digestion. With reduced general waste, the University is lessening its impact on landfill and instead contributing to green energy and food production.

5000+

Over 5,000 coffee cups collected through the Simply Cups recycling program

70%

70% recycling rate aims for solid waste in 2021



The University has spearheaded a number of innovative sustainability initiatives to reduce waste on campus

AWARD AT WORLD DEMOLITION SUMMIT

After 50 years of life, the McMullin Building was finally decommissioned in 2021. The project has been hailed as a benchmark project for planning and exceeding best practice in environmental recycling and safety standards by judges at the 2021 World Demolition Awards, with Drumderg Services named the winner of the Recycling and Environmental Award for their work demolishing the McMullin Building and upholding the University's commitment to the sustainable redevelopment of our campuses. On completion of the demolition in 2021, the project had diverted more than ninety-eight percent of the building material from landfill.

The demolition process was an exercise in closing the ecological loop. Crushed materials were redirected for use in road bases on our campuses, aluminium was smelted down to go back into the industry supply chain and all timber was made into new items, such as kitchen joinery and benchtops. Where materials could not be recycled, they were donated or sold for repurposing by community organisations. Carpet tiles from inside the McMullin Building were cleaned and sent out to communities in Fiji.





CLIMATE ACTION

SATELLITE DROUGHT SURVEILLANCE

In late 2020, the University's Centre for Water, Climate and Land partnered with Japan's Space Agency JAXA in an [Australian first for climate research](#). Led by Associate Professor Anthony Kiem from the School of Environmental and Life Sciences, this research will help better detect the beginning, end, spatial coverage, and intensity of droughts in Australia. This is a necessary first step in the development of adaptation strategies that reduce the economic, environmental, and social costs of droughts.

LAW STUDENTS AND STAFF LEAD CHARGE

Newcastle Law School students, alumni and staff have been supporting efforts to promote immediate and sustained action to reduce emissions and fight climate change. Law student Kelsey Gray has assisted on important research into the effectiveness of the Australian Government's Emissions Reduction Fund (ERF), law graduate Katrina Bullock works as General Counsel for Greenpeace Australia, and in May 2021 staff member [Jacquie Svenson](#) co-authored an [article in The Conversation](#) about an important climate activism case in northern NSW. Dr Amy Maguire is putting the rights of people by climate change to the forefront of international law in her research on self-determination.

TOP RESEARCH CENTRES

The University houses several top research centres into climate change. The [Centre for Water, Climate and Land](#) focuses on understanding and dealing with the impacts of climate variability and change in the Asia-Pacific region. The [Centre for Urban and Regional Studies](#) address the spatial dimensions of human and environmental change and helps build spaces of possibility, and the [Priority Research Centre for Frontier Energy Technologies and Utilisation](#) conducts cutting edge research on emerging energy technologies, with particular focus on the abatement of greenhouse gases and clean and sustainable energy production. The research groups for [Conservation Science](#) and [Environment and Climate](#) conduct research to support emerging energy technologies, biodiversity conservation, environmental monitoring and more.



Dr Andrew Magee is tackling the uncertainty of climate change by studying extreme weather events

PROFILE: DR ANDREW MAGEE

Climate change presents us all with a lot of uncertainties. From tropical cyclones to floods, researcher [Dr Andrew Magee](#) is studying interactions between the ocean and atmosphere and historical variability of these extreme events to help better understand future risks. As well as being involved in cutting-edge scientific research, Andrew is a passionate educator. Recently, Andrew was involved in a project to develop UNITAR-accredited short-term training courses for national meteorological and environmental organisations based in the Pacific.

JOINING THE HEAL NETWORK

In November 2021, the University of Newcastle joined the [Healthy Environments And Lives \(HEAL\)](#) network to tackle health impacts of climate change. The network brings together Aboriginal and Torres Strait Islander knowledge, sustainable development, environmental epidemiology, and data science and communication to address climate change and how it affects communities' health.

As part of HEAL, researchers, practitioners, communities and policymakers will work together on issues such as urban health, bushfires, pollution, food security, heatwaves, and biosecurity. The University of Newcastle is contributing to two of the seven priority themes: bushfires, air pollution and extreme events, led by Associate Professor Anthony Kiem, and food, soil and water security, led by Dr Thava Palanisami.

65%

65% of energy from low-carbon sources

0%

0% direct investment in fossil fuels

7,703

7,703 research citations



Dr Danielle Vernon-Kidd provides a deeper understanding of climate-related disasters to help us to predict, prepare and mitigate

PROFILE: DR DANIELLE VERNON-KIDD

[Dr Danielle Verdon-Kidd](#) is researching the nature and triggers of extreme weather events, such as droughts, bushfires and storms, to help our nation better prepare for what lies ahead. Lying at the nexus of climate science, hydrology and palaeoclimatology, Danielle's research seeks to understand what causes climate-related disasters, and what can be done about it.

“These disasters take an enormous toll on human life and our country, with significant environmental, economic and social costs.”

— Dr Danielle Vernon-Kidd

Her research provides a deeper understanding of climate-related disasters that could help us to predict, prepare and mitigate future catastrophes in Australia.

“Any advancement in the ability to predict and measure climate-related risks benefits a wide spectrum of the community, industry and economy.”

As part of Danielle's work in risk assessment and adaptation planning for climate change vulnerability, her research delves far into the past, using natural archives such as tree rings and coral growth to supplement limited instrumental weather records and build a picture of the earth's major weather events throughout history.





LIFE BELOW WATER

UNUSUAL REEF PROTECTION

A new way of measuring the volume of [poop produced by sea cucumbers](#) has alerted marine science researchers from Macquarie University, the University of Newcastle and James Cook University to the essential role these sea creatures play in shaping and keeping the world's coral reefs healthy. Remote sensing data obtained from drone and satellite imagery of the Heron Island Reef in Queensland has been used to better understand the huge volume of sediment passed through holothurians (sea cucumbers). Sea cucumbers are closely related to sea urchins and sea stars and spend their lives eating sediment, digesting the micro-organisms present, and pooping out 'clean' sediment, just like earthworms. This process, called 'bioturbation', plays an important role in coral reefs by aerating the sea floor, providing 'fresh' sediment, and releasing calcium carbonate into the water as a by-product to help support coral growth.

MOATA'A MANGROVES

Through the Pacific Node project (see SDG 17), the University of Newcastle, in partnership with the Secretariat of the Pacific Regional Environment Programme and the Ministry of Natural Resources and Environment, conducted a [coastal clean-up](#) of the Moata'a mangrove environment in Samoa in June 2020. The initiative celebrated UN World Oceans Day under the banner "Innovation for a Sustainable Ocean."

PREVENTING PLASTICS

In August 2020, Dr Sascha Fuller, the University's Pacific Node coordinator, based in Samoa, released a study with colleagues from Massey University and the University of Toronto showing that policies for the [prevention of plastic pollution](#) in the Pacific were not doing enough to stop the problem. This study pushed plastic pollution to the forefront of conservation efforts in the Pacific, and delegates at the 2020 Pacific Islands Conference began calls for a Global Treaty on plastic pollution. On Saturday 11 September 2021, the Australian Federal Environment Minister, Sussan Ley, announced that Australia had joined calls for a binding global plastics agreement.



The University of Newcastle's Pacific Node team conducted a coastal clean-up in Samoa

WATER RESEARCH ROADMAP

In consultation with industry and government stakeholders, the University has produced a [Water Research Roadmap](#) to ensure we are positioned to best assist the water sector. The Roadmap identifies the guiding principles and priority actions necessary to meet current and future water needs, sustain healthy communities, support regional economic prosperity, and protect and restore ecosystems and biodiversity values. It sets up our research centres to explore and monitor event-based impacts on marine environments, disturbances on estuarine and coastal ecosystems, aquatic toxicology and more as priorities for the University.

SHARKS TO THE RESCUE

Researchers in the School of Environmental and Life Sciences are examining [the role that large adult great hammerhead sharks play](#) in coastal food chains. The species are listed as Vulnerable in NSW and the decline in the population reflects demand for their fins, commercial fishing activities and that they are often caught in bather-protection programs involving gillnets and drumlines off eastern Australia. The team has found that great hammerheads are apex predators (top of the food chain) in the coastal ecosystem because they specialise in eating other sharks and rays.



Our ocean's secrets are revealed through Dr Vincent Raoult's work on underwater ecosystems

“As apex predators, their extinction would have a vast ecological impact on the coastal ecosystem, and protection is essential to support stability across economically important coastal ecosystems.”

“Now that our study has shown just how important their role is in linking coastal food webs, it is absolutely crucial that we see urgent conservation of the species.”

— Dr Vincent Raoult

PROFILE: DR VINCENT RAOULT

Marine scientist [Dr Vincent Raoult](#) researches how ecological processes can be used to achieve better conservation and management of threatened communities. He has used novel approaches to examine ecological interactions from species to ecosystem, developing novel methodologies to answer or improve on numerous research issues using cutting-edge techniques. In 2021, his research has focused on the health of the Williams River and Manning estuary, as well as investigating how to prevent oil spills from World War II shipwrecks using remotely operated vehicles. He is also working with Lake Macquarie City Council to quantify underwater sound and its effect on marine communities.





LIFE ON LAND

SAVE THE FROGS

Globally, nearly 200 frog species have been lost in the past 30 years to disease, and a further 200 face imminent threat. Australia has around 250 frog species, with many of them found nowhere else in the world. We have already lost nearly ten species and researchers estimate another 30 to 40 are at risk. The [Conservation Science Research Group](#) has made [several world-first discoveries](#) that offer new hope for Australia's much-loved frogs.

University researchers gained new insights about the impacts of chytrid, a highly contagious fungal disease, on the endangered Australian Green and Golden Bell frogs by studying disease incidence in natural populations at Kooragang Island and Sydney Olympic Park. They found that peak infection occurred in winter, which led to major mortality events each year. Working with industry partners, the team started a captive breeding program and from 2012 to 2016, they released 40,000 tadpoles and juvenile frogs into newly constructed habitats at Kooragang Island.

After more than two successful breeding seasons, Kooragang Island is now home to a new generation of Green and Golden Bell frogs, which had not been seen in large and sustainable numbers for nearly two decades.

NATIONAL PARK FOR KOALAS

A proposed Great Koala National Park will add 175,000 hectares of native state forests to existing protected areas to establish a 315,000-hectare reserve on the NSW Mid North Coast. The site, which includes two koala metapopulations, would protect an area that is home to around 20 per cent of the NSW koala population habitat. Researchers from the University of Newcastle have [quantified the biodiversity value](#) of transitioning 175,000 hectares of state forests to national park using the 'Willingness to Pay' methodology — a well-established international approach used to assess the community's willingness to pay to preserve the biodiversity for iconic sites, such as the Great Barrier Reef.

“The biodiversity value of the koala is estimated to be \$530 million for the NSW population and \$1.7 billion for all Australians.”

— Professor Roberta Ryan

There is a groundswell of support for the National Park from the community of the Coffs Coast.

TACKLING MOSQUITO DISEASE

New research to [tackle one of Australia's most prolific mosquitos](#), responsible for spreading most cases of Ross River virus, has commenced in the Hunter Region. The three-year project, between the University of Newcastle, Australia's national science agency CSIRO, the NSW Department of Health and the University of Melbourne, will use genomic sequencing to inform suppression strategies for the *Aedes vigilax* mosquito. [Dr Toby Mills](#), researcher from the University of Newcastle's [School of Environmental and Life Sciences](#), said the study was an important step towards informing decision making efforts to control mosquito populations in the Hunter and elsewhere across Australia.

OPEN COURSE FOR NATURE DRAWING

The free six-week [Drawing, Nature, Science and Culture: National History Illustration](#) course is offered online across the world in partnership with edX. Participants learn essential skills and techniques that form the basis for creating accurate and stunning replications of subjects such as the structure of flowers, leaves, mammals, birds and other muses from the natural world. Scientists from the Conservation Biology Science Group were concerned their science on conservation wasn't reaching the people who can make change on the ground — the community — so they decided to take action and open accessible participation in biodiversity through art.

266

266 research
papers published



University of Newcastle researchers are helping bring a struggling Green and Golden Bell frog community back to successful numbers

CLEAN UP CONFERENCE

In March 2021, a committee led by the University of Newcastle's Professor Ravi Naidu ran the [Emerging Contaminants two-day Virtual Symposium](#). The event was part of the Cleanup Conference, run in partnership between CRC Care and the University's Global Centre for Environmental Remediation (GCER), and focused on the latest developments in the detection, fate and transport, risk assessment, clean-up, and regulation of emerging contaminants (ECs).

“Contamination by the chemical products and by-products of human activity is one of the most pervasive and far-reaching of our impacts on the Earth and on our health and well-being. Traces of anthropogenic contamination are now found from the stratosphere to the deep oceans, from pole to pole, in many forms of wildlife, in all modern societies, in the food chain, and in almost all people, including newborns.”

— Cleanup Symposium



16 PEACE, JUSTICE
AND STRONG
INSTITUTIONS



278

278 graduates
from law and
enforcement courses

PEACE, JUSTICE AND STRONG INSTITUTIONS

EXPOSING FRONTIER VIOLENCE

Researchers at the University of Newcastle are discovering new information that's changing our collective understanding of Australia's colonial history. Following six years of painstaking investigation, they have created a world-first interactive digital map that documents the massacres that occurred on Australia's colonial frontier and the impact those events have had, particularly on Aboriginal and Torres Strait Islander peoples.

Developed by researchers from the university's Centre for 21st Century Humanities, the [Colonial Frontier Massacres Map](#) documents the locations, dates and details of individual massacres, along with corroborating evidence for each event. The team has been able to verify that over 8,400 people were killed during more than 300 massacres between 1788 and 1930. Ninety-seven percent of those killed in the massacres were Aboriginal and Torres Strait Islander people.

OUR NEWEST LAWYERS

For the first time in 25 years, Newcastle was proud to welcome the Chief Justice and three of the state's top judges to preside over the University's annual admittance ceremony at City Hall in January, in which eligible graduates were formally confirmed as lawyers of the court. [In his speech](#), Chief Justice Bathurst said the University of Newcastle had consistently produced a flow of outstanding graduates. Amongst the newly confirmed lawyers sat 24-year-old Wiradjuri woman [Taylah Gray](#), whose efforts campaigning for Indigenous rights have already made headlines across Australia. Overturning a decision by NSW Police to ban a Black Lives Matter protest in Newcastle's CBD in 2020, Taylah plans to continue her journey with the University as she completes a PhD on Native Title.

CENTRE FOR STUDY OF VIOLENCE

Researchers at the [Centre for the Study of Violence](#) are focused on the origins, causes, and experience of violence throughout history and the present day. They explore the global roots of contemporary violence by examining the connections between the past and the present, and the range of cultural values and perceptions that surrounds both patterns of structural violence and individual acts of violence.

AGAINST WEAPONISED TRADE

Significant research led by [Professor Lisa Toohey](#) will help secure the nation's economic future, regardless of the uncertain relations between global powerhouses China and the United States. *Australia and Weaponised Trade: Threats and Responses* is a two-year project funded by the Australian Department of Defence under its Strategic Policy Grants Program. With a global increase in the use of trade as an instrument of national security, the project aims to identify how best to safeguard Australia's interests, maintain global peace, and avoid unnecessary harm to Australian industry.

The research team includes collaborators Associate Professor Markus Wagner from the University of Wollongong and Associate Professor Elizabeth Thurbon from UNSW.

“As the newest members of the profession, you are at the forefront of innovation in the law, and have a unique opportunity to see through changes so that justice is done openly and equitably.”

— Chief Justice Bathurst

No.1

No. 1 in Australia for overall satisfaction for undergraduate Law and Paralegal Studies students

World Top 200

World Top 200 for management



Chief Justice the hon Tom Bathurst and Professor Tania Sourdin welcome one of our newest lawyers, Taylah Gray

ARC GRANTS FOR PEACE

Two [Centre for the Study of Violence](#) researchers were successful in the highly competitive 2020 ARC discovery scheme. Internationally renowned for his work on the Ottoman Empire, Associate [Professor Hans-Lukas Kieser's](#) 2021-2023 project 'The 'Peace' of Lausanne (1923): Genesis, Legacies, Paradoxes', examines one of the most significant political challenges of the twenty-first century — peace in the Middle East. [Dr Elizabeth Robert-Pedersen's](#) project 'A Century of Sex and the Australian Military, 1914-2020' will investigate the ways military authorities attempted to regulate members' sexual behaviour, as well as how service personnel understood the role of sex and sexuality within a military framework. Elizabeth's role in the project will focus primarily on the medical aspects: how understandings of sexual health shift over time, and the relationships between civilian and military medicine. The focus of this study will fill a gap in the history of how Australian military authorities have dealt with sex and sexuality.

CYBERSECURITY RESEARCH

A team of cognitive scientists, led by [Dr Scott Brown](#) and [Dr Ami Eidels](#) of the University of Newcastle's School of Psychological Sciences, are helping prepare Australia for the battleground of the future — cyberspace. The team is investigating how best to develop trust between humans and bots, as well as ways to ensure the bots present the masses of data they accrue in a way that doesn't overload human cognitive capacity.

A true cross-disciplinary investigation, Dr Brown's team involves 16 researchers spread across three Australian universities, as well as four universities in the USA. Funded by the Australia-US Multidisciplinary University Research Initiative, the team bring together expertise in cybersecurity, artificial intelligence, human-computer interaction, psychology, and decision sciences.





PARTNERSHIP FOR THE GOALS

INDIGENOUS MUSIC EXECS

Global music company BMG has expanded on its successful partnership with the University of Newcastle's School of Creative Industries in the Faculty of Education and Arts to launch its first round of [Indigenous scholarships](#), creating more pathways to employment for the next generation of students. A 2015 study by the [Australia Council for the Arts](#) found that only 2.1 per cent of Australians working in creative industries were Indigenous. BMG Managing Director, Australia and New Zealand, and University of Newcastle Alumnus, Heath Johns said there was a desperate need for more diversity and inclusivity within the music industry, and that Aboriginal and Torres Strait Islander people were not appropriately represented at an executive level. These scholarships work towards the Sustainable Development Goal of Reducing Inequality by opening doors for talented Indigenous creatives in the music industry.

HUNTER SDG TASKFORCE

The University of Newcastle is a major sponsor of the [Hunter Region SDG Task Force](#), a group of motivated businesses, not-for-profits and government bodies who are focused on collaborating to achieve the United Nations Sustainable Development Goals (SDGs) in the Hunter Region. The Task Force is essentially a collaboration of 17 action groups which have come together to set targets and take action on each of the 17 SDGs. The role of the Hunter Region SDG Task Force is to drive the accountability, education and collaboration of the UN SDGs and to accelerate the delivery in our region.

MEDICAL RESEARCH PARTNERSHIPS

The region's health and medical researchers and community will benefit from [a new partnership](#) between Port Waratah Coal Services (Port Waratah), Hunter Medical Research Institute (HMRI) and Hunter New England Local Health District. Port Waratah has invested more than \$300,000 over four years, from its Community Investment Partnership Programme, to part fund a new clinical informatics project with HMRI.

Peter Mastello, the region's clinical informatician, said extracting good health data benefits both patients and community by building the capacity of researchers. Across HMRI, the University of Newcastle and the Hunter New England Health it will support a broad range of clinical research and accelerate translational research that improves health care, health systems, and patient outcomes.

UNITING UNIVERSITIES

The [NUW Alliance](#) comprises four leading Australian research-intensive universities — the University of Newcastle, UNSW, the University of Wollongong and Western Sydney University. As an example of a project, NUW Energy is the largest and most compelling Australian research cohort addressing current energy issues. Representing a global network of leading industry partners and allied research agencies, NUW Energy enables simple, streamlined and direct access to world-class research expertise, removing the traditional barriers that are inhibiting collaboration between academic, industry and government.

NUW Energy represents more than 200 discrete areas of world-class energy research capability and unprecedented access to 30 distinct, world-leading research facilities, centres and institutes of research and innovation in NSW.

CIFAL NEWCASTLE FOR THE SDGS

[CIFAL Newcastle](#) is a United Nations Institute for Training and Research (UNITAR) affiliated training centre based at the University of Newcastle. Its purpose is to build the capacity of cities and communities with a focus on integrating Sustainable Development Goals, Agenda 2030 and implementing Disaster Risk Reduction and Public Health strategies. By transferring evidence-based practice, we empower individuals, communities, governments and organisations to effectively address global developmental challenges, reduce disaster risks and improve public health outcomes.

CIFAL Newcastle is the only CIFAL centre in Australia and Asia Pacific. There are 21 other CIFAL centres around the world.

No.1

No. 1 in the world
for Partnering for a
Sustainable Future

No.1

No. 1 in Australia for
industry collaboration

3000+

3000+ employer
connections



The University of Newcastle partners globally to achieve a sustainable energy future

PACIFIC NODE

The [Pacific Node](#) is a NIER (Newcastle Institute for Energy and Resources) development, providing a flexible framework to enhance research capacity to support regional priorities in the areas of climate change resilience, ecosystem and biodiversity protection, waste management and pollution control, environmental governance and food security and health. The University of Newcastle is working with Pacific partners to deliver collaborative solutions to environmental, social and economic challenges, and to build equitable prosperity, social cohesion and healthy communities guided by our [Pacific Research Roadmap](#). Through our *Looking Ahead Strategic Plan 2020-2025* and its [Asia Pacific focus](#), we are committed to ensuring that our nearest neighbours are supported in the face of significant challenges.

In partnership with the [Secretariat of the Pacific Regional Environment Programme](#) (SPREP), we have established the Pacific Node in Apia, Samoa to provide a flexible research framework for collaborative engagement between academia, industry, government and communities, encouraging them to get active in national priority areas including climate resilience, ecosystem and biodiversity protection, waste management and pollution control, and environmental governance.





FEATURED STATISTICS AND FACTS HAVE BEEN DRAWN FROM THE FOLLOWING SOURCES:

- The University of Newcastle Data Warehouse
- 2022 THE Impact submission
- Elsevier
- The Graduate Outcomes Survey 2018-2019
- Performance and Completions Power BI
- ELT Barometer 2019-2020
- Environmental Sustainability Plan 2019-2025
- QILT Graduate Outcomes Survey 2017-2020
- Universities Australia Integrated Learning Audit 2017
- Innovation Connections Report 2014-2020
- Department of Education Selected Higher Education Statistics 2019
- Good Universities Guide 2022
- University of Newcastle Report of Operations 2019
- Shanghai Ranking 2020
- Student Experience Survey 2019
- THE Impact Ranking 2021

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