

# Sustainable Development Goals 2021 Update



# SUSTAINABLE DEVELOPMENT GOALS

**1** NO POVERTY



**2** ZERO HUNGER



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## Introduction from the Vice-Chancellor

### Tangata Tū, Tangata Ora Engaged, Empowered, Making a Difference

I am delighted to present our second SDGs Update document. It is pleasing to see the progress we have made in the past year. We have been busy galvanising communities to build fairer, more resilient and more sustainable futures.

Sustainability is a key focus in our Strategic Vision 2020-2030, and 2021 saw some important milestones achieved. Notable was the appointment of Professor Jan Evans-Freeman as Pro-Vice-Chancellor Sustainability, a first for a New Zealand University. Professor Evans-Freeman will lead the implementation of our Sustainability objectives.

COVID-19 has again put enormous pressure on many staff and students, and of course our wider communities. Although challenging, we have learned some new ways to do our work and the achievements set out in this document are a reflection of the commitment and passion of our UC community. Student engagement remained strong through online channels, and engagement overall was extremely strong. Among the numerous achievements, there was an increase in courses offered against the SDGs and our new and innovative multidisciplinary Bachelor of Social and Environmental Sustainability (BSENS) degree commences in 2022.

Another major achievement by our Sustainability Office was the successful delivery of the remaining events for the 2020-2021 Aotearoa Sustainable Development Goals Third Summit Series. These events, like many, were held online due to the rapidly changing situation with the global COVID-19 pandemic. The Third Summit Series brought

together all New Zealand universities and many other tertiary education institutions, along with mana whenua and Māori organisations, central and local government bodies, community sector groups, businesses, youth, and others. The goal was to galvanise momentum towards Aotearoa New Zealand achieving the SDGs. Feedback from participants in the Summit Series told us it was a great success. We are delighted to also report this event has been nominated as a finalist in the partnerships category of the Australasian Campuses Towards Sustainability (ACTS) Green Gown Awards for 2022.

Notable in research is that UC and the University of the South Pacific have partnered to help Pacific countries understand the impact of climate change and how Indigenous knowledge can be deployed to help Pacific communities adapt. We have also progressed on reducing our operational and environmental footprint. Significant work took place on carbon reduction and management, with three streams of work developed simultaneously: carbon reduction, carbon sequestration and climate resilience. To advance our Carbon Net Neutral goal, a highly complex, multi-year project for the removal of coal combustion for space heating was approved, and we have made progress on replacing our vehicle fleet with new electric vehicles – more on this in next year's Update!

I would like to take this opportunity to thank the University community for their hard work and commitment to the sustainability kaupapa, in building a fairer, safer and greener world.

Professor Cheryl de la Rey

Tumu Whakarae | Vice-Chancellor

Te Whare Wānanga o Waitaha | University of Canterbury

1 NO  
POVERTY



End poverty in all its  
forms everywhere



## Building a better Aotearoa

The University of Canterbury's Young New Zealander of the Year award recognises those that build a better Aotearoa. Semi-finalist, Abbas Nazari, graduated from UC with a Bachelor of Arts with Honours degree. Nazari's journey with his family as a child refugee from Afghanistan to New Zealand is harrowing, and the success he's achieved since is exceptional.

## Scholarships at UC

We offer over NZ\$20 million in scholarships and prizes annually to help fund our students' study. UC understands that a university education is a major investment, and a scholarship might just provide the helping hand needed to make university life a little easier. We offer a wide range of scholarships, many recognising factors like academic excellence or sporting achievement. Others have an emphasis on social inclusion and equality and are awarded on the basis of financial need or other hardship.

## Society and Policy

Our Society and Policy course looks at how health and wellbeing services are regulated and managed. The course examines health services and policies in New Zealand and find ways to better access, process, and engage with vulnerable communities. By understanding the impact health policies have on society, students gain the skills needed to work in the public health and social policy sectors and make meaningful changes to the help people need.

## Free Tables

Our Free Tables are a great way of keeping perfectly usable items out of the landfill and helping each other out by giving things away. Typically, Free Tables are placed in areas where there is high foot traffic. Surplus items are placed on the tables for students and staff to repurpose or recycle them. Items are usually sourced from different offices in that building, or staff and students occasionally place their own items on them as well. Items placed on Free Tables are at the discretion of UC staff or students and could include office stationery items that are no longer required by UC staff/students; books and textbooks; small household items, homewares and crockery; non-perishable food items; clothing in good, clean condition. Students usually clear items off Free Tables very quickly.

## Financial assistance

We know that being a student can be financially challenging at the best of times, and that rising living costs are only making things more difficult. We don't want students to try to 'tough it out' or assume that someone else needs the support more. If a student is currently experiencing temporary financial difficulty, they could be eligible for support. We have a range of possible financial support structures available for students, including separate funding for technology or internet issues.

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**39 publications based on Elsevier mapping**  
**51% publications based on international collaboration**

**Based on publications from 2017 to 2021**



2 ZERO HUNGER



# End hunger, achieve food security and improved nutrition and promote sustainable agriculture





## Our Procurement

Strategic principles that guide the planning, sourcing and management of our procurement policy include: long term environmental initiatives that improve Canterbury's ecological environment; contributing towards our carbon net neutral 2030 initiative; minimising waste; protecting human health and enhance environmental quality and safety; engaging with suppliers that promote socially responsible practices (diversity, acceptance, fairness and inclusiveness); products that are being sourced in a responsible and sustainable way; and supporting and fostering businesses that are owned and operated by Māori and Pacific communities and organisations.

## Food Initiatives on campus

We have a range of food initiatives for students and staff on-campus. Some examples of the on-campus food initiatives include:

- Community Gardens, which is our flagship food initiative growing sustainable food, provides students and staff an opportunity to belong to a community of people who care about eating local, organic food and learning how to grow it
- Research into mapping the UC Food System, which identifies flows of café food and highlights food security issues. Green space, which could be used to enhance aesthetics and increase food grown on campus, is also mapped
- Organic waste is collected across the whole of campus and sent to a local composting facility, which in turn sells the compost to local gardeners

## Global contest to solve world hunger

Engineering student, Stephanie Post, was selected in the Team Universities of New Zealand to compete in a Global Case Competition in 2021. The focus of the competition was on the United Nations' work to transform the way the world produces and consumes food. Stephanie says:

"It is an honour to represent Aotearoa New Zealand, and it is exciting to work in an area that is so important to the world." Teams are given 24 hours to prepare and present their proposal online to a panel of judges based in Norway. Chef de Mission Dr John Guthrie said it is an exciting opportunity for students to compete against the best universities in the world in an online environment. "This is a truly unique chance for the teams of students to provide input for and influence the efforts of the United Nations to address the food distribution and consumption problems," he said.

## Food safety breakthrough

Dairy factories could be the big winners from a new electromagnetic detection and imaging method aimed at boosting food safety systems. At our Electric Power Engineering Centre research on a Joule heating technique for logs also paved the way to improved imaging technology for wider applications. By passing electricity from one electrode through a piece of wood to a segmented electrode array, researchers were able to produce images showing the internal structures of wood, and now this same technology is being investigated for the food industry. "This is one half of the story on this new electromagnetic tomography method we now hope to develop for food safety and quality applications," says Senior Research Engineer Dr Bill Heffernan. The goal is to develop this innovative new method so it can reliably determine the electrical conductivity distribution of food mixtures – such as milk – moving through a processing line. Food quality and safety is pivotal to New Zealand's reputation as a trusted exporter of value-added, processed food products.

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**87 publications based on Elsevier mapping**  
**69% publications based on international collaboration**

Based on publications from 2017 to 2021

**3** GOOD HEALTH  
AND WELL-BEING



**Ensure healthy lives and  
promote well-being for  
all at all ages**





## Mental health and nutrition

Professor Julia Rucklidge developed an 8-week course based on her world-leading research into the links between nutrition and mental wellbeing. Course participants learn what foods and nutrients should and should not be consumed to improve mental wellbeing and explore the fundamental role that nutrition plays in our mental health. Professor Rucklidge and other experts in psychology, toxicology, and nutrition cover the history of using food as a treatment for mental health; the food components to consider when making dietary choices; and why we need to consider micronutrients in our food, such as minerals and vitamins, for building a better brain. Over 47,122 have already enrolled!

## Health support

A variety of health support systems are available on and off campus, from personal one-on-one connections to a raft of online support mechanisms inhouse and external to UC. Our Health Centre offers free counselling to students, and the Student Care Team and Chaplains are also available to give advice and support on a wide range of issues. Our Psychology Centre offers students an opportunity to participate in a wide range of psychological assessments and treatments.

## Covid modellers win UC research medal

Associate Professor Alex James and Professor Michael Plank won UC's Research Medal in 2021 for their work developing mathematical models that helped guide New Zealand's response to the Covid-19 pandemic. Since early March 2020, the pair have been key members of the national team of scientists at award-winning research centre Te Pūnaha Matatini, which provided a series of mathematical

models informing the New Zealand Government's efforts to combat Covid-19. UC's Deputy Vice-Chancellor of Research and Innovation Professor Ian Wright says their efforts undoubtedly led to lives being saved: "Their world-beating research and deep engagement with the Government has had significant health and social impacts. They have combined pioneering science, clear communication and lightning speed to keep pace with the challenges of a rapidly evolving pandemic. They've also played a role in providing leading science communication to the public."

## Relationships and Sexuality App

A relationships and sexuality mobile app for Young People is being developed by UC. Led by our Health Education Lecturer Tracy Clelland, with 30 years of experience in sexuality and relationships education, the mobile app is being designed by UC software engineers and postgraduate students. Clelland says: "This app is about giving young people knowledge, understanding and skills to have healthy, happy relationships across the life course." An app is a great way for young people to access information, she says, because most own and regularly use a mobile phone, and it is private. "This app will be a resource where parents can get up-to-date information about the laws around consent, gender diversity and the latest types of contraception, and other topics. Our app will include safe, reliable information about sex as well as gender, consent, love, and where to access help", says Clelland.

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**420 publications based on Elsevier mapping**  
**58% publications based on international collaboration**

**Based on publications from 2017 to 2021**



## Menopause at work project

The Menopause Awareness Project Team won our 2021 Health and Safety Initiative Award for launching an educational programme, with key aims to educate staff on the range of possible symptoms, raise awareness about potential impacts, and remove the stigma of talking about menopause at work. Resources for staff include a comprehensive guideline, webpage, contact details of a new UC support group, and other helpful resources. The project was launched on World Menopause Day, 18 October 2021, followed by a seminar for staff by a leading endocrinologist. “Around a quarter of our female staff are in the demographic of potentially experiencing the symptoms of menopause. We want to ensure that every manager knows how menopause can affect women, that there are a wide range of symptoms, and everyone experiences menopause differently. This will help staff members get appropriate support, if required, to succeed at work,” the Team’s spokesperson Jules Stafford says.

## Research into e-cigarette use after legalisation

A research team led by Health Sciences Dr Ben Wamamili has found New Zealand students are vaping more since nicotine-containing e-cigarettes became legal in the country. Students were surveyed in March 2018, just before nicotine-containing e-cigarettes became legal, and were surveyed one year later in March 2019, across all of Aotearoa’s universities. Dr Wamamili’s team found that 13.5% of students were vaping in 2019 compared to 6.8% before it was legal. The results were unexpected. The issues can be addressed with better education and possibly by using technology. Dr Wamamili says, “Education and health promotion strategies including compliance with the smoke-free legislation is a good starting point. Technologies such as mobile phone apps could also be harnessed by health providers to provide accurate and reliable information about vaping.” New Zealand aims to become a smoke-free nation by the year 2025; the Government began working toward this goal in 2011.



A person wearing a green t-shirt with a white graphic and the word "Wellbeing" is holding several wooden blocks. Each block has a white label with text. The person is also wearing blue jeans and a black watch. The background is a plain, light-colored wall.

Say the alphabet backwards.

my face for the

Wellbeing

Have you signed up at the UC  
Recentre?

**4** QUALITY  
EDUCATION



**Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all**





## New Sustainability Undergraduate Degree

Our new undergraduate qualification was launched, the Bachelor of Social and Environmental Sustainability, with the first intake of students in early 2022. The degree prepares students to understand the ethical, social, business and environmental justice issues that impact sustainability decision-making. The degree is informed by and supports mātauranga Māori - Māori and Indigenous knowledge systems - based in an ethos that respects land, water, and relationships with Tangata Tiriti (people of the Treaty, such as non-indigenous New Zealanders). UC Professor Bronwyn Hayward, lead creator of the new degree, worked with colleagues from Arts, Business, Science, Law, and Aotahi School of Māori & Indigenous Studies to co-design the qualification. "I'm excited about this degree because it is an opportunity for students who want to make a difference, from their local community to the world stage, to create a more just, fair and creative future," says Professor Hayward.

## Online course a volcanic international winner

In our first year offering massive open online courses (MOOCs), we won an international prize for an exceptional volcanic course. UC Geologists Professor Ben Kennedy and Dr Jonathan Davidson won the 2021 edX Prize for Exceptional Contributions in Online Teaching and Learning for the course 'Exploring Volcanoes and Their Hazards: Iceland and New Zealand'. Informed by 10 years of research into virtual field trips and field education, the course was designed to deliver an immersive and fun virtual science

experience focussed on volcanic landscapes. By integrating an emphasis on Māori knowledge, the course also enables learners to empathise with and understand different perspectives. Many top-ranked universities around the world are part of the edX education, reaching a global community of over 40 million learners.

## Engineering the future

With an interest in sustainable engineering Stefano choose a master's project with a focus on preservation of our ocean ecosystems." He says studying at UC taught him the fundamentals of creating engineering products: "I've learnt skills that allow me to join companies designing hydro power stations, jet engines, mountain bike parts, prosthetics, and rocket ships." Stefano now works as a Development Engineer with Christchurch-based company Ossis Limited, who design and develop printed titanium hip implants. "It is really rewarding to work in a position where I am helping someone to walk again or to improve their quality of life. Also, to be working for a company that is pushing the boundaries of what is possible with technology," says Stefano.

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**190 publications based on Elsevier mapping**  
**38% publications based on international collaboration**

**Based on publications from 2017 to 2021**



## Tupuānuku wins Student Accommodation excellence award

Tupuānuku Hall of Residence received the 2021 Asia-Pacific Student Accommodation Award (APSAA) for excellence in Facility Development or Management. The award recognises the Hall's innovation as a new generation facility, which celebrates UC's bicultural values and vision, and strong focus on student wellbeing. The Hall for first-year students opened in February 2021 and has an embedded bicultural approach that puts Māori language, design, and culture at its core. Accommodating 484 residents and 20 residential advisors, the building is six levels, with each floor featuring its own large common areas, small study spaces, kitchenettes, and gender-neutral common bathrooms. Amid the 2021 challenges of the COVID-19 pandemic it achieved 98.4 per cent occupancy.

## Science, Māori and Indigenous knowledge

Our integrated multi-disciplinary course, MAOR172, between Aotahi: School of Māori and Indigenous Studies and Faculty of Science, provides an understanding of Māori and Indigenous peoples' knowledge in such fields as astronomy, physics, conservation biology, aquaculture, resource management and health sciences. The course provides unique perspectives in Indigenous knowledge, western science and their overlap. It also provides an essential background in cultural awareness and its relationship with today's New Zealand scientific community.

## Education resources destined for Tongan schools

A shipping container left our campus late 2021 full of education resources and supplies to support several new classrooms in Tonga, to be distributed by the Tongan Ministry of Education. A collaboration between EcoCARE Pacific Trust and UC, the initiative helps address shortages

of educational resources in schools in Pacific Island nations. "Each year since 2006 we have sent at least one container, with the goods distributed amongst needy schools in an equitable way to enhance the Ministry's capacity to teach," says Dr Russell Taylor, EcoCARE Co-Founder and Research Fellow for UC's National Centre for Research on Europe. EcoCARE and UC are also working on other projects to assist with capability building in disadvantaged nations from an ecological perspective, including establishing a mussel farm research project in Tonga; a vertical gardens prototype project for communities in Palestine; and a lift device for people with paraplegia and tetraplegia – to name a few.

## Māori knowledge and traditions woven into PhD

Kiri Solomon has immense passion for her work, fostering the emotional literacy of her adult students and completed her PhD at UC in 2021. Kiri's research was based on a journey of developing an Emotional Literacy (EL) programme for Adult Learners in Aotearoa New Zealand. "Emotional Literacy has been linked to increases in social skills, employment outcomes and overall wellbeing, however access to relevant courses is costly, and often programmes are more generic and based in an employment context. We also wanted to highlight how Mātauranga Māori was able to support this kaupapa and with help from Kaumātua Rereata Makiha we were able to thread concepts from Te Maramataka (Māori Lunar Calendar) throughout both our research generally and within the EL programme specifically that we developed alongside our Research Whānau," Kiri says. Examiners said her PhD thesis broke new ground in content and methodology as it melded western theories of emotional literacy with Indigenous mātauranga, based on the maramataka Māori, and made an important contribution to the field.



**5** GENDER  
EQUALITY



**Achieve gender equality  
and empower all women  
and girls**





## UC academic named in 2021 Honours List

Our congratulations to Professor Emerita Paula Jameson on receiving the Officer of the New Zealand Order of Merit in the 2021 Queen's Birthday Honours List. Professor Emerita Jameson is a leading plant scientist. In 2004, she was appointed inaugural Head of our School of Biological Sciences. Through her direct leadership and mentorship, the School became one of New Zealand's highest ranked groupings of biologists. Professor Jameson's work has been notable in combining internationally recognised research on the regulation of plant growth with leadership across the wider biological sciences. Professor Jameson received the 2019 Marsden Medal recognising a lifetime of outstanding service to the science profession.

## Flicking the Leadership switch

UC Business School offers professional development and strategic leadership courses to women to build the skills to thrive in complex environments, better manage challenges and demonstrate resourcefulness in a fast-changing world. In our popular interactive introductory course, Flicking the Leadership switch, women explore leadership pathways. The course introduces women to a range of practical tools and topics, such as ideas and action plans to support future development, ideas for lifting leadership profiles, common challenges women face in the workplace and how to navigate them, and support from a peer group, to name a few. The course benefits women from diverse industries; commercial, local government, not for profit, or education. It is aimed at ensuring women's pathways to potential can be identified and realised.

## Breast cancer screening

Jessica Fitzjohn, UC PhD candidate, is part of a research team working on a breast cancer-diagnosis device with the potential to help overcome cultural and socio-economic boundaries, reach more rural communities, and make breast screening more accessible to women of all ages. Fitzjohn hopes a new breast-screening method could become a reality in Aotearoa. The new method involves lying face down while the device vibrates at different frequencies for cameras to capture surface motions. The images are analysed to detect possible tumours. Fitzjohn says: "Currently, free mammograms are offered to women aged

45-69 in New Zealand, but only 67% of women in that age group make the most of this. Many women put off coming in for mammography because they find it uncomfortable and invasive. In addition, almost 20% of breast cancers occur in women under 45, who aren't eligible for the free programme and for whom mammography is not generally recommended."

## Symposium initiates new women's research networks

Women researchers from across Canterbury gathered at UC, to share knowledge, learn from each other's experience and engage in discussions about future research. Deputy Vice-Chancellor Academic Professor Catherine Moran opened the event, saying it was exciting to see so many women researchers together in one place. "What strikes me as I think about what this day means, is that it's about women empowering women, celebrating one another and coming together to be stronger than we are on our own," she said. She welcomed her colleagues from across UC, as well as researchers from Ara Institute of Canterbury, Lincoln University, Crown Research Institutes and other organisations. Professor Ximena Nelson, from UC's College of Science, first raised the need for a women's research symposium. She was grateful for the support of her colleagues in bringing the vision to reality, including both academic and non-academic staff.

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## 68 publications based on Elsevier mapping 40% publications based on international collaboration

Based on publications from 2017 to 2021

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## 49% of UC's total workforce were women, including 40% of academic staff

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## 50% of students starting their first degree are women

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## Exhibition on traditional Fijian female tattooing

An exhibition opened in September exploring the ancient art of female tattooing in Fiji. The exhibition was presented by Luisa Tora (Kadavu), the 2021 Creative New Zealand Macmillan Brown Pacific Artist in Residence. Tora is an interdisciplinary artist, writer, and film maker, and has a special interest in indigenous, queer and feminist themes. Tora is Fijian and has lived in New Zealand since 2009. In 2015 she became a member of The Veiqia Project, a collective of Fijian artists and researchers based in New Zealand, Hawai'i and Australia. The group is investigating veiqia, an indigenous Fijian female tattoo practice, and sharing its findings through creative outputs and community events. "The exhibition highlights the journey each artist took to learn more about veiqia, our traditional tattoo practice that was part of a rite of passage for young girls when they reached puberty," Tora says.

## Local politician graduates with a PhD

In April 2021 Sunita Gautam graduated with a PhD that focussed on self-employment as a strategy for Indian immigrants' settlement in New Zealand. Gautam says: "I come from a background where education was not a priority for girls. I strongly believe that education is crucial, and it plays a huge role in empowering wahine, and to change my destiny, I wanted to gain the world's highest degree." Originally from Shaktinagar, a small town in India, Gautam moved to Christchurch nearly 20 years ago. She and her husband have made Christchurch their home, with Gautam giving back to the community through her work as the Community Board Member for the Central Ward, Justice of the Peace, and volunteer business mentor.

## Matatū squad with UC connections

The South Island team for New Zealand's new women's rugby competition has several UC students and alumni. UC student Lucy Jenkins is in her third year of studying towards a Bachelor of Sport Coaching Degree along with Grace Brooker, as one of the first contracted players in Matatū. Alumni of UC have also been named in the team. Chelsea Bremner graduated from with a Bachelor of Teaching and Learning in 2015, Liv McGoverne graduated with a Bachelor of Sport Coaching in 2019, and Grace Steinmetz studied Law and Commerce. Vice-Chancellor Professor Cheryl de la Rey said of the team partnership: "The University of Canterbury is committed to gender equity and social inclusion, and we are proud to support South Island wāhine competing under the Super Rugby banner. It is pleasing to see nearly a quarter of Matatū contracted so far are UC-educated wāhine, paving the way for future generations."

## Haere Mai to Amy Adams

Hon. Amy Adams, former MP and UC graduate, joined the UC Council on 8 September 2021. Amy graduated with a Bachelor of Laws degree with First Class Honours from the University of Canterbury. Her legal career included becoming a partner in a Christchurch law firm. She was selected as the National Party candidate for the Selwyn region for the 2008 general election, and served as a Cabinet Minister for 6 years in a number of roles including as Minister for the Environment, Minister for Communications, and Minister of Justice. Amy was the Member of Parliament for Selwyn from 2008 until 2020, when she retired from politics.





**6** CLEAN WATER  
AND SANITATION



# Ensure availability and sustainable management of water and sanitation for all



## Water Resource Management

Sustainability and management of our valuable water resources, both supply and quality, is one of the biggest challenges facing Aotearoa New Zealand today. Water Resource Management studies investigates sustainable techniques to protect our freshwater resources and prevent further stresses and hazards upon this vulnerable commodity. Our School of Earth and Environment offers an extensive range of study options related to water resource management. Study options include freshwater resources, and freshwater science field skills, advanced water resources, water quality and quantity assessment, and water management, policy and planning. Students can also learn to evaluate the effects of domestic and commercial use on our aquatic ecosystems through practical survey fieldwork.

## Health Education for Goal 6

Global health challenges cross international borders and responses require international cooperation. Our Global Health course offers students the opportunity to explore key and emerging challenges and opportunities facing global health, major public health developments that have improved health outcomes for all, and how economic and political processes have shaped responses to global health problems. A major topic in classes explores key economic and environmental developments that have improved health outcomes including sanitation and the Sustainable Development Goals.

## Seafood waste product could help our streams

Associate Professor Aisling O'Sullivan and Professor Tom Cochrane are researching the use of waste seashells as a solution to reduce contaminants, such as nitrate and phosphorus, from our streams. Green-lipped mussels are a huge industry in New Zealand, producing over 90,000 tonnes of shells every year. Using mussel shells as a solution would help to combat nitrate leaching and meet climate change targets and would also help to reduce waste going to landfill by converting it into a high value, reusable product. The technology would help enable farmers to meet new regulations by reducing the number of nitrates leaching from their land, while providing a natural lime fertiliser and soil enhancer from the waste seashells. Plans involve filters being reused at the end of their lifespan, as a 'regenerated' filter or being crushed to make an organic fertiliser that can be applied back on the farm.

## Waterways Centre for Freshwater Management

The Waterways Centre, located at UC, is the first such centre to be established in any New Zealand university. Established in 2009, the Centre is a joint partnership between UC and Lincoln University. It is run by core staff and supported by a multi-disciplinary group of approximately 50 academic staff members with expertise in freshwater issues, drawn from both Universities. The Centre offers both undergraduate and postgraduate teaching programmes and qualifications, including research programmes. It also provides resources to learn more about freshwater systems and their response to change, and general information relevant to Canterbury's water systems.

## Student recognition in Youth Awards

The passion and hard work of UC student, Alyce Lysaght, was recognised by the community through the Canterbury Youth Awards. Alyce is a final-year Natural Resources Engineering student, minoring in Water and Environmental Engineering Systems. As well as producing her podcast series, she has been the Engineering representative for Te Akatoki, and was on the Infrastructure Commission Te Ao Māori testing panel, as well as mentoring Māori EngMe students at UC.

## On water restoration and conservation

Our Sustainability Office is an on-campus hub for students and staff and the wider community, interested in how they can create positive change and promote sustainable practices in their own lives and spaces. The water focused initiative run by the office informs our students and staff about water restoration and conservation. UC's potable water is sourced from aquifers underneath the city which are fed by water from the Southern Alps. Staff and students can learn more about where our water comes from, how it is being used, how they can help conserve it, and learn about restoration work on the three waterways flowing through our own Ilam campus. There are also lots of helpful tips and free resources available, including a pocket map which shows the locations of the nearest drinking water fountains on campus to refill your bottle.

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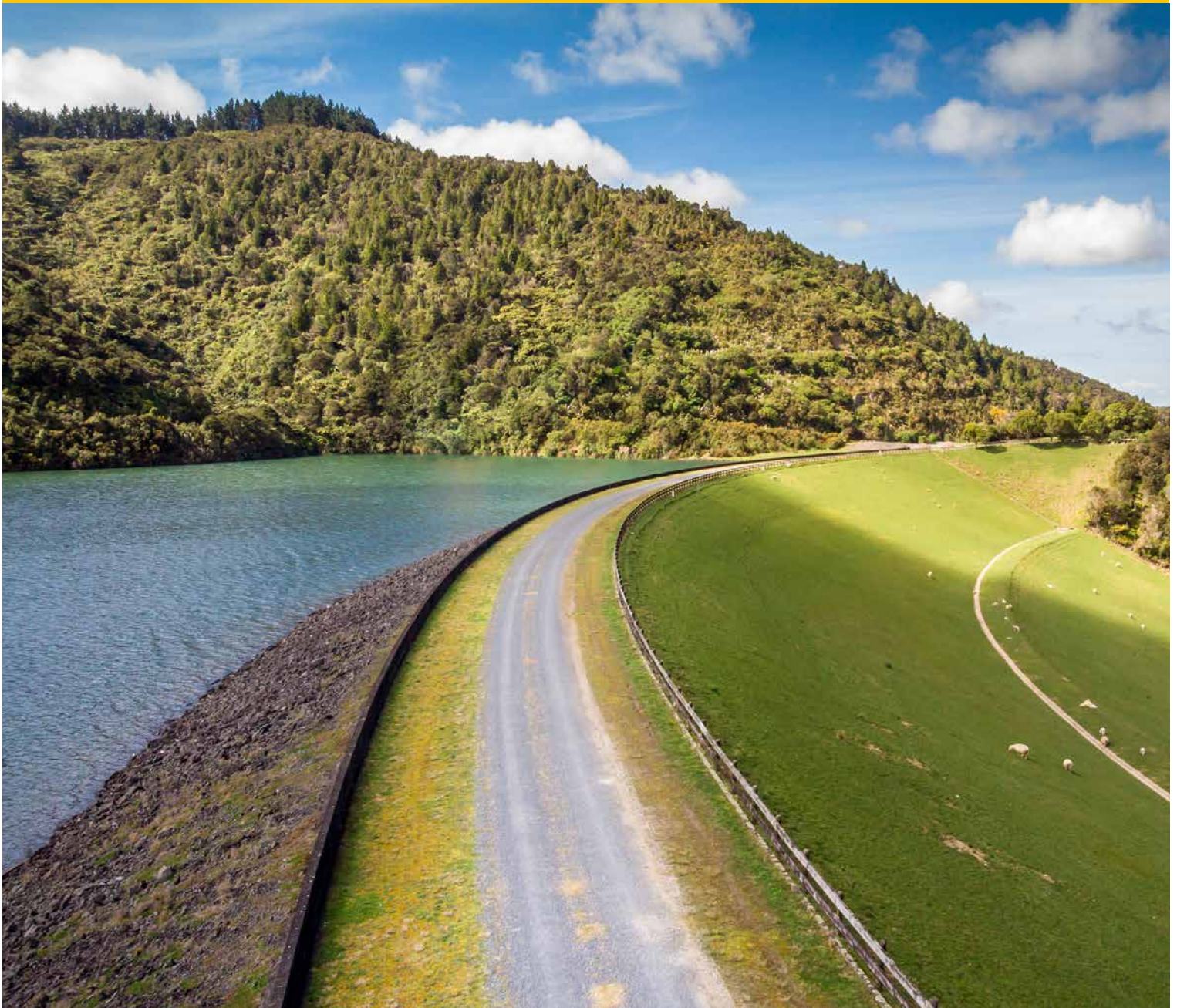
**161 publications based on Elsevier mapping**  
**58% publications based on international collaboration**

Based on publications from 2017 to 2021

**7** AFFORDABLE AND  
CLEAN ENERGY



**Ensure access to  
affordable, reliable,  
sustainable and modern  
energy for all**



## About the EPECentre

The Electric Power Engineering Centre (EPECentre) is a leading independent electric power and clean technologies research group, delivering specialist world-class research and innovation. Located on our Ilam campus, the EPECentre has strong understanding of the NZ Electricity landscape and NZ industry in general, including the manufacturing and primary sectors. With advanced laboratory facilities, the EPECentre team has high calibre researchers with cross-disciplinary capabilities, postgraduate students and support staff in management and technical roles. For over two decades now, the team has worked with large numbers of national and global industry partners and collaborators. The team delivers outcomes through research and development projects (funded by both government and industry), and specialist consulting services. EPECentre also delivers education supervision and teaching, including the provision of professional development courses.

## Future Architecture of the Network

Led by UC, the Future Architecture of the Network (FAN) project is investigating what the future electrical power system might look like in Aotearoa New Zealand. The major research challenge is to determine the future architecture, topology and a transition pathway. FAN is funded by the NZ Government and involves researchers from five NZ universities and the University of Cambridge working together on the collaborative project. The main hypothesis is that high penetration of DC transmission and distribution (conveyance) into the AC grid will provide many benefits to transition to a low-carbon power system.

## Low Carbon Freight Transport

EPECentre has been commissioned to undertake action-based, multi-disciplinary research on a low carbon freight transport system in Aotearoa New Zealand. Phase 1 of the research project is underway, which aims to deliver over the next year a baseline of direct tank-to-wheel transport Greenhouse Gas emissions for key commodities and modes.

## Transition Engineering short courses

There has never been a greater need for engineering to respond to the challenges of mitigation and adaptation. Transition Engineering professional short courses are about building a sustainable future. These short courses are supported by the EPECentre. Transition Engineering is the way the projects of carbon down-shift get done. Long-term plans involve a lot more than meeting emissions targets, but at this critical time all of our infrastructure, buildings, land use and products must be redeveloped into the adaptive, resilient and low carbon versions. The short courses were developed to prepare engineers and professionals working in various fields and are delivered in a flexible and self-paced online format. Globally, they're some of the only courses offered in the field.

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**202 publications based on Elsevier mapping**

**75% publications based on international collaboration**

**Based on publications from 2017 to 2021**



## Creating 'green' hydrogen to power our world

UC researchers are developing a carbon-neutral – even carbon-negative – way to create clean 'green' hydrogen to power our world more sustainably. Professor Shusheng Pang and Associate Professor Alex Yip are focusing on using renewable biomass – such as tree and plant waste from New Zealand's forestry and agriculture sectors – to make green hydrogen. This clean energy source can be used to replace fossil fuels, including coal and natural gas, for transport, industry use, and heating our homes. Associate Professor Yip says: "We are using a unique approach based on new technology in catalysis to simultaneously generate high-purity hydrogen and enable CO<sub>2</sub> capture. The overall process 'unlocks' the potential of using New Zealand biomass, such as trees, plants, and other renewable resources, which are abundant here."

## Unique research into tech-critical metals

Cutting-edge research into obtaining tech-critical metals from mixed oxides could play an important role in helping Aotearoa New Zealand transition to a zero-carbon country. The transdisciplinary team, led by UC's Associate Professor Catherine Bishop, integrates experts in Materials Science and Engineering, Chemical and Process Engineering, and Minerals processing. The research is focused on the processing of tantalum, a hard to process metal; and

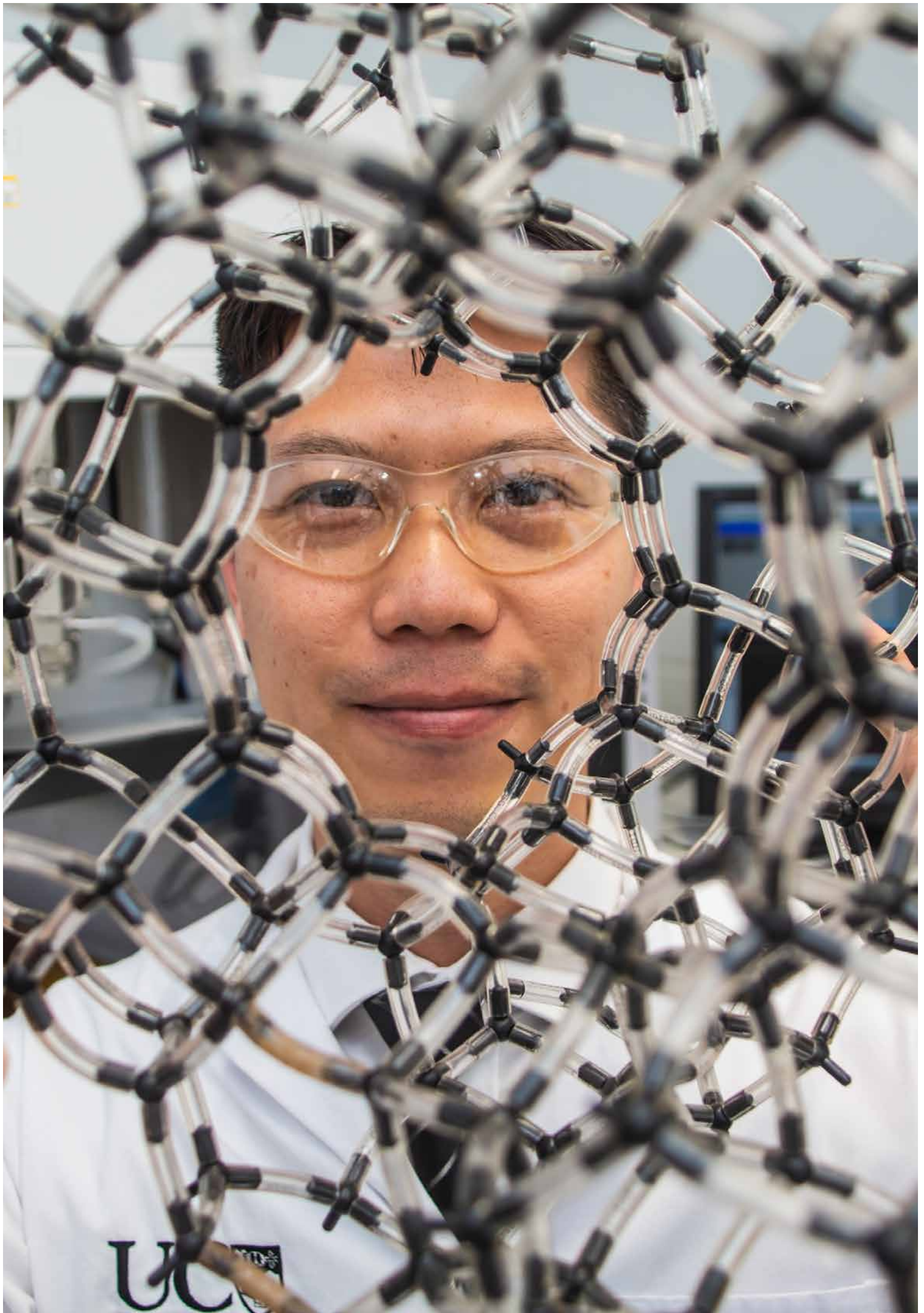
neodymium, a rare earth metal, in the initial proof-of-concept stage. These are used in capacitors and magnets, including the magnets that are a key component in almost all wind turbines. "Developing a new, carbon-free route to obtaining these critical metals will, with further innovation, be a means to achieving New Zealand's low carbon goals; securing access to these metals has also been identified as essential for achieving equitable transition to low carbon goals by the International Energy Agency," says Associate Professor Bishop.

## Joining forces

We joined forces in a strategic partnership with the Western Institute of Technology in Taranaki to support the transition to clean energy and improve accessibility to education in Taranaki. The three-year agreement, effective from semester one in 2022, creates opportunities for joint teaching and for students to move more easily from one institution to the other. The partnership focuses on sustainable energy, business studies and on supporting mana whenua tauria Māori students. Vice-Chancellor, Professor de la Rey, says: "We believe that by working together and sharing our knowledge and expertise we can be more effective at co-creating real solutions for the challenges ahead. Taranaki is an early adopter in the transition to clean energy, moving away from fossil fuel industries, and we are looking forward to playing a part in the region's ambitious Taranaki 2050 Roadmap. This could be an example for the rest of Aotearoa to achieve carbon emission goals while providing equitable transitions and sustainable community development."



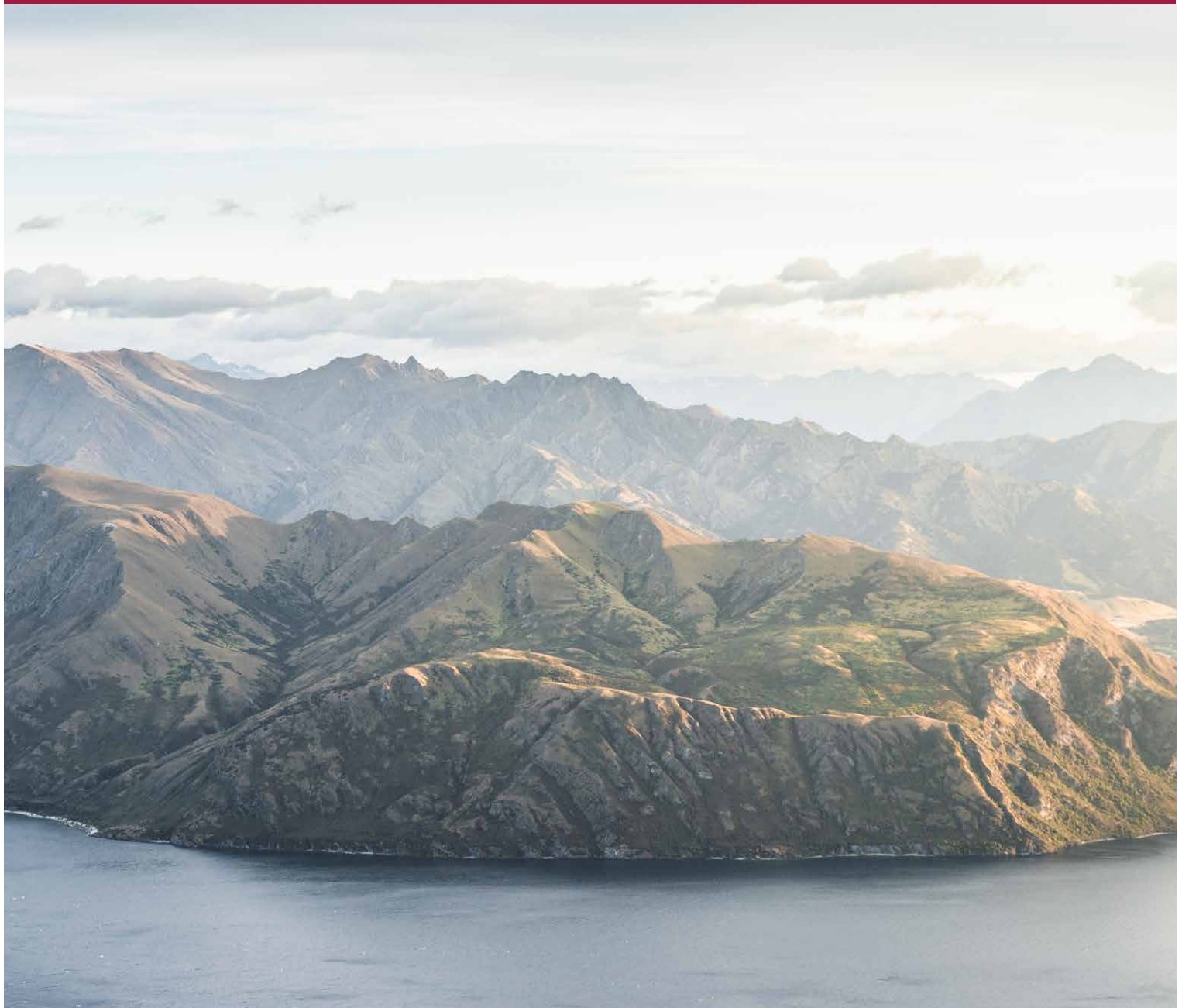




**8** DECENT WORK AND  
ECONOMIC GROWTH



**Promote sustained,  
inclusive and sustainable  
economic growth, full and  
productive employment  
and decent work for all**



## Culturally responsive pedagogy

Our People and Culture team and members from our Office of the AVC Māori have collaborated together to provide an opportunity for UC academic staff to explore, grow, develop and embed culturally responsive pedagogical approaches. This professional development programme covers more than an awareness of culture, to include an ability to utilise knowledge in cross-cultural situations and to develop and implement processes, procedures and practices that support the delivery of culturally competent and appropriate service provision, information dissemination, research, curriculum design and fully inclusive management practices.

## Centre for Entrepreneurship

The Centre for Entrepreneurship provides students with opportunities to build capabilities in entrepreneurship and innovation. The Centre's activities are connected with external organisations, enabling our students to gain real world hands-on experience. Programmes and events are open to all UC students regardless of the degree of year. We want to equip our graduates to have a real positive impact on society. Our mentors, experts and advisors work supportively with students to challenge, encourage, explore new concepts, and make things happen. The Centre also provides an avenue for students to gain experience working with growing startups so they can see what it really takes to grow business globally.

## Celebrating staff

UC recognised 16 long-serving staff members through the Hui Whakamānawa | Celebrating Excellence awards, our annual awards to celebrate all staff successes and empower high-achieving staff to accomplish even more. "It must be very satisfying for our long serving staff members to know that they have been a part of helping educate and develop several generations of future leaders and citizens of our country and the world. Congratulations and thank you for such a significant contribution to our students and our research, and to the UC Community", says Executive Director of People Culture and Campus.

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## 180 publications based on Elsevier mapping 73% publications based on international collaboration

Based on publications from 2017 to 2021



## Trading challenge competition

The CMC Markets UC Trading Challenge is an annual competition giving UC students an opportunity to put their investment strategies to practice with a range of financial derivative instruments, including cryptocurrencies, gold and silver commodities, forex and shares via the CMC Markets online trading platform. More than 200 teams, comprising of individuals or pairs, battled it out in real-world financial markets over four weeks. The contestants used a virtual fund of \$250,000 to test their knowledge and trade for the best returns. Dr Moritz Wagner, UC Finance Lecturer says, "In recent times, we have seen extreme market turmoil and the gamification of investing via commission-free fintech apps. The annual trading competition provides students with an opportunity to apply their theoretical knowledge and develop further insights across a wide range of financial products. In this safe environment, they can gain important skills for building successful careers."



## Rafael

### Freedom

"I've seen other graduates doing well and getting jobs. New Zealand is investing a lot of money in aerospace, so it's a great industry to be getting into."

## Possibilities for Adult Students

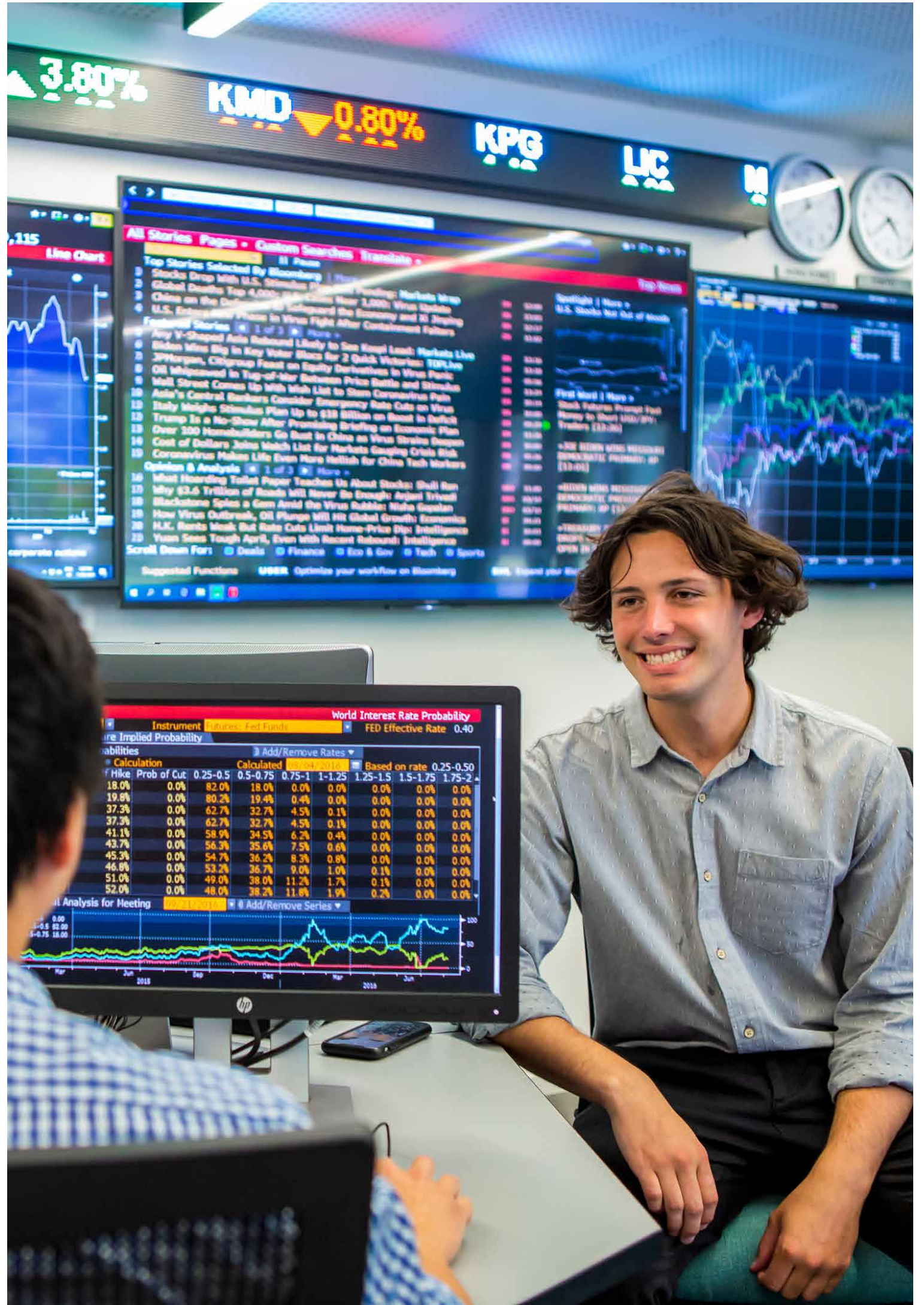
Stepping into university life as an adult can seem daunting, but we're here to make the transition to adult study easy and enjoyable. UC defines adult students as students over the age of 20. We offer a diverse range of study options for our adult students, with over 120 qualifications in more than 150 different subject areas. Targeted additional support services are available to help ensure our adult students succeed, such as health and wellbeing care services, student advisors, academic skills programme, adult student orientation, on-campus day-care services.



## Serena

### Transformation

"I thought I was just coming here to change my career, but it's also been transformative in terms of my Māori identity. Through my Indigenous studies I've had the chance to learn about myself, my people and our rich history and culture."



3.80%

KMD ▼ 0.80%

KPG

LIC

All Stories Pages Custom Searches Translate

Top Stories Selected by Bloomberg

- 1 Stocks Drop With U.S. Stimulus
- 2 Global Deaths Top 4,000 as COVID Funding: Markets Wap
- 3 China on the Defensive as Stimulus Near 1,000: Virus Update
- 4 U.S. Entrenched in Virus Fight After Containment Falters

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- 4 Wall Street Comes Up With Mish List to Stem Coronavirus Pain
- 5 Asia's Central Bankers Consider Emergency Rate Cuts on Virus
- 6 Italy Weighs Stimulus Plan Up to \$18 Billion as Boost in Deficit
- 7 Trump Is a No-Show After Promising Briefing on Economic Plan
- 8 Over 100 Homebuilders Go Bust in China as Virus Strains Shown
- 9 Cost of Dollars Joins Mish List for Markets Seeking Crisis Aid
- 10 Coronavirus Makes Life Even More Hellish for China Tech Workers

Opinion & Analysis

- 11 Most Hounding Toilet Paper Teaches Us About Stocks: Shall Run
- 12 Why \$3.6 Trillion of Roads Will Never Be Enough: Arjun Tripathi
- 13 Blackstone Spies a Gem Amid the Virus Rubble: Maha Swamin
- 14 How Virus Outbreak, Oil Plunge Will Hit Global Growth: Economics
- 15 H.K. Bonds Misch But Rate Cuts Limit Home-Price Dip: Intelligence
- 16 Yuan Seen Tough April, Even With Recent Rebound: Intelligence

Scroll Down For: Deals Finance Eco & Gov Tech Sports

Suggested Functions: **UBER**: Optimize your workflow on Bloomberg **BMW**: Track your BMW



World Interest Rate Probability

Instrument: **Fed Funds** | FED Effective Rate: 0.40

Implied Probability

Add/Remove Rates

Calculation	Calculated	Based on rate
0.25-0.5	0.5-0.75	0.75-1
1-1.25	1.25-1.5	1.5-1.75
1.75-2		

Prob of Cut	0.25-0.5	0.5-0.75	0.75-1	1-1.25	1.25-1.5	1.5-1.75	1.75-2
18.0%	0.0%	82.0%	18.0%	0.0%	0.0%	0.0%	0.0%
19.8%	0.0%	80.2%	19.4%	0.4%	0.0%	0.0%	0.0%
37.3%	0.0%	62.7%	32.7%	4.5%	0.1%	0.0%	0.0%
37.3%	0.0%	62.7%	32.7%	4.5%	0.1%	0.0%	0.0%
41.1%	0.0%	58.9%	34.5%	6.2%	0.4%	0.0%	0.0%
43.7%	0.0%	56.3%	35.6%	7.5%	0.6%	0.0%	0.0%
45.3%	0.0%	54.7%	36.2%	8.3%	0.8%	0.0%	0.0%
46.8%	0.0%	53.2%	36.7%	9.0%	1.0%	0.1%	0.0%
51.0%	0.0%	49.0%	38.0%	11.2%	1.7%	0.1%	0.0%
52.0%	0.0%	48.0%	38.2%	11.8%	1.9%	0.2%	0.0%

Analysis for Meeting

9 INDUSTRY, INNOVATION  
AND INFRASTRUCTURE



**Build resilient  
infrastructure, promote  
inclusive and sustainable  
industrialisation and  
foster innovation**



## Famous UC graduate Ernest Rutherford turns 150

UC commemorated 150 years since the birth of one of its most famous scientists, academics and alumni. Ernest Rutherford was one of New Zealand's most successful and respected scientists. Rutherford was awarded the 1908 Nobel Prize in chemistry for his investigations into the disintegration of the elements, and the chemistry of radioactive substances. It's thanks to the scientific discoveries made by Rutherford and his peers that television, radio, sonar and telephones were invented. Among the treasures UC holds in its archives are Rutherford's large medal collection, the original declaration of students signed by Rutherford on his entry to the University, a large collection of original and secondary source material relating to Rutherford, including 26 academic diplomas, scientific papers, a short film and sound recordings, and replicas of his Nobel Prize. We have two replica sets of Rutherford's original Nobel medal: one set is on display in the Ernest Rutherford Building, located on our Ilam Campus.

## Mayor takes a virtual tour

Christchurch Mayor Lianne Dalziel learned about aerial firefighting and toured a virtual reality hospital during a hands-on visit to UC's Ilam campus. The Mayor was shown around the Human Interface Technology Lab New Zealand (HIT Lab NZ). The HIT Lab NZ focuses on using new and emerging technologies, such as virtual reality (VR) and applied immersive game design, to solve real-world problems. During the tour Mayor Dalziel tried out a VR training tool for aerial firefighters developed by UC postdoctoral research fellow Rory Clifford and tested a VR game where the user can move around a virtual hospital completing a series of tasks to review the building layout and design. The hospital design project is the work of UC Master of Human Interface Technology student Emma Buchanan, who has a background in architecture and healthcare design.

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**186 publications based on Elsevier mapping**

**65% publications based on international collaboration**

**Based on publications from 2017 to 2021**



## ThincLab Canterbury

ThincLab Canterbury sits alongside UC's Centre for Entrepreneurship and is Canterbury's best connected incubator for growing hi-tech, or research and based companies with global aspirations. ThincLab is the only Founder Incubator located within a New Zealand university setting. You don't need to have a connection to UC to be involved. ThincLab provides capability building for founders and their teams, connection to industry experts and agencies, and international pathways to growth and investment.

## Students share knowledge with local businesses

The Global Virtual Micro-Internship programme, a new partnership scheme, was launched by our Business School. Under the programme, international students studying Business will be matched with local Canterbury businesses keen to expand into Asia. The aim is to help the students gain real-world experience and enable businesses to benefit from the students' unique expertise. Business School Executive Dean Paul Ballantine says UC has a talented group of international students, the vast majority from Asia, who are eager to gain practical work experience: "Alongside the business skills they develop as part of their studies with us, these students bring with them a wealth of linguistic and cultural knowledge and skills that will be of immense value to any business looking to expand overseas."

## Bringing AR to smartphones

The need for social connection became clearer than ever as people locked down around the globe. UC student David Huang realised there was an appetite for a fresh way of connecting with family and friends. Oasis AR uses true augmented reality (AR) on a smartphone to create the sensation of having friends close by in the room, even when they're far away. Socialising with 3D avatars in games isn't particularly new, David says, "What's new is making the use of AR accessible to everyone with a smart phone, and that's what Oasis AR does. Although we couldn't cure the pandemic, our hope was that we could create something using AR to help people feel like they're in the same room with their friends and family. It's currently the closest thing possible to replicate real-life interaction in an accessible way." David will be within the first cohort of students to graduate with the conjoint Bachelor of Product Design (Immersive Game Design) and Commerce (Finance) degrees, graduating in 2022. He plans to get involved with ThincLab next year to continue working on the app full-time.







**10** REDUCED  
INEQUALITIES



**Reduce inequality within  
and among countries**



## UC boosts scholarships for Māori and Pacific students

Takere, a pilot programme launched in January 2021 with 37 participants, was extended to mid-August 2021 to accept more Māori and Pacific applicants after gaining positive feedback. For 2022, Takere will, for the first time, provide needs-based subsidised accommodation at Tupuānuku, UC's newly opened hall of residence, throughout the students' first year. The Takere scholarship and transition academic programme includes a six-week academic and cultural live-in programme, and it also provides tailored academic support and mentoring from Māori and Pacific student advisors throughout the year, a fees-free course, opportunities for strengthening leadership skills, and accommodation for the year at Tupuānuku (subject to a financial needs assessment). Andrew is part of the 2021 Takere programme, and says it completely transformed his experience of university: "Having advisors available straight away to help with anything you need to do with uni, makes you feel a lot more comfortable. I absolutely recommend it." Andrew is currently studying Law and Youth and Community Leadership at UC.

## Students engineer off-road e-trike

Four UC students created an off-road electric trike for Blair Nevin, who has cerebral palsy. The four Mechanical or Mechatronics Engineering students chose to custom-build the mountain-trike as their final-year project. The cast of characters in the photo are:

Seated in front: Blair Nevin (who has limited mobility)  
UC Students: Gareth Wadsworth, Finian Tse, Sam Hall, Jackson Stewart  
UC Academics: Professor Digby Symons and Lecturer Shayne Crimp

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## 112 publications based on Elsevier mapping 54% publications based on international collaboration

Based on publications from 2017 to 2021





## Online advice offers a hand up to children with autism

Associate Professor Laurie McLay from UC's Education, Health and Human Development, is leading two studies investigating the effectiveness of "telehealth" delivered interventions, provided through websites and video conferencing, for children with autism. She says the number of children diagnosed with autism is growing internationally, with an estimated one in 59 people affected. But there is a shortage of trained specialists available in New Zealand to provide the support they, and their families, need. "There is an urgent need to establish evidence-based, culturally appropriate approaches to service delivery, particularly for those who face barriers to access. We hope it will increase timely access to critical support for families who otherwise face long waits. The material produced for both of these studies could be combined to provide a comprehensive online library of freely available, evidence-based resources that can be shared with caregivers of children on the autism spectrum," says Professor McLay.

## Student Accessibility Service

We estimate that between 20-25% of our students have some form of visible or invisible disability, and our Student Accessibility Service provides support services, assistance, and advice to ensure that our students make the most of their time here and achieve their academic goals. Support to our registered students includes, for example, practical

support such as interpreters and notetakers; assistive technology such as screen reading, voice recognition software, Otter notetaking; information in alternate and accessible formats, including electronic, braille; and special arrangements for exams such as extra time, separate room, reader/writer support.

## LGBTQIA+

UC aims to provide a welcoming and inclusive environment and recognise that belonging is important for everyone. We support LGBTQIA+ students and staff with assistance on and off campus and celebrate sexual and gender diversity on campus.

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**'Anyone starting university can feel alone and if you're queer it's doubly so. It's important to find your community and at UC that exists in so many different places. To be in a place where your work and your identity are validated is so exciting. If you reach out, you'll be welcomed.'**

**Sean Lydiard, UC Me**

## Students' stereotyped view of ability limiting future careers

Findings from a study of diverse 13-year-olds set off alarm bells for UC Education Researcher Dr David Pomeroy when he looked into students' attitudes towards Physical Education (PE) and maths. While most male students enjoyed PE, male students who are Māori, Pasifika or other students from lower socioeconomic status (SES) were much more likely to assume they would go into physical careers. This was true even for those who performed well at maths. Female students didn't fare such better. Female students who were Māori, Pasifika or other students from low SES families had gender-dependent aspirations, citing preferences for service jobs such as beautician. These career assumptions influenced, and limited, their attitudes to school subjects, with wide-ranging implications. Dr Pomeroy says we need to stop acting as if test results reflect future potential – they don't. All students need to be challenged; teachers need to talk about the job market and not leave this to careers advisors; we need to examine our own biases about race and physical and intellectual talent.

## Fairer, more caring economies

UC Science Researcher Associate Professor Kelly Dombroski is exploring how community investment can lead towards a more caring, holistic economy. Associate Professor Dombroski says traditional economic models are driven by Western ideas of competition, profit and individualism but communities and governments are beginning to transition to more 'holistic' economies that prioritise wellbeing over economic growth. Associate Professor Dombroski is investigating community organisations that are already on the ground and engaged in the types of economies that care about social change, with case studies in urban areas, farming, composting, and co-housing. Further investigations will be studies with diverse communities that include Māori and Asia-Pacific-based community organisations. "I hope to support a number of Māori and Asia-Pacific postgraduate students into these and other important Māori-led partner projects as well," she says.



11 SUSTAINABLE CITIES  
AND COMMUNITIES



**Make cities and human  
settlements inclusive, safe,  
resilient and sustainable**



## Resilient Cities Education and Research

Our School of Earth & Environment have a range of innovative learning and research options for on resilient cities, environments and communities, along with facilitated learning through students engaging with local groups to help make our city Ōtautahi Christchurch and the Canterbury region of Aotearoa New Zealand more sustainable and resilient. For 2021, a sample of UC student research projects explored:

- Juvenile bar-tailed godwit settlement at the Avon-Heathcote Estuary
- Engaging with young people on climate change
- Landscape Preservation on Banks Peninsula, is there enough
- Engaging with communities in the Ōtākaro Avon river corridor with rephotography
- Learning from the past in developing our urban landscapes
- Risks and opportunities of blue carbon as a response to sea level rise in Lyttleton Harbour

## On becoming carbon net neutral

We are committed to reducing our carbon emissions. UC received a funding boost from the Government to help us become carbon net neutral by 2030. The funding boost will help us in the conversion of our Ilam campus boiler from coal to biomass and allow us to introduce ground source heats pumps which will become our sole source of heat in the next 10+ years. "We are investing in the future, so our students are learning in facilities that are as efficient and sustainable as possible. Thanks to the Government's funding we can do that sooner", says Professor Jan Evans-Freeman, Pro-Vice-Chancellor Sustainability.

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**564 publications based on Elsevier mapping**  
**67% publications based on international collaboration**

Based on publications from 2017 to 2021



## Timber wall innovation a leap forward

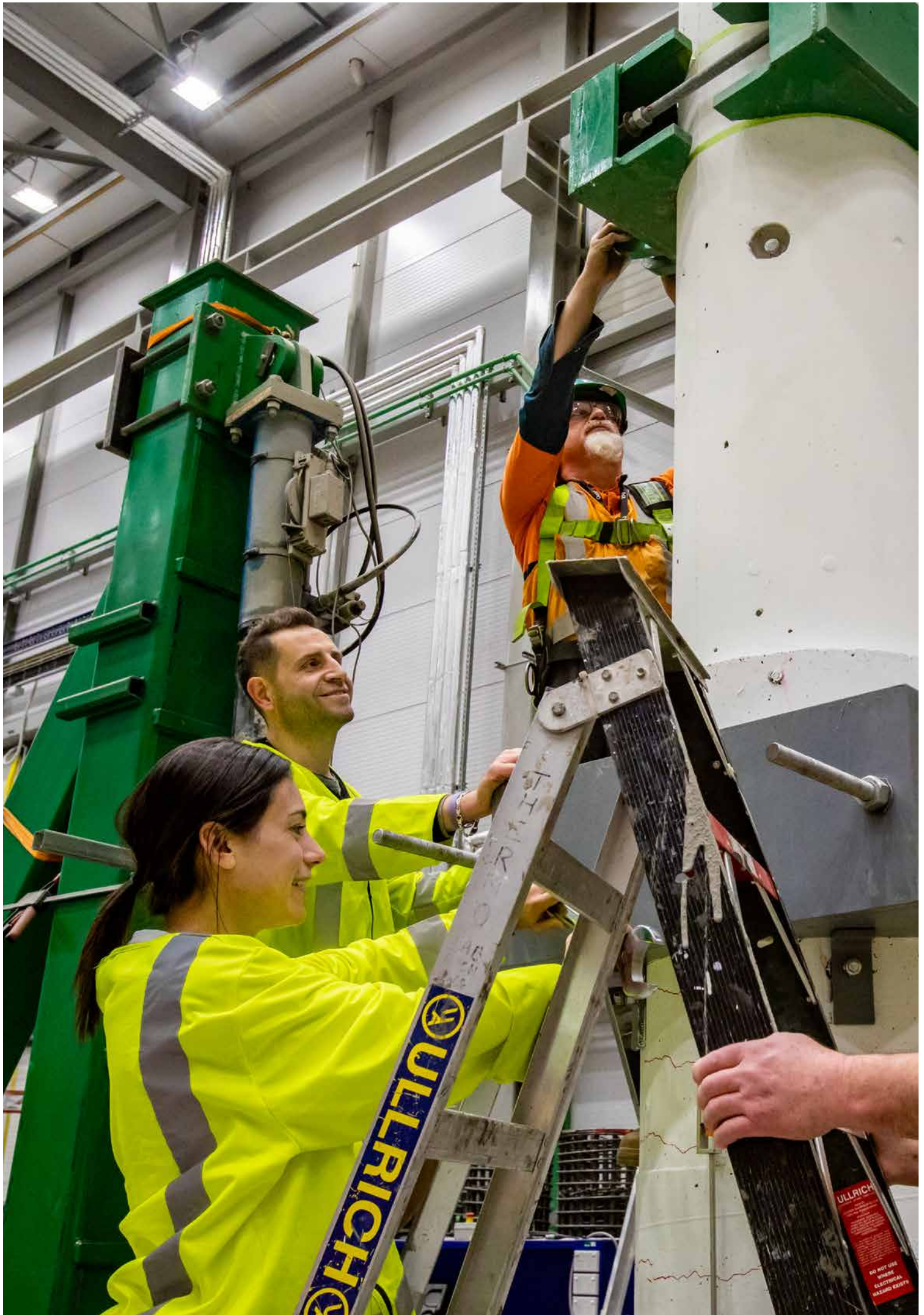
Exciting new research has demonstrated cross-laminated timber (CLT) walls are feasible and cost-competitive with steel or concrete systems in low-rise buildings and offer significant environmental benefits. The findings from research by Associate Professor Minghao Li and his team could have far-reaching implications for the construction and forestry industries and New Zealand's quest to become a carbon-neutral economy. The research team designed innovative high-capacity connections to resist earthquake forces and protect the integrity of the timber walls. "New Zealand has 2.1 million hectares of plantation forests, and we grow a lot of high-quality timber, like radiata pine that we can use for construction. We hope our research will convince the building industry to use more timber, which will also benefit our forestry industry," says Associate Professor Li.

## Building bridges on uncertain ground

There has been increased interest in creating more earthquake-resilient bridge infrastructure in Aotearoa New Zealand. In response, our Civil Engineering researchers expanded on past research and application of post-tensioned rocking bridge columns, and developed a cost-effective, low-damage solution for bridges. The combination of self-centring rocking bridge columns can achieve large displacements with little to no damage compared to conventional bridge columns. A rocking column is comprised of two main structural components: one or multiple high strength bars that act like rubber bands to recentre the column, and several conventional steel bars that are detailed to dissipate energy and can be easily replaced if heavily damaged. The low-damage solution for bridges yield little to no damage if hit by a strong earthquake. The low-damage, cost-effective solution for bridge infrastructure means engineers and constructors can start adopting it sooner.







12 RESPONSIBLE  
CONSUMPTION  
AND PRODUCTION



## Ensure sustainable consumption and production patterns



## Pioneer of environmental accounting

UC Business School Professor Markus Milne won our 2021 Research Medal for his work investigating the social and environmental impacts of business. Professor Milne began his research some 30 years ago, when the field was very new, and today he is known as an international pioneer of social and environmental accounting (SEA). Professor Milne is Aotearoa New Zealand's most cited accounting academic. "I don't think anybody in the late 1980s envisaged how corporate practice might develop towards environmental accountability," he says. As awareness of climate change and human impacts on our planet's ecosystems increases, the importance of Professor Milne's work has gained recognition internationally. "I think that frugality and simplicity spills over into everyday living and that is essential for humanity to behave sustainably. It teaches you humility. At times, the consequences for survival of not fitting in on nature's terms are all too grim and obvious. That is a lesson as a species we seem reluctant to learn," says Professor Milne.

## Design ethics

The Design ethics course offered by our unique School of Product Design intends to provoke thought and reflection over the role of the designer and their responsibilities. Students develop an understanding of the many aspects of ethical and moral debate within the contemporary product design industry, including the impacts of design on Māori and Indigenous understandings and concerns related to sustainability and the idea of responsibility in design.

## Smart tech to help monitor food safety remotely

Drones, satellite imaging and artificial intelligence are some of the smart technology tools that could soon be used to ensure farmers and other food industry businesses are following health and safety rules. A UC-led project has explored the opportunities and challenges of this process, which involves auditors checking a farm or company's systems are compliant without physically visiting the site. According to the lead author, Professor Pavel Castka, from UC's Business School, smart technology tools will bring numerous benefits to farmers and others working in the food industry, addressing some of the concerns about the cost and time involved in compliance auditing. Professor Castka also believes there are benefits to consumers from improving accountability for health and safety at food processing facilities. "Consumers care more about the quality and the environmental and social impacts of the food they buy now, so I think monitoring and reporting processes are becoming more important to meet this consumer need," he says.

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**200 publications based on Elsevier mapping**  
**75% publications based on international collaboration**

Based on publications from 2017 to 2021



## Turning biowaste into economic boost **New materials from flax and cabbage tree leaves**

A UC-led project, in collaboration with Manaaki Whenua Landcare Research, Plant and Food Research and Lincoln University, aims to turn biological waste products into new products that could deliver a significant economic boost to New Zealand's economy. UC's Professor Brett Robinson is spearheading the project. Waste products from New Zealand's food processing industry, such as potato scraps and grape skins, could be transformed into high-value soil conditioners and animal feed. "We want to create economic and environmental value from biowastes by ensuring the nutrients they contain are harnessed to improve our soils and feed our animals. Our overarching goal is to reuse and recycle our waste, helping to make our agricultural economy more circular and our food production more sustainable in the long-term," he says. Transforming this biowaste into high value products, such as soil conditioners and nutritionally balanced animal feeds, would help reduce New Zealand's carbon emissions and bring economic and environmental benefits.

Sustainable materials made from cabbage tree leaves and flax could soon be used to build high-performance skis and skateboards in Christchurch. After experimenting in the garages of their student flats, two UC Industrial Product Design students, Ben Scales and William Murrell, have developed new natural composite materials using New Zealand ti kōuka (cabbage tree) and harakeke (flax). They plan to use these materials to create recreational products such as skis, snowboards, kayaks and skateboards, currently manufactured from fibreglass and carbon fibre. They have finished their first working prototype, a harakeke biocomposite skateboard made from recycled polylactic acid derived from corn starch and harakeke fibre, and plan to have other prototypes under way next year. Scales says making recreational products from recycled natural materials is a growing market internationally, but their point of difference is in using distinctly New Zealand materials to create a new fibre. Scales and Murrell have already had inquiries from international companies who've heard about their work and want to find out more.



TOKI O TE TANGERE,

MO, KA PAHE TE TERE O TE WAKA

O MOANAUATOA.

THROUGH THE EXPERT... AND THE  
ACCURATE STEERING OF... OF OCEAN  
CONDITIONS CAN BE SUCCESSFULLY... GATED.



**13** CLIMATE  
ACTION



**Take urgent action to  
combat climate change  
and its impacts**



## UC joins the Race to Zero

In 2021 we joined the international campaign, Race to Zero, aimed at halving global emissions by 2030. The United Nations-backed campaign has a membership of over 1000 educational institutions worldwide. UC's Pro-Vice-Chancellor Sustainability, Professor Jan Evans-Freeman, says, "We join a number of universities in Australia who have signed up to this agreement, and we are currently the first in Aotearoa New Zealand to join the movement. Through Race to Zero we can support a worthy global initiative and reaffirm the important role universities play, plus we can learn from what other universities are doing in terms of their commitments, action plans, and progress reporting."

## New Year's Honours list

Years of internationally recognised work were honoured in New Zealand's 2021 New Year's Honours list for Professor of Political Science Bronwyn Hayward. The passionate and dedicated academic was named a Member of the New Zealand Order of Merit (MNZM) for services to political science, particularly sustainability, climate change and youth. Professor Hayward has served as a Coordinating Lead Author for the Intergovernmental Panel on Climate Change (IPCC). She is co-primary investigator for the Centre for Understanding Sustainable Prosperity (led by the University of Surrey), leads the CYCLES Children and Youth in Cities Lifestyle Evaluation study in seven world cities, and is a well-respected and active researcher, author and media commentator. UC Vice-Chancellor Professor Cheryl de la Rey says, "It's a great accolade that acknowledges the significant achievements of individuals who are UC academics."

My heartfelt congratulations, and for contributing to our understanding of the world and for making a tangible difference for communities and for Aotearoa New Zealand."

## Conserving our mountains one app at a time

UC graduate, Ambrose Ledbrook, is eagerly using his software engineering skills to keep the snow on the mountains by developing a new app that helps people live more sustainably. A new start up business was launched, DifferenceNow, which developed an app focused on helping people make behavioural changes to make their lifestyles more climate friendly. Ambrose's motivation stems from childhood memories. "When I was a kid, it would snow every year in the town on my birthday," he says. "Over the years, it began to snow less and less, and over time it's become a huge deal [if it snows] in the town. I'm only 22 and over my lifetime I've already seen the effect that climate change has on the mountains." He realised that at this rate of climate change, the next generation might never be able to ski the way he has, and he developed a passion to try something different that would help protect the environment.

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**207 publications based on Elsevier mapping**  
**71% publications based on international collaboration**

Based on publications from 2017 to 2021



## Pioneering research recognised

The Earth's climate and atmospheric composition are changing rapidly as a result of human activities. Dr Laura Revell, School of Physical and Chemical Sciences, conducts pioneering research on the impact of airborne microplastics on the global climate system. Dr Revell was awarded the 2021 Cooper Award from the Royal Society in recognition of her chemistry-climate interactions modelling work and research, and the significant contribution she is making to climate and atmospheric science. She has led numerous climate modelling studies examining how greenhouse gas emissions affect the ozone layer and air quality. Dr Revell says: "I am honoured to receive the 2021 Cooper award, and the acknowledgement it brings for my field of atmospheric chemistry and climate research."

## Efficient biofilters and climate change

Research into making biofilters more efficient could be key to New Zealand meeting its climate change targets and improving cattle farming long-term. Professor Peter Gostomski, a biofilters expert, leads a team aiming to dramatically improve the efficiency of biofilters in removing methane from dairy shelters. With 37% of New Zealand's carbon footprint from methane produced by cattle, in order to reduce methane emissions by 10% by year 2030, biofilters could help meet this goal. "No-one has come up with a solution for nitrate leaching, other than getting cows off the paddock in autumn and early winter," Professor Gostomski says. He believes a recent development called composting

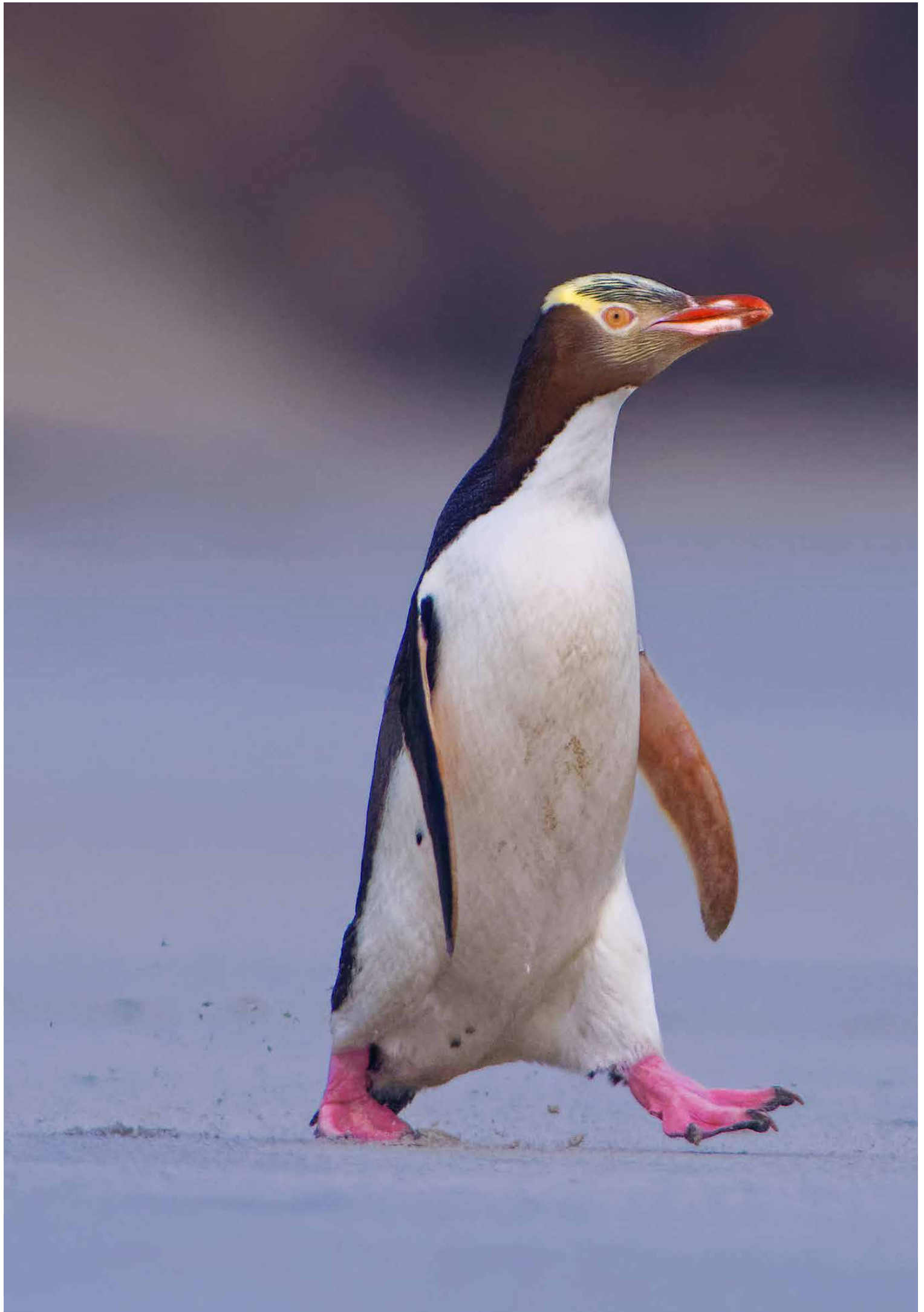
shelters would work well with his biofilters. These shelters allow cows to move around independently and contain wood shavings that compost over time. They benefit animal welfare and have had the unexpected advantage of improving milk production.

## A Polar Law approach to climate change?

Who is legally responsible for protecting our ice caps? Could a Polar approach to climate change strengthen political and legal responses to climate change and other human activities in both the Arctic and Antarctic regions? UC Law Professor Karen Scott is co-editor of the Polar Law Research Handbook which explores these and other questions of law and policy relating to the Antarctic and Arctic. The Handbook brings together 35 leading international researchers exploring the Polar Law that applies to territory, peoples and activities in the Arctic and Antarctic regions. "There are Indigenous Peoples in the Arctic, in contrast to the Antarctic – and of course the geo-political situation is quite different. The Arctic is largely under the sovereignty of a number of states whereas the Antarctic is managed as an international space under the Antarctic Treaty System," Professor Scott says. One possible benefit of identifying Polar Law (beyond law which applies to the Poles) is that it enhances the authority of the law, both within the regions themselves but also within other organisations such as the United Nations (UN) and the climate change regime.

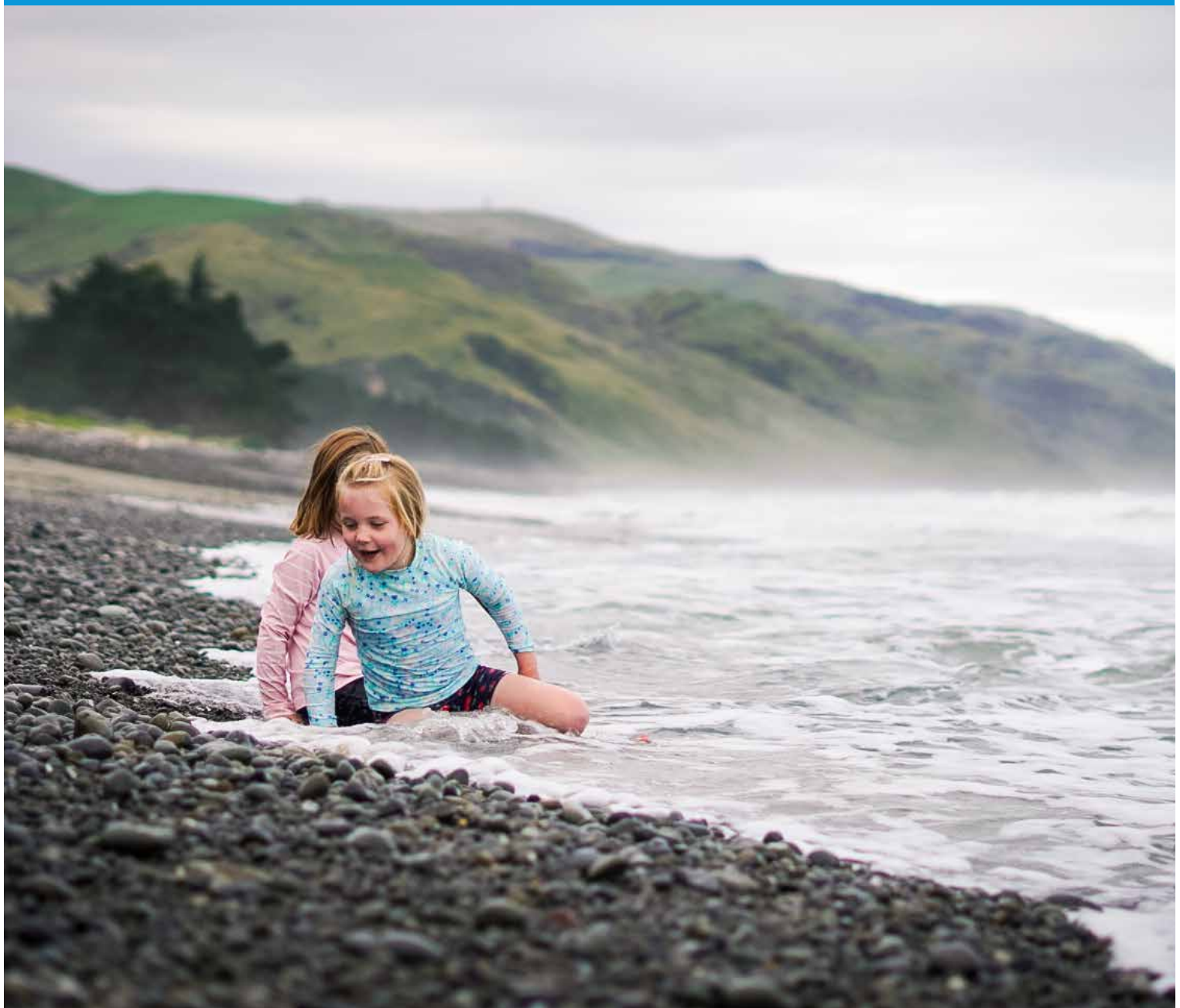








**Conserve and sustainably use the oceans, seas and marine resources for sustainable development**



## World's first Weddell Seal count

An international research team led by UC Antarctic scientist, Dr Michelle LaRue, completed the world's first global population estimate of Weddell seals in Antarctica, showing that there are significantly fewer seals than previously thought. Documenting the seals' population trends over time will help scientists better understand the effects of climate change and commercial fishing. It is the first direct population estimate ever conducted for the global distribution of any wide-ranging wild animal species on Earth. In addition to this first-ever count, the researchers gained new insights into the habitat of Weddell seals. The seals prefer to be near the continental shore but also near deep water – possibly because of the location of predators and the fish they eat. Perhaps most interestingly, the seals appear to prefer to be near Emperor penguins, but only if there aren't too many of them.

## Education on Sustainable Coasts

With more than half of the world's population living in coastal zones, many nations are dependent on the ocean to sustain life. Aotearoa New Zealand as an island nation has a unique history and cultural narrative with its coastal settlements and marine resources and is a living laboratory for learning how to live sustainably. The Sustainable Coasts major, offered by the School of Earth and Environment, students can learn about how to manage our coastal and marine resources. Courses covered include marine and ecology; field ecology; marine ecosystems; coastal studies; coasts and rivers: from natural processes to urban environments; environmental process: principles and applications; and environmental hazards and disasters.

## Making law to protect the future of our ocean

A future-focused research project co-led by UC Law researcher Associate Professor Elizabeth Macpherson is considering what legal and policy options might exist to protect our oceans for generations to come. Associate Professor Macpherson's co-led project will provide options for legal and policy reform to enable ecosystem-based management in the marine environment. The interdisciplinary project also brings together researchers from around New Zealand, and includes UC's Law researcher Adrienne Paul. Associate Professor Macpherson says the findings could lead to changes that affect every New Zealander. "This project is intended to support transformational change. The health of our oceans is deteriorating at a rapid rate. There is a real risk that if we don't change something, New Zealanders won't be able to use these marine environments in the way that we do today," says Associate Professor Macpherson.

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**153 publications based on Elsevier mapping**  
**63% publications based on international collaboration**

Based on publications from 2017 to 2021



## Engineering a more sustainable future for commercial fishing

Tighter rules around fishing practices to discourage the catching of smaller fish have been signalled by the New Zealand Government as part of moves to better protect the natural marine environment and more closely monitor and regulate commercial fishing activity. Unintended bycatch of undersize fish and unwanted species can have a major impact on the sustainability of fish stocks. As part of a government-led project aimed at developing new generation sustainable trawl gear, UC student Stefano Barfucci explored innovative ways to allow undersized juvenile fish to escape directly from the trawl net. "I explored a number of different designs as part of this research, using 3D printing and laser cutting equipment at UC. I was also able to test some of the concepts within a flume tank at UC to simulate ocean conditions," says Stefano. While there is one precision fish harvesting system available, it can only be used on large purpose-built vessels; Stefano developed his system for use on any commercial fishing boat. Stefano says, "It is a cost effective, lightweight and robust solution that is easy to use."

## Research to take guesswork out of whitebait fishing

New research into whitebait fishing will address whether whitebait are in decline and assess the impact of commercial and recreational whitebaiting on the long-term sustainability of the species. The multi-disciplinary project, led by UC's Dr Mike Hickford, will be the first to integrate ecological and fishery data to understand whitebait population dynamics.

The new research uses innovative experiments in rivers closed to whitebaiting to isolate fishery and habitat effects on populations, analyses previously unavailable data to reconstruct catch statistics, and develops new methods to assess catch and effort and establish a baseline to determine future changes in the fishery. The research team includes UC's Distinguished Professor David Schiel, and Professor Angus McIntosh; Professor George Perry from University of Auckland; Dr Shane Orchard from Waterlink Consulting; and Dr Eimear Egan from the National Institute of Water and Atmospheric Research.

## Water rights research award

Associate Professor Elizabeth Macpherson was presented with the 2021 Royal Society Te Apārangi Early Career Research Excellence Award for Humanities, for her work exploring opportunities for Indigenous peoples' water rights in laws and policies around the world. Associate Professor Macpherson has been working on issues of Indigenous and environmental justice for the past 18 years. She uses a 'law in context' method to understand the operation of law on the ground and hopes to collect evidence that will encourage governments to implement legislative and policy changes to address environmental issues. Associate Professor Macpherson said she was honoured to be recognised with the award: "I research environmental law and policy because I hope there can be some improvement in how we protect ecosystems and their biodiversity, for the benefit of future generations – we are seeing rapid deterioration in ecosystem health in Aotearoa New Zealand, and this requires urgent action."





**Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss**

**15** LIFE ON LAND



## Investigating the mathematics of extinction

Two UC mathematicians have been granted a Marsden Fund to investigate mathematical models for extinction events in the tree of life. Using a mathematical and algorithmic framework, Distinguished Professor Mike Steel and Professor Charles Semple hope to address some fundamental questions in biodiversity theory and conservation. “Unfortunately, human impacts on the natural world are precipitating a sixth mass extinction,” says Professor Steel. “We intend to develop and apply new mathematical techniques and models to investigate the precise relationships between the different measures of biodiversity that are based on evolutionary trees and explore the extent to which extinction of species is linked to the loss of feature diversity.” Additionally, the research team aims to develop and apply more complex models of multiple species loss based on ‘extinction cascades’, investigating their impact on feature diversity loss.

## Forestry Education for Goal 15

UC offers a range of course options to equip the next generation in sustainably managing forests in Aotearoa New Zealand. Environmental Forestry provides students with an overview of the broader environmental and cultural issues associated with plantation forestry. Forests are particularly important as they provide many key ecosystem services that are not necessarily provided by other comparable land uses such as farming. The course focuses on a range of the ecosystem services provided by plantation forestry including biodiversity conservation, soil and water conservation, and cultural services. As the title suggests, Forest Management provides students with an understanding of forest management decision-making. Forestry managers and owners make significant strategic and operational decisions regularly, such as what volume of wood to harvest each year, whether land should be replanted after harvesting, and silvicultural regimes.

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**329 publications based on Elsevier mapping**  
**61% publications based on international collaboration**

Based on publications from 2017 to 2021



## Native birds on campus more than tripled

Since 2016, we have been monitoring birdlife on our Ilam Campus. Monitoring gives us a snapshot of numbers of species, and numbers of birds, which helps us to enhance our biodiversity efforts, particularly of indigenous species. While there have been variations in counts over the years, which is to be expected from a count of this type, during the summer of 2020/2021 an extensive analysis found the number of native birds, such as bellbird, fantail, swallow, silvereye, have more than tripled, and 5-7 more native species have since colonised on campus.

## Using audio to lure predators

Building new science capability is critical for achieving all of New Zealand's environmental goals. Our country's brightest young minds are setting out to revolutionise pest management, in helping efforts to eradicate possums, stoats and rats by 2050. Ben McEwen is a Computer Science PhD candidate, and recently graduated with a BE(Hons) with First Class Honours specialising in Mechatronics Engineering. Ben aims to investigate and develop new predator luring

technology and develop a system that uses state-of-the-art visual and audio technology to identify predator species in real time, allowing populations to be estimated, and audible lures to be automatically selected, making trapping more effective. This system has the potential to significantly improve predator interaction rates with traps.

## Understanding Biodiversity loss

Global Change Biology, a course offered by our School of Biological Sciences course, addresses selected major issues concerning the role of biological processes in the Earth System and the impact on these of human activities (global change). The course covers a range of broad topics where students can gain understanding of how actions result in ecosystem change, and then relate this to social and economic trade-offs that underpin environmental decision-making. For example, discussion on issues include the significance of biodiversity loss on ecosystem processes and strategies to mitigate climate change, and the impacts of past and future climate change on biota.







**Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels**

**16** PEACE, JUSTICE  
AND STRONG  
INSTITUTIONS



## On anti-terrorism and extremism

New Zealand's first annual meeting on countering terrorism and violent extremism was held in Christchurch in June 2021. Some of the most powerful and influential people in New Zealand spoke at the event, including Prime Minister Jacinda Ardern, Director-General of Security Rebecca Kitteridge, Police Commissioner Andrew Coster, and Anjum Rahman of the Islamic Women's Council. Christchurch Mayor Lianne Dalziel spoke, as did UC's Vice-Chancellor, Professor Cheryl de la Rey. Below is a brief excerpt taken from Professor de la Rey's speech:

**“Terrorism and extremism of any type is in fact antithetical (contradictory) to the very nature of universities and our academic missions which is fundamentally about open-mindedness, inquiry and developing knowledge in its multiple forms and perspectives. Universities bring together students and staff from a range of walks of life, different generations, different ethnicities, varying perspectives and academic disciplines to learn and to research. Our commitment to diversity is backed by a substantial body of research in psychology, economics, computer science and many other fields that shows that diversity and inclusion in our approaches to tackling complex challenges produces better outcomes compared to homogeneity.”**

## Paving the way for rights

UC History Professor Katie Pickles explored the legacy of Kate Sheppard and those who paved the way for women's rights in Aotearoa New Zealand. Professor Pickles says Sheppard is sometimes framed as a reformer, called to work for a more peaceful and egalitarian society. Who else might represent the heroic archetype? Waikato woman of mana and Kingitanga leader Te Puea Hērangi is described by historian J.G.A. Pocock as possibly the most influential woman in New Zealand's political history. Her activism included seeking compensation for land confiscation. Viewed through an early 21st-century lens, both women stand for citizens working together for the common good.

## First Professor appointment

The Ngāi Tahu Research Centre has appointed its first Professor, Dr Shaun Ogilvie, as Professor of Ecology and the Environment, a co-appointment with the Faculty of Science, at UC. Professor Ogilvie graduated with a PhD in Ecology from UC and has held numerous academic and research roles. The appointment of Professor Ogilvie is part of a commitment to grow and attract senior Māori academics to UC, supported through the Ngāi Tahu Research Centre. This is the first of five professorial positions. Associate Professor Te Maire Tau, Director of the Ngāi Tahu Research Centre, says, “Equity within the University is quite simple. Knowledge needs to be seen as a capital asset to which our people have equal access and academic leadership provides a route for our students to gain access to new knowledge and to contribute to new knowledge.”

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**169 publications based on Elsevier mapping**  
**51% publications based on international collaboration**

**Based on publications from 2017 to 2021**

**17** PARTNERSHIPS  
FOR THE GOALS



# Strengthen the means of implementation and revitalise the global partnership for sustainable development



## The Ngāi Tahu Research Centre

Te Rūnanga o Ngāi Tahu and UC announced the establishment of an Office of Treaty Partnership, Kā Waimaero the Ngāi Tahu Centre. The announcement signalled progressive new changes to the structure of UC to acknowledge mana whenua Treaty Partners – believed to be a first for Aotearoa New Zealand universities. The Ngāi Tahu Centre creates a tangible space that represents the partnership and works directly with the Vice-Chancellor to oversee the implementation of the partnership agreement and provide strong Māori academic leadership on a pan-university basis. “This is a journey the University of Canterbury began a long time ago in developing a greater understanding of cultural inclusiveness and the principles of the Te Tiriti o Waitangi in action. Building a strong relationship with Ngāi Tūāhuriri and Ngāi Tahu is fundamental to continuing our bicultural journey and engaging our Māori community. This is the practical manifestation of that,” said Vice-Chancellor Professor Cheryl de la Rey.

## Partnering on researching climate change in the Pacific

Researchers and academics from UC and the University of the South Pacific in Fiji launched a new research partnership project, The Pacific Ocean Climate Crisis Assessment, that will explore the impact of climate change in the Pacific and the role Indigenous Knowledge can play to help communities to adapt. The project is co-led by Professor Steven Ratuva, who is the Director of the Macmillan Brown Centre for Pacific Studies at UC, and Professor Elisabeth Holland, Director of the Pacific Centre for Environment and Sustainable Development at the University of the South Pacific, Fiji. The project will provide a robust evidence-based assessment of climate change impact and social resilience in the Pacific to help inform the global stocktake or assessment of progress and climate change resilience over time.

## Third SDG Summit Series

The third SDG Summit Series in Aotearoa event (2020-2021) was successfully co-hosted by UC and Lincoln University. The Summit supporters included the Christchurch City Council and Ara Institute of Canterbury, and partners were ChristchurchNZ, Tourism NZ, NZ National Commission (UNESCO), Universities NZ, UC Centre for Entrepreneurship and Seeds podcast. Under the theme Collaboration for Systemic Change, the Summit attracted 440 participants after moving online due to Level 3 and 4 Covid-19 restrictions. “Our scientists have pointed out that time is short and urgent change is needed if we are to achieve the SDGs, so let us set aside our narrow institutional and sectoral interests, let us work together and secure a future for our people and our planet,” Vice-Chancellor Professor Cheryl de la Rey said in her opening address.

## Kiwi sustainability declaration

UC's co-hosting of the third SDG Summit Series in Aotearoa led the way in committing to action the United Nations 17 Sustainability Development Goals with over 190 participants and organisations signing the Aotearoa SDG Declaration. The Declaration was created by a nationwide team after originally planning for the summit. The Declaration commits Signatories to abide by fundamentals such as Te Tiriti o Waitangi | The Treaty of Waitangi underpinning their actions, collaboration, urgent transformation of our economic and social systems, and ensuring no-one is left behind.

## Start-up support

People who lost their job because of COVID-19 were offered the chance to kick-start their new business idea as part of an innovative new programme, Start Me Up. The programme guided potential business owners or those interested in learning about the process of testing out their concept to see if it has what it takes to be successful. The programme culminated in a graduation event celebrating participants' successful completion and showing their concepts to an audience of local business, investors, entrepreneurs. Partnership for the new innovative programme includes ChristchurchNZ, Ministry of Social Development, Ara Institute of Canterbury, and UC's Business School.

## Digital tech supporting diversity

Academics at UC participated in a virtual, biennial conference, Ka Renarena Te Taukaea Creating Communities, which ran in late 2021. UC's Business School Professor Paul Millar said contributors were asked to think carefully and courageously about the role digital humanities might play in creating communities capable of leading and contributing meaningfully to global conversations about a safe, equitable and sustainable future. The conference opened with a distinguished all-women panel discussing Indigenous Data Sovereignty. UC's Executive Director Māori, Pacific and Equity, Associate Professor Sacha McMeeking was one of the panellists, reflecting on working to ensure Indigenous Data Sovereignty is recognised and protected, and what full and fair implementation of an Indigenous Data Sovereignty agenda might mean for Indigenous communities in the 21st century.

## About this document

This is the University of Canterbury's (UC) second document produced on our commitment and engagement in support of the United Nations' (UN) Sustainability Development Goals. Our approach for this document is to identify and summarise UC's activities and outcomes that most closely align with the UN's SDGs, through our core functions of research, education, engagement, and operational activities, across the campus. Our activities and outcomes principally cover the 2021 calendar year.

The material is substantiated with metrics (quantitative) and case studies (qualitative). For quantitative data, searches related to the SDGs were conducted on the Scopus database to collate our research, using the keyword search terms created by the Elsevier methodology. Due to the size of our institution and large number of varied courses taught, our own curriculum audit was conducted for the education metrics. Using a set of keywords in course descriptions, developed by Sustainable Development Solutions Network and Australasian campuses towards sustainability, we then linked them to the SDGs by either direct impact (e.g. if the course allowed students to understand how to tackle the goal) or indirect impact (e.g. if the course allowed students to understand the basics and build on this knowledge to contribute to the goal). For qualitative data, case studies that most closely aligned with producing outputs for the SDGs were selected by a variety of ways, including through a consultation process, conducting a review of our website, consulting with operational directors and managers, and gathering input and feedback from a range of UC staff and students with particular expertise.



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