He Kitenga

Making our mark

2024 UNIVERSITY OF OTAGO **RESEARCH HIGHLIGHTS**

University of Otago
ŌTĀKOU WHAKAIHU WAKA

see perceive find discover

He Kitenga reflects the concept of discovery. The Māori word kitenga derives from kite which translates to words such as *see*, *perceive*, *find* and *discover*. This title reflects the University of Otago's connection to New Zealand's cultural heritage, as well as its commitment to national and international research and innovation.

Founded in 1869, the University of Otago | Ōtākou Whakaihu Waka is New Zealand's oldest university. Today it has a nationwide presence and enjoys an international reputation for excellence. Over the past 155 years Otago has successfully balanced the traditions of its history with modern scholarship and world-class research.

Welcome

The University of Otago has a global reputation for research excellence and impact, with our researchers driving significant advancements in health, society, culture, science and sustainability.

This edition of *He Kitenga* explores the ways in which Otago research generates new knowledge that informs and guides change. From innovations in teaching to technology, our researchers want to make their mark. Here we bring you 26 stories of researchers (or research groups) and examine the specific impact each is making.

As always, when planning *He Kitenga*, we were spoiled for choice. The stories we chose highlight the depth and breadth of the research taking place across our campuses and the wide-ranging impact it makes. We could easily have made a different selection and had an equally compelling publication.

What we have selected highlights the difference our research is making here in Aotearoa New Zealand, in the Pacific, and around the globe – ranging from our Arts Fellowships which underpin the University's commitment to society and culture (pages 52 to 55); to a world-first Indigenous-led collaboration to improve holistic wellbeing for Indigenous children and their families through play (pages 84 to 87); to the community-led team whose cancer genetics work has saved tens of thousands of lives worldwide and earned them the 2024 Prime Minister's Science Prize (pages 38 to 41).

In 2023, the University set out its future aspirations through a new guiding document. *Pae Tata* (our Strategic Plan to 2030) outlines our commitment to organising and focusing our research and innovation efforts to deliver high-quality, impactful research.

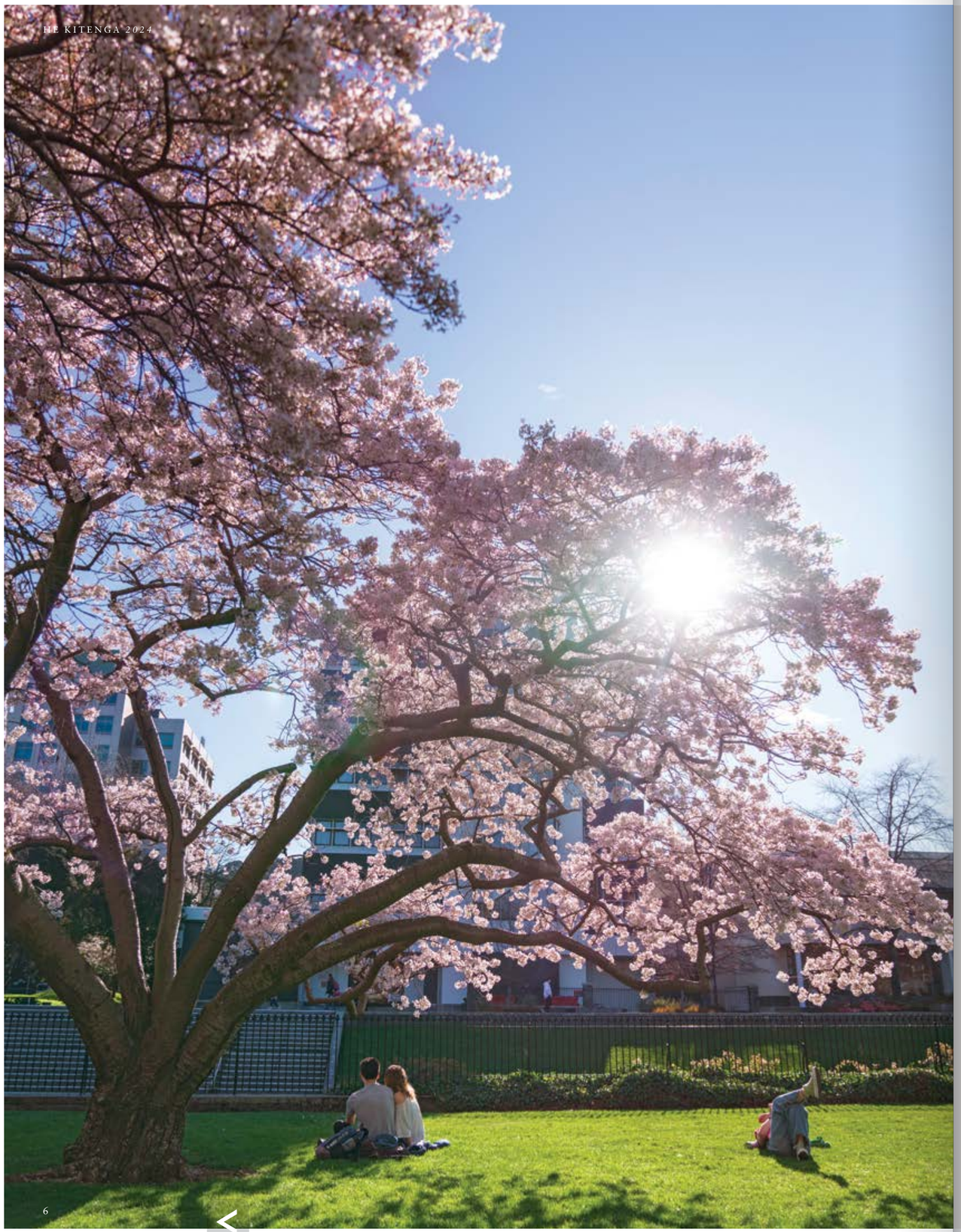
What better time, then, to look at research which is doing just that? It makes me proud to see all of these stories in one place. I hope you feel as inspired as I do.

As always, we welcome feedback about our research and about our publications. So, please feel free to contact me, the editor of *He Kitenga* Lisa Dick or any of our researchers directly if you want to find out more.

"It makes me proud to see all of these stories in one place. I hope you feel as inspired as I do."

Ngā mihi manaakitanga

Professor Richard Blaikie
Deputy Vice-Chancellor
(Research and Enterprise)



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Mud, mud, glorious mud

Nothing quite like it for ... telling the story of global carbon sequestration.

The University's research vessel *Polaris II* on Patea/Doubtful Sound.

Photo: Richard Robinson

Fiordland's towering peaks and lush rainforests often dominate the region's photogenic reputation. Yet below the waterline, and escaping the photographer's lens, sit thick layers of mud that hold their own mighty story. These vast reservoirs of sediment are now capturing the attention of scientists for their vital role in the global carbon story.

Professor Chris Moy, a sedimentology and paleoclimatology specialist based in the University of Otago's Department of Geology, is leading an international team of researchers exploring the role that organic sediment, which sits at the bottom of Fiordland's fjords, has for carbon storage and sequestration.

With a career spent in some of the world's most remote and wild places, Moy says Fiordland is unique for science due to the intensity of a myriad of Earth system processes occurring simultaneously.

"Here we see around eight metres of annual precipitation fall over a temperate rainforest that's perched on the margin of very steep terrain and is constantly shaking," Moy says. "Climate, tectonic, biological and oceanographic processes all influence what we ultimately see in the sediment.

"Disentangling these processes from the sediment record accumulating within the fjord is challenging, but will help us gain a new understanding of how Fiordland works and the role it plays in the carbon cycle."

Supported by a five-year MBIE Endeavour Fund grant, and co-led by the University of Otago and GNS, the project brings together 13 international research partners and around 40 scientists, collaborators and students. The multidisciplinary project – that's connecting science with economics and climate policy – is engaging with a wide range of experts to address this layered challenge and opportunity.

Commencing in 2021, the research to date has conducted field work across 14 fjords and collected sediment samples including around 600 from the seafloor and 30 three-metre length cores. Geophysicists on the project have assessed sediment reservoirs of up to 300m thick that have accumulated from the massive amounts of material entering the fjords in the dynamic environment.

Distributed worldwide for analysis, including at Otago's Repository Core Analysis laboratory, the information held in these samples will help reconstruct a story and record of carbon and changing environmental conditions since the last ice age over 15,000 years ago.

Partners on the programme, Te Rūnaka o Ōraka Aparima (Ngāi Tahu), are contributing mātauranga Māori to the research, including their own cultural knowledge of historical events, to help explain observations and patterns seen in the sediment records.

Moy says these extensive data sets will shed new light on a global challenge.

"It will allow us to determine the climate, environmental and anthropogenic drivers of carbon sequestration in Fiordland, determine how much carbon is there and how it accumulates on an annual basis and, finally, say something about how future climate change might impact these systems.

"There is potential to influence environmental policy and carbon accounting here in Aotearoa New Zealand and internationally."

Responsible for building a bridge between the project and New Zealand's carbon and climate reporting and policy, marine ecologist Dr Rebecca McLeod is no stranger to Fiordland's mud. She studied the mudflats at the head of fjords for her own research on the links between forest energy and marine food webs.

Now, as Chair of the Fiordland Marine Guardians (a group tasked to advise government and protect the area's special character), McLeod says the research is shining the spotlight on the important role of Fiordland in the carbon cycle.

"It's really highlighting Fiordland's ability as a super-powered natural system for sinking carbon and shows how protected environments can really help us with the climate change response. The science is pointing to the huge contribution fjords make to New Zealand's carbon removals and gross emissions budget."

Helping to connect the project with climate change carbon reporting and policy, Lincoln University's Agricultural Business Unit economists are building models linking science and the carbon fiscal system.

Over the next phase of the project, the science data input into climate and marine carbon models will feed into these economic models. The models will determine the value of natural services for carbon pricing and be used to test the fiscal implications for ecosystem change scenarios, such as freshwater discharge from the Manapouri power station or climate change forecasting.

Bringing together these complex interactions between science, policy and society is an extremely gratifying part of the project for McLeod. She also describes a sense of satisfaction that the Fiordland mud she became very familiar with during her own studies is now the focus of international research.

"Spending all that time rummaging in the mud wasn't glamorous, but I got a sense of the magic that happens in the sediment," McLeod says. "So, knowing this research has the potential to impact carbon policy both here and globally feels, to be honest, really good."

Fiordland removes on order of

22-68

megatonnes of CO_2 per year which is ***equal*** to New Zealand's gross CO_2 emissions

Top: Geology Master's student Jorgee Robb and Dr Rebecca McLeod: "*Spending all that time rummaging in the mud wasn't glamorous, but I got a sense of the magic that happens in the sediment.*"

Bottom left: Geology Master's student Luke Whibley operates a multi-corer, sampling mud from the depths of Patea/Doubtful Sound.

Bottom right: Professor Chris Moy: "*Disentangling these processes from the sediment record accumulating within the fjord is challenging but will help us gain new understanding of how Fiordland works and the role it plays in the carbon cycle.*"

Photos: Richard Robinson

FUNDERS: Ministry of Business, Innovation and Employment

Help children, help the world

At a time when government ministers are discussing more police, larger prisons and boot camps for young offenders, Associate Professor Dione Healey (Psychology) has come up with a different approach to building a better society.

Long-running research has shown that children who don't learn to control their behaviour, focus and emotion when very young could face a wide range of difficulties as adults.

Healey – a registered clinical psychologist who has specialised in children with behavioural difficulties – has developed a programme to teach children how to self-regulate, giving them skills that could potentially improve their life outcomes.

She wanted to find an alternative to interventions such as medication and behaviour management training, which provide external regulation of symptoms but have little lasting effect when withdrawn.

She developed ENGAGE as a way to teach children to self-regulate by focusing on internal skill development within the child, using games to teach skills and then connecting these to everyday functioning.

Her research coincided with Otago's world-famous Dunedin Study finding that poorer self-regulation abilities shown by three-year-olds were associated with subsequent problems with education, employment, relationships, substance abuse, physical and mental health and criminality. The research led to calls for self-regulation skills to be taught to all preschoolers.

Healey initially developed ENGAGE as a home-based approach with individual parents. She then adapted it for early childhood educators (ECEs) and worked with Methodist Mission Southern's Chief Development Officer Jimmy McLauchlan to trial then implement it at scale in ECEs across Aotearoa New Zealand.

The Tindall Foundation funded trials at 28 ECEs in Auckland, where not only did children and teachers like it, they saw results: significantly improved self-regulation in the children taking part. The government has now provided $19.7 million to roll it out in ECEs nationally and is funding trials in primary schools.

Following ENGAGE's success in Auckland, the University's commercialisation company Otago Innovation Limited (OIL) supported Healey in licensing the programme.

"We know poor life outcomes can result from behavioural issues in young children," OIL Chief Executive Officer David Christensen says. "ENGAGE aims to equip kids for a future that doesn't involve boot camps or prisons."

The Methodist Mission Southern currently holds the licence to train facilitators, and for facilitators to train teachers to deliver ENGAGE within ECEs in Aotearoa New Zealand.

ENGAGE has also been successfully translated and trialled in Finland, with further international interest from Australia, Germany and the United Kingdom. Healey will be working with these potential collaborators during a sabbatical next year.

"It feels surreal," Healey says. "After 10 years developing a relatively simple idea, it's still growing. What's happening now is very exciting.

"But it has taken a lot of inter-disciplinary collaboration to make it happen, with me translating psychology to education, Otago Innovation working on commercialisation and licensing, and the Methodist Mission training facilitators and teachers at scale. Bringing this all together across disciplines has been amazing."

The Mission's McLauchlan sees ENGAGE as an answer to how best to help people get a good start in life: "It's a great team effort and a great partnership because we all share the goal of improving people's lives far down the track."

Associate Professor Dione Healey: *"After 10 years developing a relatively simple idea, it's still growing. What's happening now is very exciting."*

Within the ENGAGE programme, children are taught to take superhero breaths as a strategy for calming themselves and regulating strong emotions.

Photos: Rory and Jade Media

FUNDERS: Health Research Council • Tindall Foundation • Ministry of Education

Poor self-regulation at

3

is associated with high rates of unemployment, criminality, relationship difficulties, mental health problems, substance abuse and physical health problems.

Outwitting drug resistance

Otago research is gaining ground against one of the world's greatest threats: antimicrobial resistance.

The North Oakkalapa TB clinic in Yangon, Myanmar, one of the major clinics diagnosing and treating drug-resistant TB.

Photo: Supplied

As a child, Dr Htin Lin Aung was chatty and social, the lively student teachers would put in charge of rallying his peers into action. When the school bell rang, his attention switched to football. He would run from door to door in his Myanmar hometown of Yangon, cajoling his friends to come out and play on the narrow streets.

Thirty years on, the high-energy boy is still evident, albeit now in an adult's body. Football remains a passion but has been overtaken by his research.

Aung, a molecular microbiologist in the University's Department of Microbiology and Immunology, leads a research programme focused on improving health outcomes for communities disproportionately impacted by infectious disease. His group uses the world's most deadly disease, tuberculosis (TB), as its working model.

TB is both preventable and curable, but still killed 1.3 million people in 2022. Disturbingly, the bacteria that causes TB is becoming increasingly elusive to treat, continually evolving new antimicrobial resistant strains that do not respond to many existing drugs.

Aung says antimicrobial-resistant TB is the leading cause of death associated with any antimicrobial resistance.

"If we do not do something right now, by 2050, 10 million people will die from antimicrobial resistance per year."

From the beginning, Aung wanted to do research that would translate into policy and help communities. The best way to achieve that is a transdisciplinary approach. His research group is made up of molecular biologists, clinicians, genomic scientists, geneticists, epidemiologists, health economists and social scientists. This team liaises closely with policymakers, community leaders and, most importantly, the communities themselves.

Because antimicrobial-resistant TB is so widespread, determining an effective treatment plan can involve months of trial and error. In 2014, Aung's research group sequenced the entire genome of the TB bacteria and, in collaboration with the Wellcome Sanger Institute in Cambridge, identified the mutations related to treatment-resistant TB strains from Myanmar.

In a perfect world, a TB patient would provide a saliva sample; it would be sequenced within 24 to 36 hours; and the attending medical professionals would know which mutations were present and, therefore, which drugs would be ineffective and could skip immediately to the viable options.

However, the reality is not that straightforward. Even if a patient is treated with effective drugs, it takes at least two years to treat antimicrobial-resistant TB. And this cocktail of pills, injections and side effects can be crippling enough to affect the patient's ability to work. If they live in a country with no state welfare they may, understandably, choose to stop treatment early to feed their family. From a resistance perspective, the TB bacteria has chalked up another win.

The University of Otago and the Myanmar National Tuberculosis Programme (NTP) began collaborating in 2015. Early on, Aung's group sequenced the genome of a patient infected with an extreme strain of TB that was resistant to all available TB drugs. The patient became the first in Myanmar to be treated with a then-new TB drug and survived.

The experience underscored, for Aung, the power of genomics-guided diagnosis. What if diagnosis was available within Myanmar, rather than 10,700 km away in New Zealand? The high-energy boy from Yangon swung into action. With the support of New Zealand expats in Myanmar, NTP's laboratory received a genome sequencer in 2019.

The research group's findings are widely published, including papers in *Lancet Global Health, Clinical Infectious Diseases* and *Emerging Infectious Diseases*. In Myanmar, the research has fed into policy and, consequently, Myanmar was one of only 15 (out of 204 countries) that achieved a World Health Organization goal of reducing TB cases by 20 per cent by 2020, compared to the 2015 baseline.

Back in Aotearoa New Zealand, there is a low prevalence of TB, but Māori and Pasifika communities are affected at rates six- and 16-times greater, respectively, than Pākehā. Compounding the grim statistics are two strains of highly transmissible TB-causing bacteria that are prevalent in Māori and Pasifika communities.

Thanks to Aung's group identifying the genetic markers for the strain affecting Māori, New Zealand health authorities have used saliva testing since 2018 and therefore know almost immediately if they are dealing with the more contagious TB strain.

What of the future?

Three people die from TB every minute. "If I could have my legacy be anything, it would be to reduce the number of TB deaths per minute, even if only by a fraction.

"I engage with these communities, I see the people behind these numbers. This gives me even more energy to reach my goal."

IMPACT:

MYANMAR
FIJI
AOTEAROA
NEW ZEALAND

Dr Htin Lin Aung: *"If we do not do something right now, by 2050, 10 million people will die from antimicrobial resistance per year."*

Photo: Sharron Bennett

60%

reduction in TB prevalence in Myanmar over 10 years *(2009 vs 2018)*

FUNDERS: Royal Society Te Apārangi • Health Research Council • Marsden Fund • Otago Medical Research Foundation • University of Otago • Maurice Wilkins Centre of Research Excellence • Te Niwha Infectious Disease Research Platform

Climate adaptation

Two University of Otago academics are immersed in research on community adaptation to climate change.

IMPACT:
AOTEAROA NEW ZEALAND

Professor Janet Stephenson (Centre for Sustainability) and Associate Professor Sophie Bond (Geography) have undertaken a swathe of research on climate change adaptation over the past few years, working in close collaboration with colleagues, councils and communities.

One recent major project, Innovations for Climate Adaptation, tracked innovations embarked on by mana whenua and local authorities as they adjusted to making decisions for a climate-impacted future.

The research focused on adaptation initiatives in three regions – Otago, Taranaki and Bay of Plenty – and was funded by the Deep South National Science Challenge.

Stephenson says that, in the absence of robust legislation and policy frameworks regarding climate change adaptation, Māori communities and local and regional councils are "just getting on with it, discovering, inspiring others and innovating their way to climate adaptation solutions as they go along."

Associate Professor Sophie Bond (left) and Professor Janet Stephenson: "*It's about collecting and winnowing and presenting stories and experiences – which may be positive or negative – of councils and communities, so other councils and communities can learn from that.*"

Photo: Graham Warman

She says the research programme was a way to capture and explore some of those initiatives and innovations: what works, what doesn't and why.

"It's about collecting and winnowing and presenting stories and experiences – which may be positive or negative – of councils and communities, so other councils and communities can learn from that.

"In each of the three regions, we engaged with at least one regional council, at least one district or city council and at least one Māori organisation.

"We interviewed them every six months over a period of two years, following the initiatives they were undertaking and how those initiatives were evolving, and essentially capturing the stories of those innovations," Stephenson says.

One example of climate change mitigation comes from the South Taranaki District Council, which is exploring the native reforestation of 200 hectares of council-owned land across the district over the next five years.

"The work of Professor Janet Stephenson and Associate Professor Sophie Bond, and their teams of student researchers, has been pivotal in informing, shaping and encouraging the work of responding to the climate changes in our community."

Eleanor Doig
South Dunedin Community Network

Another is the Maketū Iwi Collective in the Bay of Plenty, which has developed a climate change action plan that includes hands-on education, environmental monitoring of the local estuary and river, and developing relationships with regional and district council staff and councillors.

The Innovations for Climate Adaptation research project has resulted in many publications written by core team members – Stephenson, Bond, Professor Merata Kawharu (now at Lincoln University) and Dr Gradon Diprose from Landcare Research – with some being co-produced with the project's Māori research partners.

Stephenson says that, while the Centre for Sustainability produces academic outputs, there is also a strong focus on short, image-rich publications that use non-academic language, with the intention of being accessible to lay people.

The researchers have also made their findings known through various other outlets, including a national hui, online seminars and submissions to a Parliamentary select committee inquiry on climate change adaptation.

A second climate change adaptation assignment in which Stephenson and Bond and their colleagues are intimately involved is close to home: the South Dunedin Future programme.

This joint initiative between the Dunedin City Council and the Otago Regional Council is a response to future climate change challenges – notably heavier rainfall, rising seas, rising groundwater and increasing storms – that will make parts of "The Flat" unsuited to housing and other intensive uses.

Stephenson says this latest project, which builds on many years of Otago staff and students undertaking research on South Dunedin, was initiated to produce research that will help the two councils make decisions that are "founded in the best global evidence about climate adaptation."

The researchers have generated three recently launched reports penned by Stephenson and Bond, along with Centre for Sustainability research associate, Professor Mick Abbott; Geography teaching fellow and research assistant, Paige Stowell; and Geography PhD candidate, Jule Barth.

These offer advice on community engagement, the use of mapping, and considerations for adaptation if major land use changes are proposed for South Dunedin.

"We will always have an engagement with South Dunedin because it is a nationally critical example of the impact of climate change on a large urban area," Stephenson says. "And Dunedin is further forward in terms of planning for that process than anywhere else in New Zealand."

As for climate adaptation research generally, Stephenson says: "It is incredibly satisfying because you can see where your work is directly leading to the evolution of better responses to climate change adaptation at a local level."

Such is Stephenson and Bond's reputation for quality climate change and other research that they are routinely invited to share their work with national agencies, including the Climate Change Commission, Ministry for the Environment, Local Government New Zealand, and the Parliamentary Commissioner for the Environment.

72,000

New Zealanders are now at risk from coastal flooding. With sea level rise, this could increase to 188,000 people at risk by 2100.

Community feedback pinned to an engagement map at South Dunedin Street Festival, April 2023.

South Dunedin Future Expo, March 2024.

Photos: Dunedin City Council

FUNDERS: Deep South National Science Challenge • Dunedin City Council

Planting the seed

Otago research is enhancing native reforestation in Aotearoa New Zealand.

Clearing Aotearoa New Zealand's forests for food production may once have seemed like a good idea, but the world has moved on and now there are pressing reasons for native reforestation.

Climate change mitigation, improved ecosystem services and species conservation all drive Associate Professor Janice Lord (Botany) in her multifaceted research helping to re-green future New Zealand.

Her work on plant, seed and fungal biology (in relation to large-scale reforestation for ecological restoration and carbon sequestration) involves a host of collaborative projects across the country, many of them in conjunction with Botany colleague Dr Matt Larcombe.

Two well-established experiments at high-country stations are providing valuable information about how best to go about restoration in difficult locations: Motatapu Station between Wanaka and Arrowtown and High Peak Station in Canterbury.

The first project started after most of the four high-country stations in Otago's Motatapu area were put into a QEII covenant and renamed Mahu Whenua. Stock was removed in 2009 and manager Russell Hamilton began an extensive programme of reforesting in native trees.

Lord and Zoology's Professor Christoph Matthaei met Hamilton when he invited the University to do some ecological surveys on the property.

Hamilton asked for advice on problems they were having with their plantings, which resulted in the University starting research experiments at Mahu Whenua, helped by sponsorship from the QEII National Trust and the station owners. It was the beginning of a bountiful partnership for all concerned.

"These are landscapes I care about," Lord says. "You need plant knowledge to find out how these things are going to work, particularly in such difficult high-country land."

Associate Professor Janice Lord:
"Trying to rehabilitate a pastoral system involves restoring the soil environment to one conducive to growing native trees long before you can try reforestation."

Photo: Alan Dove

At Canterbury's High Peak Station, the Guild family were also considering native reforestation. James Guild heard about Hamilton's work with Lord through his involvement with the QEII National Trust and offered his property as a second major experimental site.

Subsequently, the Trust co-funded Lord to do pilot studies as part of the Biological Heritage National Science Challenge, which led to funding from the Ministry of Primary Industries-for the One Billion Trees research programme gifted the name Ngā Kakano Whakahau – the Seeds Project.

The first phase of high-country research involved isolating and identifying mycorrhizal fungi associated with beech and manuka at Mahu Whenua.

"It's not just the obvious problems of climate above ground that make a difference. What is underground is just as important," Lord says.

"Trying to rehabilitate a pastoral system involves restoring the soil environment to one conducive to growing native trees long before you can try reforestation. Decades of pastoral use change land from the tussock conditions that natives can thrive in.

"It's a slow process that takes years to research. It has taken a while to find out that methods used to remove weeds and grasses change the soil biology and create environments that may not be good for native trees. Now we need to work out how best to rehabilitate the soil to make it welcoming for natives."

Large scale seeding trials at Mahu Whenua and High Peak compare fungal inoculation as well as different sowing methods and approaches to site preparation and weed control. Glasshouse trials support fieldwork by investigating the reproductive biology and fungal associations of key species.

"We have high aspirations about reforestation but we have to be realistic," Lord says. "Our climate is

IMPACT:

AOTEAROA NEW ZEALAND

either dry and hot or dry and cold, not warm and wet like Auckland, where similar projects have trees three metres high.

"We have a lot of natural regrowth happening, but in the high-country of Canterbury and Otago it's not going to become a forest in five years."

There have been setbacks. Apart from the difficulties of working through the COVID-19 pandemic, weather bombs that closed State Highway 1 at the Ashburton Bridge also swept away the High Peak experimental areas. Lord's team re-established them only for them to be swept away again, after which they chose a new site. Then escaped stock ate new plantings.

"This is reality," Lord says. "Real systems are not as easy to research as working on a nice, controlled plot where the results may simply not be applicable in the real world.

"Despite setbacks we have learned a huge amount. We may not have a new forest we can show to a visiting minister, but we have a mass of new knowledge to share with community groups and anyone who wants to learn."

The work is attracting international students of reforestation and the associated growth in biodiversity, as well as interest and involvement from all kinds of local groups.

"Talks I give have led to a great network of people who are keen to do similar work of their own. The ripples of what we are doing are constantly spreading outwards, which is very rewarding."

FUNDERS: Soho Properties • QEII National Trust • New Zealand BioHeritage National Science Challenge • Ministry for Primary Industries / Te Uru Rakau • High Peak Station • University of Otago

Crowning glory

A non-invasive dental caries treatment for children's baby teeth is being developed at the University of Otago to replace current techniques using metal crowns.

Dr Joanne Choi, who is based in the Faculty of Dentistry's Sir John Walsh Research Institute, credits former Otago academic Associate Professor Lyndie Foster-Page with igniting her interest in crowns.

Foster-Page ran a clinical trial of the Hall Technique, widely used in the United Kingdom and Europe, using pre-formed silver crowns to seal off decaying baby teeth, halting the decay until they were replaced naturally by adult teeth.

"It's a non-invasive dental caries treatment. Normally we would have to give an injection, drill the tooth decay out and then put in fillings," says Choi.

"Dental anxiety is a big problem and if kids have a bad experience, it can affect them lifelong, because they are less likely to go to the dentist."

The main problem with the silver crowns is that they stand out if used on prominent teeth.

Choi was studying dental technology and dental materials for her PhD, so decided to try and find a better material for paediatric dental crowns.

There were multiple challenges. The material needed to be thin (because they are not drilling away any of the existing tooth to fit it) and needed to have some flexibility (so it would not break).

"Having that combination was the hardest part, because you can get something really hard that is tooth coloured, but with no flexibility," Choi says. "Or you can get something like the metal crowns, which have a little bit of flexibility and won't break, but you can't overcome the colour."

After trying several avenues, Choi secured Health Research Council and National Science Challenge funding to work with New Zealand-based companies to examine a range of polymer combinations and improve designs to create prototype white crowns for planned trials.

They simply crown the tooth, using dental cement, which creates a seal to prevent bacteria in the cavity from getting oxygen.

The crowns usually take about 10 to 15 minutes, rather than having to give an injection, drill the tooth and fill the cavity, which takes much longer and is more traumatic. This means the crowns can be fitted in mobile dental clinics.

Choi says her team has enjoyed extensive support from the University's commercialisation company Otago Innovation Limited (OIL).

OIL opened up research funding opportunities and enabled the team to attend a range of commercialisation workshops to help them better understand business language, learn how to work with potential investors and come to grips with concepts such as market validation.

"I feel motivated every day knowing our solution can make a direct impact to improving the oral health of children not only in New Zealand but also overseas."

Dr Joanne Choi

Dr Joanne Choi: *"It's a non-invasive dental caries treatment. Normally we would have to give an injection, drill the tooth decay out and then put in fillings."*

One of the leading causes of dental anxiety is a negative experience with a drill or injection.

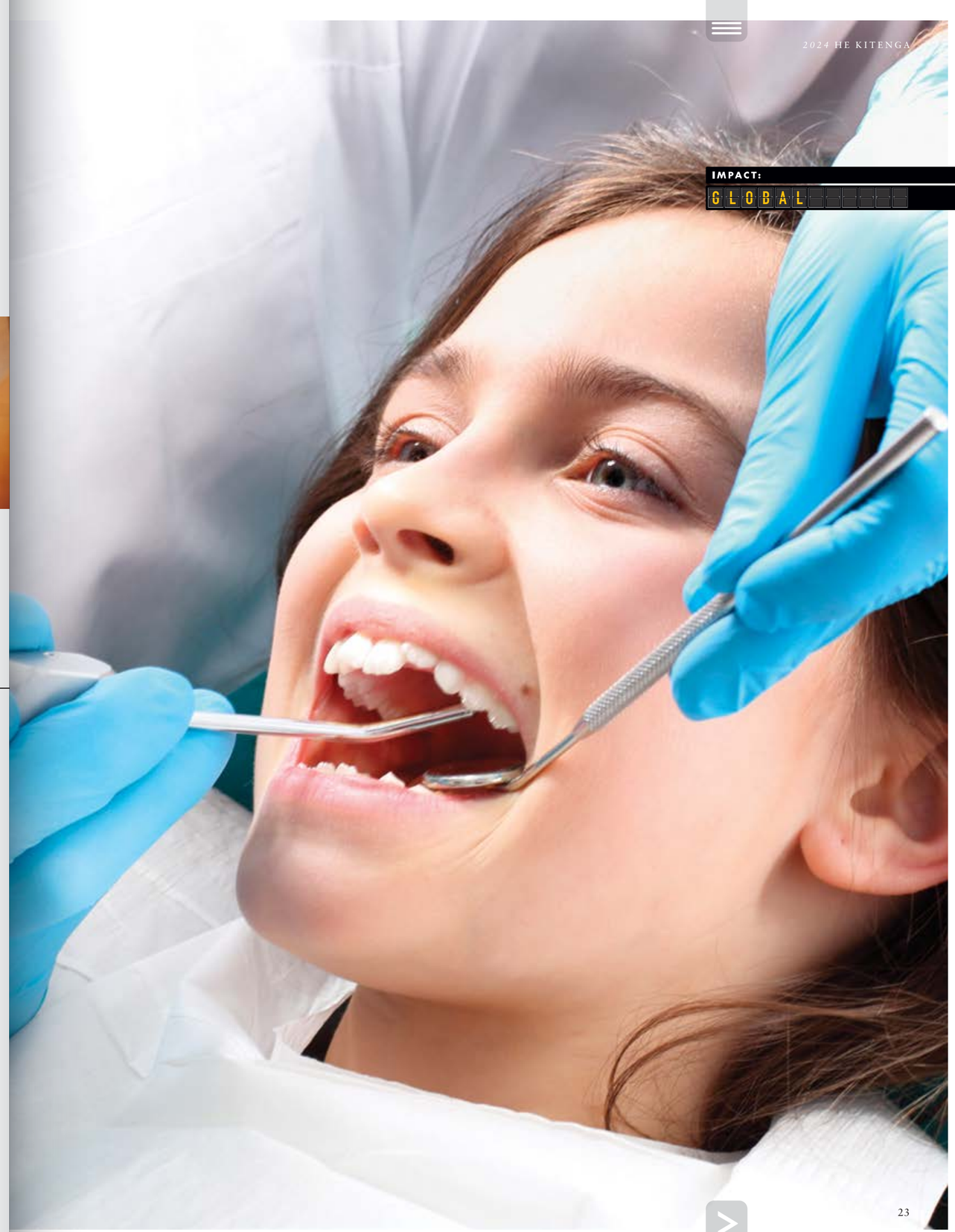
Tooth decay is the most common chronic childhood disease in Aotearoa New Zealand.

530 million +

children with dental caries worldwide.

FUNDERS: National Science Challenge Kaupapa kākano Seed projects • Health Research Council • Ministry of Health • Cure Kids

IMPACT:
GLOBAL



Spreading the word

Two University of Otago academics exemplify the links between creative and academic work and show the impact they can make combining both.

Professor Liam McIlvanney comfortably combines his day job as an academic with his life as a novelist.

Born and raised in Scotland, McIlvanney studied at Glasgow and Oxford universities and taught at the University of Aberdeen before coming to Otago in 2009 as the inaugural Stuart Professor of Scottish Studies in the Centre for Irish and Scottish Studies, where he is also the director.

He has accolades for his academic and fiction writing. His academic publications include an award-winning book on the Scottish poet, Robert Burns. He is also an internationally-acclaimed crime fiction writer whose four novels have each won or been shortlisted for various literary awards in the United Kingdom and New Zealand.

McIlvanney sees creative and academic work feeding into each another. In writing, for example, he says the tools of the crime fiction writer – such as understanding how best to shape a story and keeping the reader hooked – are skills that can be used in academic writing.

It is a similar story when it comes to his teaching of crime fiction writing within the English and Linguistics programme.

"It has been both a challenge and a joy to bring my experience as a creative writer to bear on my teaching and find ways to bring various techniques and methods into the students' toolkits," McIlvanney says.

"At the same time, being obliged to formulate and articulate my ideas about the craft has made me more conscious of my own creative practice as a writer, which has helped me bring more focus to my writing."

He says teaching can bring more direct benefits too. "Sometimes, when teaching a class, the discussion will throw light on a problem I've been wrestling with in my own writing, so it's very much a two-way street. I learn a great deal from my students."

McIlvanney's academic experience has also been useful when it comes to his fifth thriller, to be published in the United Kingdom next year. "The narrator is a literature professor, so I was able to draw on some of my academic background for that one."

As for the impact of his academic work on his students, McIlvanney cites former students Molly Crighton – who recently signed a book contract with a major publisher for her first crime novel, and Wendy Parkins – who is currently in the United Kingdon promoting her debut novel that started life as her PhD thesis at Otago, which he supervised.

Dr Lynley Edmeades is a New Zealand-born poet and essayist whose academic qualifications include a Master's degree in creative writing from Queens University Belfast and a PhD in English from Otago.

Edmeades teaches creative writing in the English and Linguistics programme and is the editor of the arts and literary journal, *Landfall*, published by Otago University Press. Her three books of poetry have been recognised in various literary awards in New Zealand, Australia, Britain and the United States.

Edmeades says her background as a poet feeds into her academic writing. "I found a space where I can bring in both sides of myself. I will have academic rigour and research but then I make it more poetic so that it is not just an academic article."

She says poetry she is reading also feeds into her teaching. "What I am drawing inspiration from are often the things I end up speaking about in the classroom."

Edmeades says the reverse is also true: her academic background feeds into her poetry. Her PhD on avante-garde poetics, for example, featured the American writer, Gertrude Stein. "I still go to Stein when I am writing. I have metabolised so much of that reading and thinking that I can't help but apply it in my own writing. She still hovers there for me."

Edmeades says her poetry also benefits from her teaching. "If I am having issues in my own work – such as problems with point of view – I can discuss this with my students and see what they think."

The various undergraduate creative writing courses at the University will be enhanced by a new Master of Creative Writing degree from next year – further boosting Otago's impact on New Zealand literature.

Dr Lynley Edmeades:
"*What I am drawing inspiration from are often the things I end up speaking about in the classroom.*"

Photo: Graham Warman

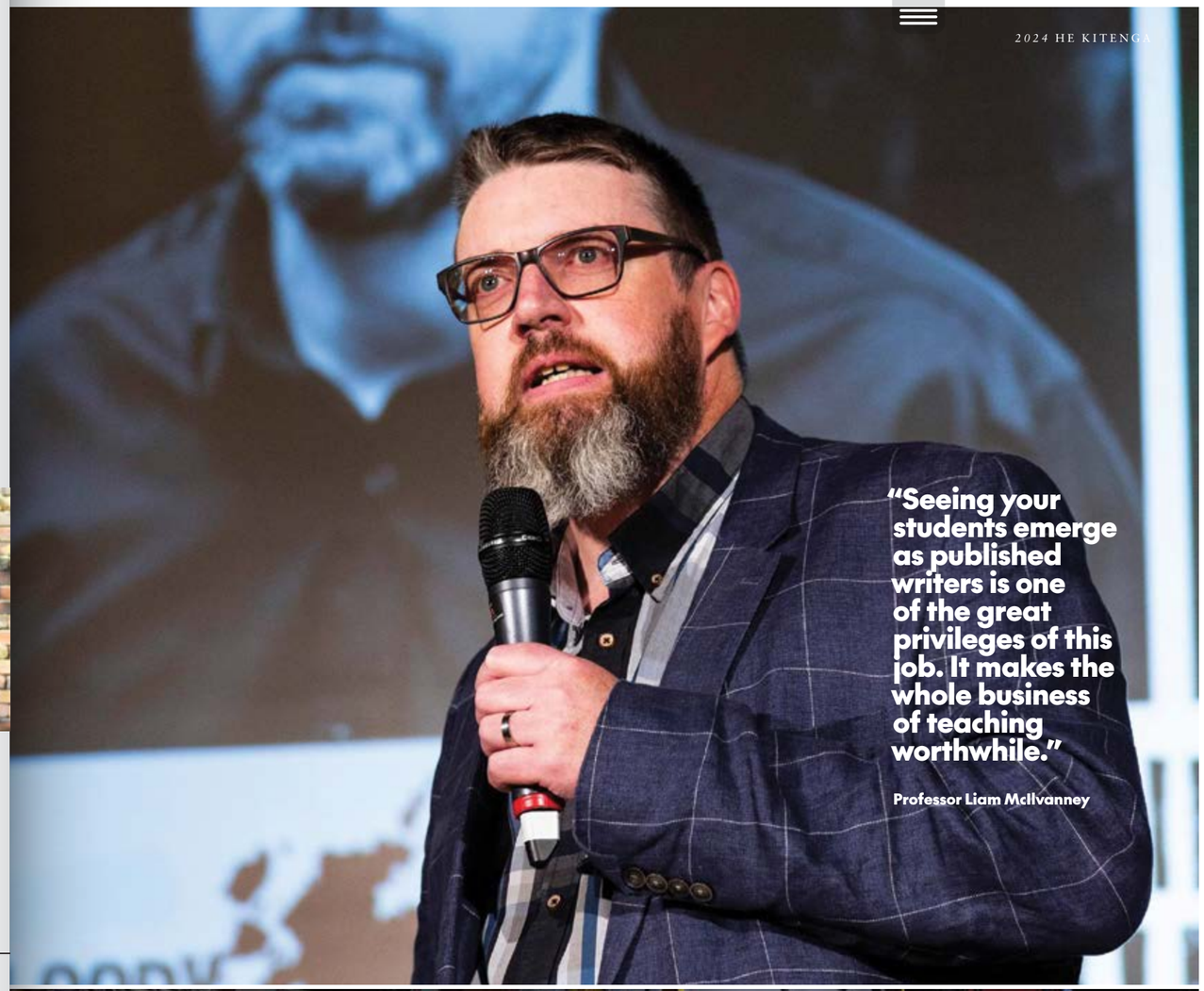
Professor Liam McIlvanney:
"*... being obliged to formulate and articulate my ideas about the craft has made me more conscious of my own creative practice as a writer, which has helped me bring more focus to my writing.*"

Photo: Bloody Scotland Crime Writing Festival 2018

New Zealand's longest running literary journal, *Landfall*, will celebrate its 250th issue in 2025 with Dr Lynley Edmeades as editor.

Photo: Graham Warman

FUNDERS: The Stuart Residence Halls Council *(Liam McIlvanney)* • Creative New Zealand *(Lynley Edmeades)*



"Seeing your students emerge as published writers is one of the great privileges of this job. It makes the whole business of teaching worthwhile."

Professor Liam McIlvanney

Guiding gout management

Witnessing the suffering a common health condition can cause inspired an Otago researcher to dedicate her career to improving management of it.

Gout is the most common form of inflammatory arthritis worldwide.

In 2019:

13.1% *of Māori men*

22.9% *of Pacific men*

7.4% *of New Zealand European men*

4.3% *of Māori women*

7.0% *of Pacific women*

2.1% *of New Zealand European women*

were affected by gout.

Professor Lisa Stamp: "*I am grateful to those who have participated in trials for our research – not only did they improve their own health, but that of countless others both here and overseas.*"

Professor Lisa Stamp is a rheumatologist in Otago's Department of Medicine, Christchurch, and Te Whatu Ora Waitaha Canterbury, and leads the Canterbury Rheumatology and Immunology Research Group.

She has spent the past 20 years conducting research into gout in the hope of improving treatment and patient outcomes for this form of arthritis.

"Gout is extremely common in Aotearoa New Zealand, especially in Māori and Pacific people – more than 200,000 people here have it, and it affects tens of millions of people around the world," Stamp says.

Gout is caused by a build-up of uric acid, resulting in severe pain and swelling in the joints, and can lead to complications if left untreated.

"I was working as a registrar in rheumatology at Middlemore Hospital in 1999 when I first saw the terrible suffering it can cause and wanted to find ways to manage it better."

Her research group focuses on drug treatments for gout, particularly in relation to the medication allopurinol. Clinical trials have been of huge importance to the research.

By controlling the level of uric acid in the blood, the number of gout attacks can reduce and stop. Allopurinol is the most commonly used medication to achieve this, but it was once considered unsafe to use in high doses particularly in people with kidney problems.

That was until Stamp conducted a robust clinical study of more than 180 people with gout in New Zealand and found that higher doses of allopurinol were in fact safe and could prevent ongoing attacks of the painful condition.

"Allopurinol has been in use since the 1960s, but for many years people were under-treated due to fear of adverse effects. New drugs are more expensive so it was fantastic to find we could, more effectively, use older and cheaper medicines to manage gout."

Gout is caused by a build-up of uric acid, resulting in severe pain and swelling in the joints.

The research has been translated into clinical practice at both primary and secondary healthcare levels. The group's pharmacological and non-pharmacological treatments, such as diet and exercise advice, have also been incorporated into international gout management guidelines.

"It is now considered gold standard practice to treat gout by slowly increasing the dose of allopurinol based on an individual's monthly blood uric acid levels."

However, Stamp acknowledges this can be time-consuming and labour intensive as there is no single dose which will work for everyone.

"Our current clinical trial is seeking to find the best way to increase allopurinol to treat gout – we want to know if increasing the allopurinol to a dose we predict someone will need, is just as effective as the more labour-intensive increase based on monthly blood tests."

The research group is also involved in an international study on the risk factors for developing gout, for people who have high urate levels in their blood but do not have the condition.

"We don't know why some people with high urate levels get gout and others don't. This study will help us understand which indicators can predict the development of gout.

"This will be a big step towards better understanding the cause of the condition and might help to come up with a way to prevent the development of it in the first place. This would unlock the potential to reduce the rising global prevalence of the condition."

Each of these clinical trials has built on the last, highlighting their importance for making a real difference in health outcomes.

"Clinical trials are an integral part of improving healthcare and provide the highest quality evidence to effect change in clinical practice.

"I have long advocated for improved access to clinical trials for patients because they are central to a high-functioning health system. I am grateful to those who have participated in trials for our research – not only did they improve their own health, but that of countless others both here and overseas."

While Stamp says there is still work to be done to ensure cases of gout are properly managed at all levels of the healthcare system, she is proud of the work the research group's collaborators, research and clinical staff, study participants and funders have achieved.

"You can't do good research alone – it's a team effort."

IMPACT:

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"Seeing how the lives of people are improved when their gout is effectively managed and hearing how they spread the word to their friends and whānau that something can be done is immensely satisfying."

Professor Lisa Stamp

FUNDERS: Health Research Council • Arthritis New Zealand • Lottery Health New Zealand

IMPACT:
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The decider

Otago's Professor Paul Hansen is one of the dynamos behind powerful software that for 22 years has been helping individuals and organisations make important decisions.

In the normal scheme of things, op-shop devotee Professor Paul Hansen (Economics), wouldn't look twice at chic Scandinavian furniture. But he will always reserve a special spot on the top shelf of his memory bank for a stylish IKEA sofa – one that played a crucial role in the birth of an innovative decision-making software company called 1000minds.

The sofa incident happened in 2001, when Hansen was on sabbatical at the Stockholm School of Economics. Having reluctantly agreed to accompany his then-wife on a furniture-ogling trip, he used their cycle journey to chew on work thoughts. That's when his eureka moment hit.

"I was biking to IKEA on autopilot and thinking about this problem that had been on my mind for six years, when I suddenly saw the mathematical solution," he says. "To the detriment of my marriage, I spent the next eight weeks on an IKEA couch in our Stockholm apartment, gibbering away developing the proof. My poor wife – it was our first time in Europe, so she wanted to go and explore. It's not good for a relationship, is it? But I was obsessed."

Looking back on it now, Hansen thinks this was the biggest moment of his life. "If I had the slightest religious bone in my body – which I don't – I would've said God spoke to me. People in history have sat up on hills and starved themselves to get that sort of inspiration."

Unlike those hungry hill-sitters, Hansen had a full belly and a nice comfy couch to help power his mental gymnastics. He nutted out the basic proof on the back of an A3 envelope. "It was covered in scribbles, eraser marks, coffee, beer, dribbles, tears."

Realising he needed help to breathe life into his rudimentary solution, he got in touch with Franz Ombler. "He's a genius, a computer expert par excellence, and a polymath who is curious and interested in elegant questions."

The two had met five years earlier when Hansen was seconded to work at the Treasury; Ombler was running the IT section there. "We were both from Dunedin, so we had that in common, but he's a quiet, thoughtful person and I'm just a raver."

It took the pair "years and years of magical insanity" to generalise the Swedish epiphany and grow it into the elegant decision-making software it is today (Hansen's 'support furniture' for this phase of mental gymnastics? A shabby sofa in Maitland Street, Dunedin).

Their invention: PAPRIKA – a method for determining weights on criteria, representing people's preferences. This became the heart of 1000minds software. Launched in 2003, its target audience was the health sector. Since completing his PhD in health economics in 1994, Hansen's research gaze has been trained on Multi-Criteria Decision-Making – a decision science that involves prioritising or choosing from competing alternatives or individuals, based on considering multiple criteria.

Motivated by the depressing state of Aotearoa New Zealand's health system in the 1990s with its many arbitrary patient prioritisation decisions, Hansen wanted to affect change. "It was a huge political football back then – clinicians were up in arms saying they weren't going to use the system anymore because it was producing unfair outcomes. There were front page stories about it."

When they first took their software to market, there was a lot of pushback. Hansen thinks he knows why. "I walked in as some brash, surfer-economist in jandals and said: 'Your decision-making needs to be improved and you're possibly putting patients' lives in danger.'"

Hansen and Ombler eventually got their big break in 2004 when the Ministry of Health started using 1000minds to rank patients for operations. They were thrilled to see their software baby out in the world and flourishing.

Their list of health sector clients has grown exponentially ever since – including the likes of the World Health Organization, which uses 1000minds to rank the nastiest antibiotic-resistant diseases so researchers know which to tackle first.

Closer to home, the software played a crucial role in creating a system for prioritising COVID-19 patients for intensive care – which, thankfully, didn't need to be used. Hansen recalls the sobering high-stakes meetings that took place at Dunedin Hospital. "The staff were freaking out. They had seven ventilators for the whole of Dunedin. We worked with experts to come up with a set of criteria and weights that would be prioritised to help with deciding who would get put on ventilation and who wouldn't. I was actually in tears; I was so shocked. It felt like something out of a horror movie."

1000minds quickly proved useful outside the health sector too, offering up decision-making and conjoint analysis support to those in business, government, nonprofit and academic spheres.

"We're trying to help people make better decisions – from the mundane to the momentous. There's nothing more important in life than the decisions we make."

Professor Paul Hansen

30+
patient prioritisation systems for New Zealand

250
clients since 2004

15
innovation awards

It even won Google's attention. The 1000minds founders were flown to the company's Californian headquarters in 2014 to install their software. Hansen bought a pair of red sneakers from The Warehouse for the occasion. "I thought I'd better wear something Google-esque because I'd seen that movie *The Internship* and I looked a bit like Owen Wilson."

The software has also proved an indispensable tool for researchers, yielding upwards of 1,250 academic projects and publications from more than 700 universities and research institutions worldwide.

Unsurprisingly, the innovation awards have piled up over the last two decades (15 and counting). Most recently their new AI assistant was a finalist for a New Zealand Hi-Tech Award in 2024.

There are now nine people employed in 1000minds, including four in the USA and Ukraine. But it has might at its core. "None of this would've been possible without Franz – and also Julian Moller (both of whom are Otago alumni). It's a team effort. It's an Otago success story."

Hansen loves this quote from Pythagoras: "Choices are the hinges of destiny."

"We're trying to help people make better decisions – from the mundane to the momentous. There's nothing more important in life than the decisions we make."

And he should know. Had this jandalled, entrepreneurial economist not opted to hop on his bike and shop for Scandinavian furniture back in 2001, the world's decision-making prowess may have been all the poorer.

Professor Paul Hansen: "*I was biking to IKEA on autopilot, and thinking about this problem that had been on my mind for six years, when I suddenly saw the mathematical solution.*"

Photos: Graham Warman

Breaking bacteria's defences

A surprise Otago-led discovery has shed new light on the defence mechanisms of bacteria – with implications globally for human health and agriculture.

An international team of Otago-led researchers is studying the microscopic arms race between bacteria and phages.

Professor Peter Fineran and Dr Nils Birkholz: *"... we found that the domain of our anti-CRISPR regulator has a highly unexpected additional function that has never been seen before."*

Photo: Alan Dove

Cells fighting against invading viruses. It is an age-old battle shared across so many different forms of biological life – including bacteria.

Professor Peter Fineran and Dr Nils Birkholz (Microbiology and Immunology) are leading international research focusing on how phages (viruses that specifically infect bacteria) go about their work. Their research was featured recently in the prestigious journal *Nature*.

Fineran says parallels can be drawn with our own immune system.

"Like we can get infected by viruses like COVID, bacteria can get infected by phages. So, we're really interested in the interaction between bacteria and these phages," he says.

But it is more than simply the ability of phages to kill bacteria that is of interest. Bacteria have also evolved defences against phages, using the bacteria's own immune system known as CRISPR.

"It can generate a memory, so it's adaptive, learning which viruses it has seen and resisting those," Fineran says.

At the same time, phages have come up with ways of getting around this defence, using anti-CRISPRs. It is the team's findings around how they do this that has grabbed international attention.

Birkholz says that in an earlier project they were surprised to identify an associated protein that downregulated anti-CRISPR production.

"It seemed weird that this phage would take its own weapon away."

But, Birkholz explains, other researchers found if a phage produced too much of the anti-CRISPR it could lead to toxic effects on the cell.

"When the phage first enters the bacteria it will produce quite a lot of the anti-CRISPR and inhibit the bacterial cell's CRISPR defence. But if it makes too much of the anti-CRISPR the cell won't be able to support the reproduction of new phages."

"It will be exciting to see the impact of our work, including its potential to trigger a re-think about genetic regulation and contribute to the development of phage-based antimicrobials."

Professor Peter Fineran

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The group has examined a protein involved in regulating the anti-CRISPR response. What is particularly exciting is that this protein contains a well-characterised part, called helix-turn-helix (HTH) domain, found across all forms of life from bacteria to humans.

"HTH domains have been investigated for decades, but we found that the domain of our anti-CRISPR regulator has a highly unexpected additional function that has never been seen before," Birkholz says.

This research raises the question of whether this new mechanism has been generally overlooked and has unexpected roles across a whole range of organisms. That will be a focus of future research.

Aside from this fundamental aspect, the group's findings could be useful for the possibility of eventually using phages to fight bacterial pathogens in human health and agriculture.

Having started as an Otago project, Fineran says it has grown to include a range of international collaborators from Germany, the United Kingdom and the United States, as well as from other Otago departments. Some are former Otago students who are now well-established scientists overseas, or researchers who have come for visiting fellowships and studentships.

FUNDERS: University of Otago • Royal Society Te Apārangi • Alexander von Humboldt Foundation • Tertiary Education Commission • Health Research Council

Māori and Indigenous economies

Otago researchers are helping develop the next generation of Māori and Indigenous business leaders - focusing on unique economic models that value more than just money.

With the support of Te Maea, PhD tauira Sequoia Short has developed an escape room centred on Indigenous data sovereignty.

Te Maea researchers (from left) Associate Professors Diane Ruwhiu and Katharina Ruckstuhl and Kirsten Robertson: *"The types of transactions that take place are more likely to be relational, whereas in a traditional capitalist economy we just look at the money."*

Photo: Alan Dove

"We hope Te Maea will develop as the community's go-to place for Māori and Indigenous economic and entrepreneurship research."

Associate Professor Katharina Ruckstuhl

Te Maea. Translated it means to be gathered, or to emerge from something, and now the Te Maea: Māori and Indigenous Economy Network, is emerging as the first Māori-focused research theme in Te Kura Pakihi – Otago Business School.

Co-Directors Associate Professors Katharina Ruckstuhl (Ngāi Tahu, Rangitāne) and Diane Ruwhiu (Ngāpuhi) are excited by this latest step, coming in the wake of the work of the network in recent years.

"Our network has been about focusing on the Māori economy and Māori entrepreneurship, but also incorporating other Indigenous groups, including Pacific members," Ruckstuhl says.

"It has enabled us to coordinate some of that really fine work that people have been doing in a very focused way, so that we can now show that this is a place where business-focused research for, by and with Indigenous people is going on."

They are working with iwi organisations and Māori enterprises small, medium and large, looking at what Māori and Indigenous businesses are bringing to the broader economy and how they are doing that.

One example is research into diverse economies, looking at the economy not just in macroeconomic terms, such as wages or labour, but at all the other economic activities that go on in a community or a society, Ruckstuhl explains.

"It's things like what I call the tītī economy, where Kāi Tahu will go down to the tītī islands and bring back birds. It's kai, it's food, but also it creates other types of economy.

"It means that we have cultural relationships with those islands and with each other, and that builds community strength."

Ruwhiu says, in customary economies, the types of organisations that have evolved are not necessarily business or corporate – they might be more social enterprises.

"The types of transactions that take place are more likely to be relational, whereas in a traditional capitalist economy we just look at the money.

"It enables us to understand the value that is attributed to things like relationships and Māoritanga – that

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intergenerationality which comes with a lot of our decision-making."

Ruckstuhl says their new research theme will examine how Māori and Indigenous economies have evolved.

"What are some of the principles that enable those traditional economies to organise themselves – what underpins that? And then how do those values and organising principles move forward into modern forms of economy."

An example of this research is a current PhD student who is surveying iwi organisations and trusts nationwide to find out their investment preferences and how they balance financial against other values such as social, governance or environmental.

Ruwhiu says they also have a recently completed PhD student who has been investigating sustainable land development in his Fijian community.

This contributes to building Te Maea's ability to understand and contribute to broader Indigenous economic frameworks.

"There's a lot of similarity across our Indigenous worlds, but because they are specific to place there's a lot of nuances and differences."

Te Maea also offers researchers and students opportunities to build their kete of knowledge of, and experience with, Māori organisations in order to feel confident that their projects are relevant and well-designed. This includes developing fun ways to engage with new Māori concepts such as Indigenous data sovereignty.

Ruckstuhl says that, given the economic issues Māori and Indigenous enterprises face, it is important that Te Maea works across different departmental disciplines and divisions.

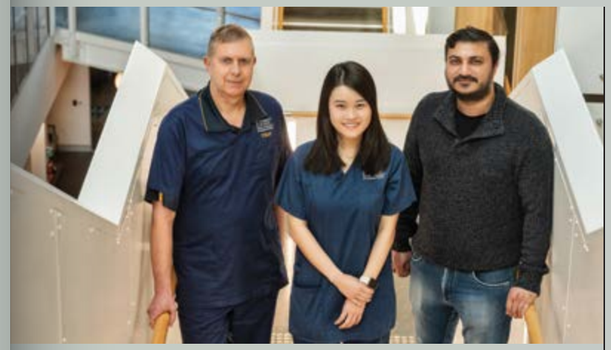
"We hope Te Maea will develop as the community's go-to place for Māori and Indigenous economic and entrepreneurship research."

FUNDERS: Ngā Pae o Te Māramatanga • University of Otago • Dunedin Chair of Entrepreneurship

Transforming gum disease diagnosis

47%

of all adults have gum disease.



Professor Warwick Duncan (left) with Elora Low and Dr Tanmoy Bhattacharjee: *"Currently, only dentists have the knowledge to detect gum disease early on, and even they struggle."*

Photo: Alan Dove

An Otago academic has created a device that could help prevent gum disease worldwide.

Gum disease affects nearly half of the world's adult population.

"But it doesn't kill you, so people aren't worried about it," says the School of Dentistry's Professor Warwick Duncan.

It won't kill you – but it is linked to increased risk of pulmonary heart disease, heart attack, stroke and pre-term birth.

Duncan is the Clinical Founder and Advisor of start-up company Periomedic, formed by the University's commercialisation company Otago Innovation Limited (OIL), in 2021. Periomedic is commercialising an ultrasound device that measures the elasticity of gums to signal gum inflammation – the first, but reversible, stage of gum disease.

"By the time gum disease is obvious, it's too late and no longer reversible," Duncan says.

The concept of an ultrasound diagnostic tool began in 2014, when Duncan received a call from Paul Harris, an expert in miniaturised ultrasound at Callaghan Innovation.

"Paul introduced himself and asked how we diagnose gum disease. I said: 'you poke it with a stick.' Paul was aghast, but that is what we do. We use a metal probe with markings on it and poke it around people's gums."

The project got off to a running start, thanks to a three-year $1 million Ministry of Business, Innovation and Employment (MBIE) Targeted Research grant. It has since received pre-incubation funding from WNT Ventures and $80,000 from Te Tītoki Mataora Research Acceleration Programme (stage 2). The device won third prize at this year's Te Tītoki Mataora MedTech Research HealthTech awards.

Duncan says a critical aspect of the project is that a layperson can operate the device and interpret its results.

"Currently, only dentists have the knowledge to detect gum disease early on, and even they struggle."

A two-year clinical trial in South Auckland community health clinics is scheduled to begin in 2026.

The device is now on its third prototype and is small enough to fit comfortably in a dental surgery. But, with smaller physical size comes bigger challenges around software reliability – and this is the research team's current focus.

To fund the next stage of development and prepare for a commercial launch in the United States (US), Periomedic is working to raise $2.5 million of venture capital. Periomedic has an experienced medical device chief executive officer in the US who is driving commercial focus and laying the foundation for a US market launch.

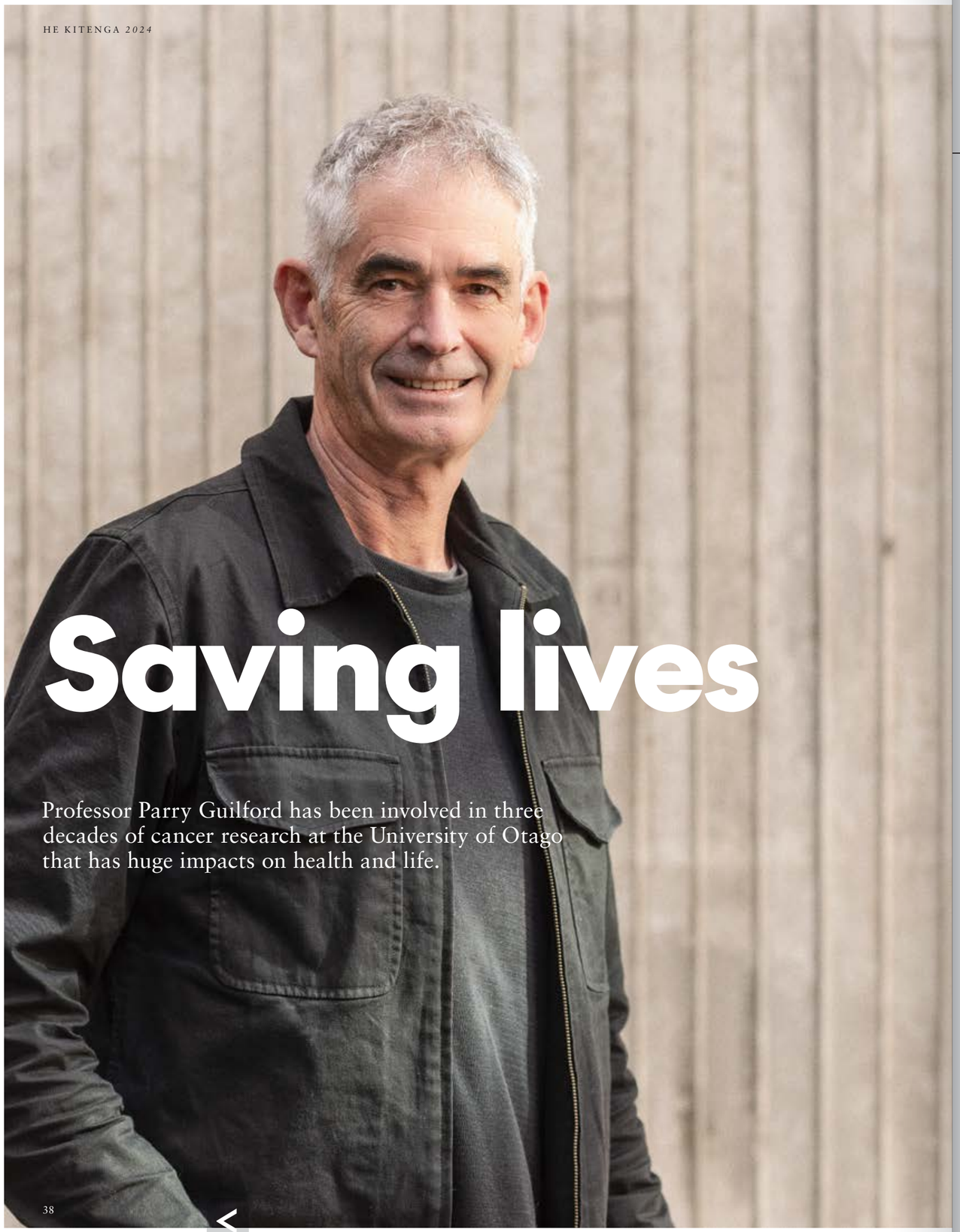
Duncan's team is also looking at the device's potential as a diagnostic tool for oral cancer. Specifically, to triage oral lesions to determine if a lesion is an ulcer or something more concerning.

"Diagnosis of gum diseases has changed little in over a century and is as much an art as a science. We hope our device will allow earlier diagnosis, at a stage when treatment is relatively painless, less costly and more successful."

Professor Warwick Duncan

The device, now on its third prototype, is small enough to fit comfortably in a dental surgery.

FUNDERS: Ministry of Business, Innovation and Employment • Otago Innovation Limited • WNT Investments • Consortium for Medical Device Technologies Research Acceleration Programme II Award • HealthTech Award



Saving lives

Professor Parry Guilford has been involved in three decades of cancer research at the University of Otago that has huge impacts on health and life.

Professor Parry Guilford:
"... we want to develop a blood test for primary diagnosis that is a total alternative to the stool test: a real grass-roots test for people who have worrying symptoms, or family histories, or who simply wish to be proactive about their health."

Photo: Alan Dove

Parry Guilford completed an MSc at Otago, followed by a PhD in virology from Cambridge University and research at the Pasteur Institute in Paris on the genetic causes of human deafness.

Returning to Otago – where he is the director of the Centre for Translational Research within the Biochemistry Department – Guilford became involved in ground-breaking cancer research projects that have improved the care of cancer patients around the world and saved many lives.

Research by the internationally-renowned cancer geneticist and his colleagues on bladder cancer, for example, has been integral in the development of a simple-to-use, non-invasive, diagnostic tool branded as Cxbladder.

This is a urine test to diagnose and manage – or rule out – bladder cancer, Guilford explains, which reduces the need for bladder cystoscopies and reduces healthcare costs.

"The test looks at genes that are highly active in bladder cancer, and searches for evidence of that activity in the urine sample. Based on that, you can diagnose with very good accuracy the presence or absence of bladder cancer."

CDH1 testing has/will directly save the lives of at least

400-450

New Zealanders alive today.

Guilford co-founded a start-up company, Pacific Edge Ltd, which developed the test that is widely used in New Zealand and the United States, with about 27,000 tests currently being run each year. They have reduced the need for invasive cystoscopies in New Zealand by about a half.

Pacific Edge Ltd won the Supreme Award at the NZ Innovators Awards in 2013 for Cxbladder.

A second major area of cancer research, on inherited stomach cancer – led by Guilford and the University's Hereditary Diffuse Gastric Cancer Research Group – has led to a dramatic decrease in deaths from the disease.

The team identified a gene mutation that causes an inherited and potentially fatal form of stomach cancer in some families – mainly in Māori whānau in this country – and devised a simple test to determine the family members who carried the wayward gene.

Guilford says there is a 50 per cent chance of one parent passing on the gene to a child, and up to a 70 per cent lifetime risk of the carriers developing fatal stomach cancer. Female carriers have an additional increased risk of developing breast cancer.

Guilford says a positive test for the rogue gene gives people a choice of surveillance through annual endoscopies, or a stomach removal operation to eliminate the risk and enable people, in time, to live near-normal lives.

Guilford estimates that, as a result of the genetic testing, surveillance and gastrectomy operations, about 450 people alive in New Zealand today, and more than 20,000 people in Europe and the United States, have had or will have their lives saved thanks to this research.

The research group includes people from affected whānau, working out of the Kimihauora Health Clinic in Mount Maunganui, and clinicians at Tauranga Hospital.

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"Our research has lessened the impact of cancer on many people's lives and provided hope to many more. We feel privileged to have been able to do something to ease the impact of this disease."

Professor Parry Guilford

The Hereditary Diffuse Gastric Cancer Research Group's work is ongoing. Guilford explains that this inherited form of cancer starts off as very small lesions in the stomach, and he and his team are now focusing on finding drugs that kill these lesions – but leave normal cells alone – before they have a chance to progress.

"We are encouraged by our results so far, and hope to get our first clinical trial going in two to three years' time," Guilford says. "We think at this stage it would require annual treatment, possibly with a drug sprayed onto the lining of the stomach at the time of the annual surveillance, but it should mean that people can keep their stomachs."

Guilford adds that these drugs would have potential use in treating all diffuse-type stomach cancers, not

FUNDERS: Health Research Council • Healthier Lives National Science Challenge • Cancer Society • Hope Without Fear • No Stomach for Cancer • Save our Stomachs • New Zealand Seed Fund

just those caused by the inherited mutant gene, and would also have applications for treating the lobular subtype of breast cancer.

A third major cancer research effort Guilford is leading is in the field of circulating tumour DNA (ctDNA), which, he explains, is DNA that has been spilt from a tumour into the bloodstream. "You can take a blood sample and, if a person has cancer, there will be trace amounts of the tumour DNA present in that blood sample."

He and his colleagues at Otago, along with various research partners, are looking at how this technology can be applied in the New Zealand health system, initially focusing on colorectal (bowel) cancer.

In one study, the Otago research team looked at 60 patients who had advanced colorectal cancer and were getting chemotherapy at Dunedin Hospital. "Immediately prior to each fortnightly cycle of treatment we took blood samples and looked at each patient's ctDNA marker to see how well the chemotherapy treatment was working."

Guilford says this blood sampling approach delivers rapid, regular information on treatment efficacy, in contrast to current CT scan imaging techniques that are done only every eight to 12 weeks, and are only available in major hospitals. "The idea is to use these tests to quickly recognise when chemotherapy is not working, allowing the clinician to rapidly change treatment to something effective."

Guilford says ctDNA technology can be used for primary diagnosis as well. "You can take a blood sample and search for DNA fragments that, in all probability, have come from a cancer."

The identification of the stomach cancer gene has the potential to save the lives of

>20,000

people in Europe and the US.

The immediate aim is to develop a simple blood test to diagnose colorectal cancer that can be turned into a major screening tool.

"The current colorectal cancer screening programme is a stool-based test, but the vast majority of positive stool tests are not cancer, so you have this huge burden on the healthcare system where these people go on to have colonoscopies and only a few cancers are found.

"We want to support the current colorectal cancer screening programme by inserting a ctDNA test between the stool test and the colonoscopy to triage out those who don't have cancer.

"As well as being an adjunct to the bowel screening programme, we want to develop a blood test for primary diagnosis that is a total alternative to the stool test: a real grass-roots test for people who have worrying symptoms, or family histories, or who simply wish to be proactive about their health."

Guilford is confident that, once the integration of this precision medicine ctDNA technology to detect cancer and manage cancer treatment has been refined, it will be used routinely and has the potential to affordably transform cancer care in Aotearoa New Zealand.

Guilford's cancer research has garnered him the country's most coveted scientific honours, including the Health Research Council's Bevan Medal, for his contribution to translational research; the Royal Society Te Apārangi's Sir Charles Hercus Medal for biomedical sciences; and, with his colleagues, this year's Prime Minister's Science Prize, awarded annually for a transformative scientific advance. That was for the research on inherited stomach cancer.

Guilford has also been awarded the University's highest research honour, the Distinguished Research Medal, and was elected as a Fellow of the Royal Society in 2016.

He typically deflects such recognition onto "the huge team effort" involved in his various cancer research endeavours.

A visual representation of the difference Guilford's work has made: A celebration hui to celebrate life 25 years after finding the stomach cancer gene, including the research team, and some of the many people whose lives the gene has threatened.

Photo: Supplied

Reimagining hospital waiting rooms

A first-of-its-kind research project aims to create a new blueprint for hospital waiting room design – one developed through an indigenous lens using kaupapa Māori design.

The waiting room research team (back row, from left): Kimiora Whaanga (IDIA), Jacqueline Gartell (Health NZ/ Te Whatu Ora), Denise Braid (Health NZ/Te Whatu Ora), Niamh Ireland Blake (Otago) and Lucy Shand (IDIA) with (front row, from left): John Moore (IDIA), Johnson Witehira (IDIA), Associate Professor Filoche (Otago) and Georgia Gifford (IDIA).

100,000+

hospital waiting room users per year

The project is a unique collaboration between healthcare professionals, healthcare scientists and Māori health researchers from the University of Otago, Wellington, Te Whatu Ora/Health NZ and designers from Indigenous Design & Innovation Aotearoa (IDIA).

Associate Professor Sara Filoche, the Head of Obstetrics, Gynaecology and Women's Health at Otago's Wellington campus, says the project will prioritise culture-centred design, with New Zealand Māori, as the indigenous people of Aotearoa New Zealand, at its heart.

"Hospitals here have a legacy founded in colonialism and are designed to Eurocentric principles of health and wellbeing," Filoche says. "They are inequitable by design and represent culturally unsafe spaces for many of those who need to access them."

The research project will involve communities and health consumers through a kaupapa Māori design process. Working together, they will co-create a reimagined virtual waiting room, which the project team hopes will have an impact on the design of healthcare environments more broadly.

Dr Johnson Witehira, the Creative Director at IDIA, says creating safe and welcoming spaces is key to longer term positive outcomes.

"Patients often find hospital waiting rooms highly stressful spaces. But imagine if you walked into a hospital waiting room and it felt calming; you saw yourself and your culture represented; and it didn't feel clinical and unwelcoming. It could help you be in a better space for your consultation."

The researchers plan to consult a wide range of patients and other stakeholders to get their views on all aspects of existing waiting rooms including the layout, furniture, colour, wall coverings and the general customer experience before, during and after their visit.

IMPACT:

AOTEAROA NEW ZEALAND

"Some of the questions we are going to be answering are: How can an indigenous design process create more culturally safe spaces? And if the physical environment of a hospital waiting room contributes to anxiety and stress for marginalised users of healthcare services, what are the design changes that will mitigate stress and support the healthcare encounter?"

Witehira says there are many examples of spaces and places that have been designed and developed through a cultural lens, using kaupapa Māori design principles and practices.

"We think this should be the norm."

He says the project will likely be the first opportunity patients in Aotearoa New Zealand have had to express their views on waiting room design.

"Our approach for all of our respective work is inclusion and collaboration, not 'about us, without us'."

"I am excited at the prospect of contributing to transforming how all people in Aotearoa New Zealand and beyond can experience a hospital waiting room."

Associate Professor Sara Filoche

FUNDERS: Health Research Council

Urban reconnection

Ahi kā. Its literal translation means ‘home fires burning’, representing a place of traditional occupation and land use. But for a team of Māori environmental planning researchers at Otago, it symbolises a desire for tangata whenua, or people of the land, to be able to reconnect with those places through urban planning.

Dunedin’s George Street redevelopment incorporates a range of mana whenua values and narratives through whakataukī, etchings of matau or fishing hooks and makā or barracouta, Mahika kai garden beds, and footpath patterns which use Māori motifs.

Photo: Otago Daily Times

IMPACT:

AOTEAROA NEW ZEALAND

Headed by Professor Michelle Thompson-Fawcett (Ngāti Whātua), the ‘Toitū He Kāinga: Healthy Environmental Relationships in Urban Settings’ research programme has been running for more than two years as part of Ngā Pae o te Māramatanga, the Māori Centre of Research Excellence.

“We specifically devised a programme that had a strong urban component, and that would feed back really deliberately to Māori communities,” Thompson-Fawcett says.

“Urban areas have been quite poor at providing appropriately for Māori communities, be they mana whenua, or indigenous people from other locations.”

Thompson-Fawcett says the planning system has been good at alienating Māori and suppressing them but, despite that, some Māori communities have been innovative in leading significant change in urban spaces.

“Sometimes it means working within the planning system and using tools that are from within it, because that’s an easy way to help politicians, local councillors and council officers to understand.”

Another pathway has been to set up innovative property development enterprises, such as Māori-led co-housing developments or papakāinga developments on ancestral land. These can be innovative in terms of the range of land uses and activities that take place there – from preschools to health centres and community gardens.

“One of the things we are trying to do is find those exciting examples, document how they have taken place and the processes that the groups and communities involved have used to overcome obstacles that they face. These would provide models and examples to other Māori groups.”

Thompson-Fawcett says they would also be able to provide advice and recommendations to local authorities, their councillors, planners and parks and recreation staff, to help incorporate expressions of mātauranga in the city.

"Dunedin's a good current example, with the George Street redevelopment. It incorporates a range of mana whenua values and narratives in that space through whakataukī quotations on walls, etchings of matau or fishing hooks and makā or barracouta, Mahika kai garden beds, and footpath patterns which use Māori motifs."

One of their MPlan postgraduate students, Corrigan Millar (Ngāti Kahungunu ki Te Wairoa), has worked specifically on how this was achieved, and also how design elements have been incorporated into the University's new Te Rangihīroa College.

"It's a significant documentation of the struggles and the things that hold it back. It's not just a single thing. It can range from architects not being used to working with mana whenua and co-designing things or it can be documents such as the District Plan not really recognising this is a possibility," Thompson-Fawcett says.

"For Māori communities, the built environment is not simply about physical places; it is an expression and extension of identity, inseparable from ancestors, events, practices and context."

Professor Michelle Thompson-Fawcett

Millar is one of three Māori Master's students involved. The team also collaborates with a Victoria University Te Herenga Waka research group – the two Principal Investigators there having completed their PhDs and lectured at Otago.

Thompson-Fawcett says MA student Kaila Tawera (Ngāti Porou) is looking at how young people (rangatahi) experience space and the importance, or not, of visible evidence of your culture in public spaces and how that connects with a person's sense of identity as a Māori citizen in Aotearoa New Zealand.

"The thing about mana whenua is they were here before. Yet somehow, up until quite recently, that has not been very visible in our urban space."

Their third student, MPlan candidate Daizy Thompson-Fawcett (Ngāti Whātua), is examining how urban spaces could be redesigned to integrate mahinga kai (traditional food sources) to allow Māori to regain independent food sovereignty.

"I'm exploring that, seeing what's out there nationally, as well as what's here in Dunedin, and also what challenges and barriers there are to that," she says.

She is working under the supervision of Dr Robin Quigg (Raukawa (Waikato) Ngāti Tamaterā), a Senior Lecturer in Māori Health, who says the overarching idea is one of nourishing green spaces.

Quigg, who has worked in local government parks and reserves management, is taking a more conceptual approach to examining what is it about parks and reserves that nourishes wellbeing – a little studied area.

A worldwide literature search, done in collaboration with Christchurch-based Otago researcher Els Russell (Ngāti Maru) found only about 100 papers talking about it, she says.

"But only 30 per cent of them are written by Indigenous people. So, the bulk of them are other people writing about our spaces and our values."

Quigg says there are around 70 local authorities in New Zealand with more than 6,000 plots of land designated as parks and reserves, mostly with very western conceptions of land use and style.

"They are not inviting places for Māori to go and practice our ahi ka – our places of being. There is opportunity to change that, which is why we're focused on how can we contribute ideas and recommendations to encourage councils to change their practices."

Thompson-Fawcett says their research has been running for two years and they have been providing ongoing feedback to authorities and to the Māori communities they have been working with, reassuring them the research group is delivering their messages.

A key aspect is to urge councils – both councillors and staff – to recognise the role they can play by being good tangata Tiriti, and not putting the burden of change, to rebalance things, onto Māori communities.

Somewhere near the top of Thompson-Fawcett's wish list for the future is an increase in the number of young Māori working in the planning area, with only about two Māori per year coming through Otago's planning programme.

"Certainly, our Māori communities and our Māori environmental agencies – lots of our iwi or hapu have some sort of environmental planning agency – they're wanting more Indigenous planners.

"There is the demand. The challenge for us is getting them in, in the first place."

FUNDERS: Ngā Pae o te Māramatanga

Dr Robin Quigg, Professor Michelle Thompson-Fawcett and Daizy Thompson-Fawcett: *"The thing about mana whenua is, they were here before. Yet somehow, up until quite recently, that has not been very visible in our urban space."*

Photo: Graham Warman

Indigenising the Law degree

When she was a law student at Otago in the 1990s, Distinguished Professor Jacinta Ruru (Raukawa, Ngāti Ranginui) was acutely aware that something was missing. She set about changing that.

"I was desperately looking for content on our Te Tiriti rights and learning about Māori law as our country's first legal system," Professor Jacinta Ruru, who is now the University's Deputy Vice-Chancellor (Māori), says.

Underpinning these yearnings was Ruru's dedication to understanding law as a tool for reconciliation and restitution, one that is committed to social justice, and has the power to make positive change.

Three decades on that same law student, who in 2016 became Aotearoa New Zealand's first Māori Law Professor, is now leading a project that is focused on Indigenising Aotearoa New Zealand's Bachelor of Laws Degree.

Led by 18 Māori legal researchers associated with Ngā Pae o Te Māramatanga, New Zealand's Māori Centre of Research Excellence, the kaupapa is supporting law schools across the motu to move towards a bicultural, bilingual and bijural curriculum.

The multiphase research project, which began in 2020 with the support of the Michael and Suzanne Borrin Foundation, has to date engaged widely on the kaupapa with Māori, law schools, academics, tauira and the legal profession.

Over the past two years, following extensive consultation and feedback, the mahi has shifted to developing and rolling out initiatives for incorporating tikanga Māori within the teaching of the LLB degree.

While each law school is implementing initiatives according to its individual structure, a collaborative approach between schools is ensuring a unified approach for turning ideas into actions. As Ruru describes, the project is adding a new strand of learning into what is already a well-established law curriculum.

For Otago Law students starting their second-year programme, one of these initiatives sees all students participating in a seven-day wānanga that engages with mātauranga and tikanga Māori. It is an initiative in the Faculty of Law that Ruru refers to as an "enormous moment in legal education in Aotearoa" and one that has been welcomed by tauira.

As a space awash with whanaungatanga, the wānanga brings the students and kaiako together and establishes a collaborative environment that lays the foundation for supporting each other's legal learning and tikanga journey.

The wānanga includes a visit and warm welcome on to Ōtākou Marae which, for over half of the 2024 cohort of second-year law students, was their first experience on a marae.

Based in Otago's Faculty of Law, Metiria Stanton Turei (Ngāti Kahungunu ki Wairarapa, Āti Haunui a Pāpārangi, Rangitane, Te Ātiawa) says this marae visit gives tauira a small window into Māori ways of living and the laws that govern it.

"Every day we all live by state laws but there are many that don't get to experience tikanga Māori law as it's happening," Stanton Turei says. "Giving the tauira the opportunity to observe and learn about marae processes such as pōwhiri and poroporoaki are examples of tikanga Māori law."

Introducing students to tikanga Māori law – such as the learnings on a marae – is also equipping students

FUNDERS: Michael and Suzanne Borrin Foundation • Ngā Pae o te Māramatanga

Jacinta Ruru, Desiree Mahy, Yasmin Olsen, and Metiria Stanton Turei:
"When I reflect on my own experience as a law student in the 1990s, and now as I stand here as a lecturer with my colleagues, to see that it's actually happened feels like a remarkable dream."

Photo: Alan Dove

IMPACT:
AOTEAROA NEW ZEALAND

"I feel so humbled and excited that our Faculty of Law colleagues and students, along with so many in the legal profession, are so enthusiastically engaged in this monumental change in legal education."

Professor Jacinta Ruru

Tāwhaki, a pou whenua on the University's Dunedin campus, symbolises the importance of te ao Māori at Otago.

Photo: Dave Bull

More than half of the students coming into second year Law have never been to a marae.

Photo: Supplied

Respondents to a 2021 survey of the legal profession thought having more knowledge about

te reo Māori (94%), Māori law (89%) and tikanga Māori (94%)

would be helpful for their work.

with a range of relevant skills. As an example, Stanton Turei describes speaking at the poroporoaki, which teaches formal skills of addressing the haukāinga and helps build confidence for public speaking – an important skill for the legal profession.

A growing Māori demographic is seen as a critical reason for developing the cultural competency of law students and equipping them with the relevant skills needed to future-proof their careers, Ruru explains.

"We want our graduating law students to be able to more confidently work with and engage with Māori knowledge, Māori material, and Māori legal arguments to better serve iwi, whānau, hapū."

Stanton Turei says she feels fortunate being in the Faculty of Law right now helping to develop and indigenise the curriculum across all the years.

"First-year law students are introduced to the history of New Zealand law, second-year students participate in dedicated wānanga that digs deeper into the relationship between tikanga Māori law and state law, and we have developed a new third-year paper dedicated to the Māori legal system."

Stanton Turei describes this paper as providing the opportunity to engage tauira with Māori legal principles and practice, both historical and contemporary.

"The material gets deeper and more complex as the students progress through their studies," Stanton Turei says. "It requires an understanding of te reo and Māori concepts so can be challenging for the tauira but we are seeing them really stepping up to it.

"We see this knowledge as important and necessary for our graduates to practise law in the 21st century and to function well in their future careers."

Such initiatives are being implemented in advance of The New Zealand Council of Legal Education's revised legal education regulations that come into effect from the start of 2025 and recognise the inclusion of Māori tikanga.

As an ongoing research project and kaupapa, the research team intends to publish on their experiences and reflections on the range of actions and models implemented across the motu as part of the project.

Reflecting on the project to date, Ruru says the kaupapa that will continue to find opportunities to bring Māori knowledge and experience into the curriculum has been fulfilling both professionally and personally.

She adds the project has highlighted the generosity shown by law colleagues as they stand alongside this research, and the open hearts and minds of tauira as they embrace and engage with the tikanga.

"I always knew we could do more, which is what has really been driving my entire career. It means the world to me and us as Māori and has shown what is possible in the tertiary classroom.

"When I reflect on my own experience as a law student in the 1990s, and now as I stand here as a lecturer with my colleagues, to see that it's actually happened feels like a remarkable dream."

Creative fellows

Otago's five arts fellowships enrich the cultural life of the University, community and country.

2021 Caroline Pummer Fellow Lucy Marinkovich: *"Dunedin has such a distinctive artistic culture and I feel so grateful to have been able to be immersed in it and embraced by it."*

Photo: Dean Zillwood for Footnote New Zealand Dance Company

The University of Otago has a long tradition of fostering the arts.

Dr Ali Clarke notes in her 150th anniversary history, staff and students have long been creators and consumers of the arts; and cultural production has been the day-to day business of University programmes such as Music, Theatre Studies, English and Dance.

From 1959, the University has additionally been a formal patron of the arts, through a series of fellowships – the recipients of which read like a who's who of the country's finest writers, artists, composers and dancers.

"The arts fellowships are a unique and rare opportunity for talented creatives to spend a significant period of time in a vibrant environment," the University's Pro-Vice-Chancellor (Humanities), Professor Hugh Campbell, says.

"Numerous fellows over the years have talked about how the fellowship arrived at a critical moment in their development and helped launch a whole new direction in their endeavours."

Campbell says the fellows, in turn, bring "a very special kind of excitement and dynamism to University life" and "often work on projects that engage the wider city".

Robert Burns Fellowship

Otago's first arts fellowship, the Robert Burns Fellowship, was created with an at-the-time anonymous gift from Dunedin poet, editor and arts patron, Charles Brasch, and his philanthropic cousins: Esmond, Mary and Dora de Beer.

They donated money to establish a literary fellowship to mark the bicentenary of the birth of the Scottish poet and statuesque Octagon resident, Robert Burns; and the contribution to early European settlement of the Burns family, notably Thomas Burns, who was the University of Otago's first Chancellor.

When journalist and novelist, Ian Cross, was appointed as the inaugural fellow in 1959, there was little financial support for New Zealand writers, and the Burns Fellowship provided the country's first, most substantial and most prestigious literary residency. It furnished recipients with an income for a year, an office in the English Department and the freedom to write anything.

The chair of the Burns Fellowship selection committee, Dr Lynley Edmeades, says the value to the fellows is huge.

"There is the monetary value, the time and space and resources, immediately being a part of the community but, more than anything, it is the legitimacy: we value what you are doing."

The list of 65 Burns fellows from Cross to the current recipient, Mikaela Nyman, includes many of New Zealand's most distinguished writers. The first decade of fellowship alone included Maurice Duggan, Maurice Shadbolt, Maurice Gee, Janet Frame, James K. Baxter, Ruth Dallas and Hone Tuwhare.

As Emeritus Professor Lawrence Jones wrote in his book marking the Fellowship's first 50 years: "The primary purpose of promoting and encouraging imaginative New Zealand literature has been achieved magnificently."

The 1965 Burns Fellow Janet Frame in a garden in 1998.

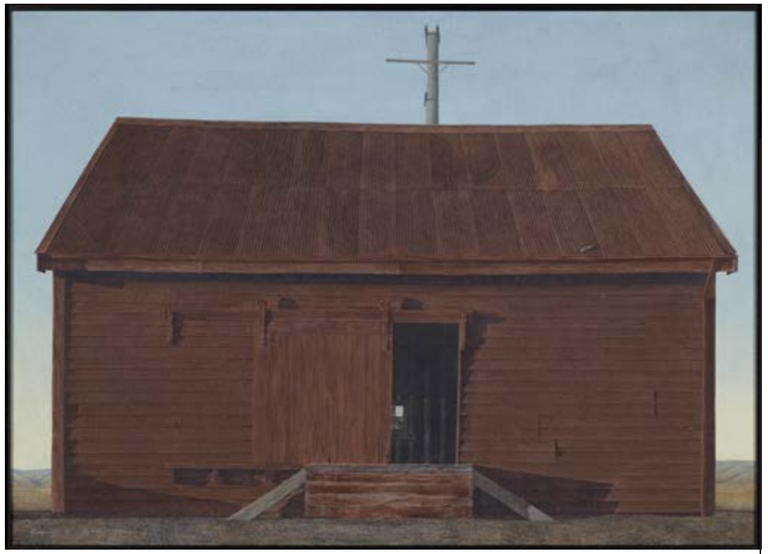
Photo: Reg Graham photograph, P2013-015/2-022, Hocken Collections Uare Taoka o Hakena

Frances Hodgkins Fellowship

Inspired by the success of the Burns Fellowship, Brasch and the de Beers again anonymously gifted money to set up a similar scheme for painters and sculptors, named after the celebrated Dunedin-born artist, Frances Hodgkins. The fellowship has since received generous financial support from the Community Trust of Otago.

As with the Burns Fellowship, there was no other opportunity like it at the time, and it continues to be the country's most prestigious, full-year, residential award for visual artists.

From the first fellow, painter Michael Illingworth in 1966, the Fellowship has offered recipients a studio, a salary and, in the words of the chair of the Hodgkins section committee, Emeritus Professor David Bell, "the opportunity to enjoy a full year unfettered by other work commitments: researching, reflecting, exploring and developing their arts."



Grahame Sydney (b.1948), *Railway Red*, 1975, egg tempera on board: 590 × 823mm (sight size). Purchased with the assistance of a subsidy from the Queen Elizabeth II Arts Council of New Zealand. Hocken Collections - Te Uare Taoka o Hākena, University of Otago - Ōtākou Whakaihu Waka, 80/188.

Reweti, Bridget, (b.1985), 4958 *You can pick the holiday next time (for Chloē)*, 2021, Whenua coloured gelatin silver photograph; Frame: 235mm h x 285mm w x 20mm d; Sight: 195mm h x 245mm w. Purchased from the artist, Dunedin, 2022 using Hocken Endowment Funds. Hocken Collections Te Uare Taoka o Hākena, Acc: V2022.04.2

"By 1978, I was in my fourth year of trying to establish myself as a career painter and printmaker, still uncertain of its longevity. To have my own name added to those of such art idols as Michael Smither, Derek Ball, Ralph Hotere and Jeffrey Harris was a thrill I never imagined possible, and the confidence it brought was invaluable."

Grahame Sydney

Bell also notes that "beyond its enrichment of our own local arts scene and the refreshing cycles of change through each year's appointment, the cumulative effect of the residency has been to secure the careers of two generations of professional artists in this country."

The 56 recipients to date include the painter, Grahame Sydney, who recalls: "By 1978, I was in my fourth year of trying to establish myself as a career painter and printmaker, still uncertain of its longevity. To have my own name added to those of such art idols as Michael Smither, Derek Ball, Ralph Hotere and Jeffrey Harris was a thrill I never imagined possible, and the confidence it brought was invaluable."

This year, for the first time, the Fellowship was awarded to a collaboration of two artists: Miranda Bellamy and Amanda Fauteux.

The University's 2024 Mozart Fellow Simon Eastwood speaks at a welcome event at the Hocken.

Photo: Dave Bull

Mozart Fellowship

Brasch and the de Beers next turned their philanthropic attention to music, with another anonymous gift that instituted the Mozart Fellowship in 1970, named after the Austrian classical composer, Wolfgang Amadeus Mozart.

The first full-time composition residency in New Zealand, the Fellowship was established to aid and encourage composers of music, to associate them with the life of the University, and to foster an interest in contemporary classical music within the University and the community.

Recipients were hosted by the Music Department and, emulating the Burns and Hodgkins fellowships, had complete freedom to play around with musical composition.

The 38 recipients – from Anthony Watson in 1970 to the current fellow, composer and bass player, Dr Simon Eastwood – include composers with international reputations, among them Professor Anthony Ritchie (1988/9) and Dame Gillian Whitehead (1992).

"I was able to get a foothold in the music community here through performances and commissions, and followed it up with work in schools and the University," Ritchie says.

"The Mozart Fellowship is also very well known and it helped my profile; but essentially, it kick-started my career as a composer and gave me the confidence to freelance for a decade."

The prolific classical composer subsequently returned to the University, where he is a professor of music and a mentor to young composers.

The 2019 University of Otago Arts Fellows (from left) Antonio Ssebuuma (Caroline Plummer Fellow in Community Dance), Dylan Lardelli (Mozart Fellow), Emily Duncan (Robert Burns Fellow), Fifi Colston (University of Otago College of Education/ Creative New Zealand Children's Writer in Residence) and Imogen Taylor (Frances Hodgkins Fellow).

Photo: Sharron Bennett

Caroline Plummer Fellowship in Community Dance

The death of a student led to the establishment of a dance fellowship at the University of Otago.

Caroline Plummer was an anthropology graduate who was also passionate about dance and had completed a Diploma for Graduates in dance at Otago.

After she died of cancer in 2003, her parents, Tony and Bibby Plummer, raised funds for a fellowship in her honour, which the government matched through the Leading Thinkers scheme, with the first award made in 2005.

The Fellowship offers a six-month residency in community dance, described as unmatched anywhere else in the world. It comes with a salary, office and dance space, and an opportunity to exchange ideas with senior teaching fellow in dance, Sofia Kalogeropoulou.

Unlike the three older fellowships, the dance fellowship is open to international applicants. The first of 19 fellows to date, Petra Kuppers, was a German living in the United States; the current fellow, Marcela Giesche, is the artistic director of her own dance studio in Berlin.

The 2021 fellow, Wellington dancer, choreographer and artistic director, Lucy Marinkovich, is a good illustration of the contributions arts fellows make to the community.

"It was an amazing opportunity to develop a community dance programme for people living with Parkinson's Disease," Marinkovich says. "The Otago dancers were an absolute joy to move with. Dunedin has such a distinctive artistic culture and I feel so grateful to have been able to be immersed in it and embraced by it."

Ritchie, who chairs the Caroline Plummer selection committee, also notes the benefits to the University. "It brings mana to the institution to have some of the best dancers and choreographers here, such as Michael Parmenter, but it is also great for our students and staff to have the opportunity to join in dance projects and attend presentations the fellow may give."

Children's Writers Residency

Otago University is the only tertiary institution in New Zealand that offers a residency for a children's writer, which the College of Education hosts and has jointly manged with the University since their 2007 merger.

The College had established a residency for children's writers in 1992, jointly funded with Creative New Zealand. It is also a six-month residency and comes with a salary, office within the College, and free accommodation in a cottage playwright and former Burns Fellow, Robert Lord, left in trust for other writers following his death.

The residency has accommodated 37 writers and illustrators to date, starting with Ruth Corrin in 1992.

The current recipient, Feana Tu'akoi, says that, as well as the "brain-space to think, experiment and fully inhabit my story, without being distracted by everyday life," the residency is giving her "a new literary community, new conversations and new ways of seeing the world. From the moment I arrived, Dunedin has embraced me."

One of the coordinators, Dr Jane Tilson, says: "Hosting a writer in residence each year brings multiple benefits for Dunedin city and beyond. The residency facilitates a rich exchange of experiences and ideas between the writer, local authors, educationalists and book lovers generally."

Tilson says the residency is above all "a gift for children who have access to high-quality children's literature created especially for them by talented New Zealand authors, whose writing has spellbound young and older readers alike."

FUNDERS: University of Otago Foundation Trust

Tikanga-informed genetics

IMPACT:
AOTEAROA
NEW ZEALAND
AUSTRALIA

Otago is leading the way with a genetics project embedded in tikanga Māori that will supercharge the diagnosis of genetic conditions.

"New Zealand may not be able to technologically lead the world in genomics research, but we can lead the world in how to do it appropriately with indigenous peoples." So said Genomics Aotearoa Co-Director Professor Mik Black in 2017.

Seven years on, the He Kākano – Aotearoa Variome Project is doing exactly that.

A variome is a database of the genetic variations found within different populations of the same species – in this case, individuals with Māori ancestry.

One of the project's initiators was University of Otago Paediatric Geneticist Professor Stephen Robertson. In 2017, tasked with forming a team to lead the project, Robertson's first call was to Associate Professor Phillip Wilcox (Ngāti Kahungunu ki te Wairoa, Rongomaiwahine, Ngāti Rakaipaaka, Te Aitanga a Mahaki), inviting him to co-lead.

While Wilcox professionally resides in Otago's Department of Mathematics and Statistics, he was originally trained as a molecular and quantitative geneticist and had managed genome-sequencing projects. He also has more than 15 years' experience developing tikanga-informed frameworks for gene technologies-based research.

The pair drew on Māori leaders and experts in tikanga, who formed a leadership roopu originally chaired by former Minister of Māori Development and Māori Party leader Te Ururoa Flavell.

"It has been a privilege to help assemble this taonga. As a resource it will powerfully inform healthcare and orient genomic medicine towards our reality as a South Pacific nation."

Professor Stephen Robertson

Together, the group decided on an initial goal: To collect 1,000 genomes (that is, the DNA sequences of 1,000 individuals, derived from saliva samples) from across Māoridom, with communities fully aware of the project's scope and controlling of the resulting resource.

He Kākano translates to "the seed". This seed has had an unapologetically long gestation. It was three years before there were enough samples to sequence, reflecting the time taken to build genuine, informed relationships with Māori health providers.

Wilcox describes the significance of where the project is at now.

"What we have done in an international context is quite remarkable. There are over 100 iwi and up to 2,000 hapū, yet at the time we started only 11 Māori communities had engaged in any form of medical genomics, such was the extent of distrust in this form of science. Recruiting 1,000 participants was a daunting task. We had to find a strategy that actually worked and was valid in the eyes of Māori."

Among Māori people's chequered history around genetics technologies is a standout success story. Ngāti Porou had a previous and positive experience working with Otago's Professor Tony Merriman (Biochemistry) to identify genetic indicators of gout.

"Since 2005, Tony worked with Ngāti Porou," Wilcox says. "Their genomic literacy and how well thought-through their tikanga around genomic research is legend. Ngāti Porou Hauora were the first cab off the rank, but they were also key to helping us secure partnerships with other Māori health providers."

Huti Puketapu-Watson (Ngati Porou, Tainui) has been He Kākano Roopu Chair since 2020 and was former Deputy and Chair of the Ngāti Porou Hauora board from 2009 to 2021.

"In te ao Māori, effective leadership is based on relationships and networks. We were able to connect with the right people to talk to several iwi, from Te Taitokerau (Northland) to Te Waipounamu (South Island). We were very fortunate that Lady Tureiti Moxon at Te Kohao was responsive and through Joe Pihema of Ngāti Whātua we were able to connect with Hāpai te Hauora. The reach of three major Māori health providers into Māori communities allowed the project to engage a wide range of participants from across Māoridom."

1,050

people recruited to the project via community organisations, and using a tikanga Māori approach.

Puketapu-Watson says Māori will not be passive recipients of future precision medicine.

"We have redefined this space by positioning ourselves in leadership roles with mana motuhake (autonomy) as our guiding principle. This protects the best interests of Māori and ensures processes employed and frameworks developed are tikanga and Te Tiriti informed."

Robertson says the creation of large genomic datasets for populations across the world has historically been done in European ancestries with nominal consent.

"There haven't been genuinely prospective conversations with populations. That's where we are different. But it does mean, if you go talking about the size of our cohort worldwide, people will be underwhelmed."

However, that is changing.

Wilcox has had more invitations to overseas conferences this year than throughout his entire career, reflecting international interest in how to appropriately engage with under-represented communities.

From Robertson's clinical perspective, He Kākano is supercharging genetic diagnosis "respectfully and potently".

"It's almost like a birth. It's a positive space we have landed up in. People are excited – all the way through to the diagnosticians who have begun to use it. In fact, they're beginning to get a bit impatient to utilise it in its complete form – a landmark that will be arrived at in November."

Robertson describes the coalface significance of He Kākano.

"For years, physicians who specialise in genetic diagnosis have recurrently come across scenarios where, for example, we find a genetic variant which we are uncertain of the significance of. That individual can have Māori ancestry or Pacific ancestry. While we can look at international databases, what we are ignorant of is an answer to the question 'is this variation common amongst Māori or Pacific people?'. Because – if it is common – it's unlikely to be causative of a rare condition."

So far, diagnosticians have asked for clarity on 80 variants – a number that is rising weekly. That is, 80 Māori individuals whose health status has been clarified, generally positively, as a result of the database insights.

In time, the diagnostic interface should be available to Australian clinicians, so it can benefit Māori in Australia.

"That would be consistent with Māori values of manaakitanga (generosity) and whanaungatanga (kinship)," says Wilcox. "It doesn't matter where people are living. What matters is that they are Māori."

Wilcox wants to see Māori finally have an experience of genetic technologies that is congruent with tikanga.

"Māori have, in my view, culturally superior ways of using traditional concepts of hereditary inheritance, but have not had a good experience with these modern gene technologies. I hope the legacy is 180 degrees the other way, to parallel a past era, when Māori had control over rauemi (resources) – such as whenua, awa and moana – and were thriving."

Robertson agrees. "The key word is 'thriving'."

Dr Phillip Wilcox, Professor Khyla Russell and Professor Stephen Robertson:
"*What we have done in an international context is quite remarkable … We had to find a strategy that actually worked and was valid in the eyes of Māori.*"

Photo: Matiu Workman

FUNDERS: Ministry of Business, Innovation and Employment • Cure Kids • Ngāti Porou Oranga

Doctors for New Zealand

For nearly 20 years, Otago has offered Aotearoa New Zealand's only programme dedicated to training doctors for rural settings – and it has shown its worth.

Dunstan Hospital in Clyde, Central Otago, one of nine centres involved in Otago's Rural Medical Immersion Programme.

Photos: From video by Ollie Bourguignon

Ashburton-based students (from left) Stephen Potter, Micah Xiang and Hylton Briscoe.

Rural-origin students who study rural medicine are more likely to return to a rural area when they graduate.

Like so many country things, it is a simple but effective formula, proven through Otago research and experience.

For decades the University has pioneered rural medical health training. It is committed to teaching and supporting students and practicing doctors in rural areas, aiming to strengthen the nation's rural health workforce and help tackle inequities faced by remote communities.

Since 2007, it has run the Rural Medical Immersion Programme (RMIP) – the only one of its kind in Aotearoa New Zealand – which has proven its worth in motivating graduate doctors to live and work in rural areas.

The one-year academic programme sees fifth-year medical students undertake all their learning in a rural community. Each community has groups of three or four students who work closely with supervisors and local health teams.

The vision of the late Dr Pat Farry, whose passion for rural medicine and medical education drove him to advocate and lobby for funding for both, came to life when a pilot was awarded funding in 2006.

What started with six students in Queenstown and the West Coast, has grown to include 31 living and working in one of nine rural communities across the South and lower North islands this year, with capacity for 35 next year.

Programme Clinical Director Dr Janine Lander says the practical, fully engaged approach makes for a more effective learning programme.

"The best thing is that they are learning in small teams under the close supervision of a rural general practitioner (GP) or rural hospital doctor – all their learning is coming from patient experiences.

"We see real progression, really quickly within the students learning within those teams as they begin to develop their professional identity and continue to acquire all the knowledge and skills they need to become competent doctors.

"Students consistently report the ease of transition to trainee intern and junior doctor roles following their apprentice-style learning in the programme," she says.

The programme covers clinical knowledge and skills while promoting students' understanding of rural health and healthcare delivery.

Students follow patients through their healthcare journey across general practice and rural hospital settings, under the guidance and mentorship of experienced GPs, rural hospital generalists, visiting specialists, and other members of the healthcare team.

The opportunities are broad and can include experiences in everything from local general practices and rural hospitals, to primary birthing units and more unique ski-field and farm-day medical visits.

Not only are their practical skills improved, but they create lasting memories and relationships. The students become part of the community – they join clubs and sports teams, work on community projects, and work with patients and whānau in a variety of contexts.

As Otago Medical School Acting Dean Professor Tim Wilkinson says "we don't just train doctors, we train doctors for New Zealand".

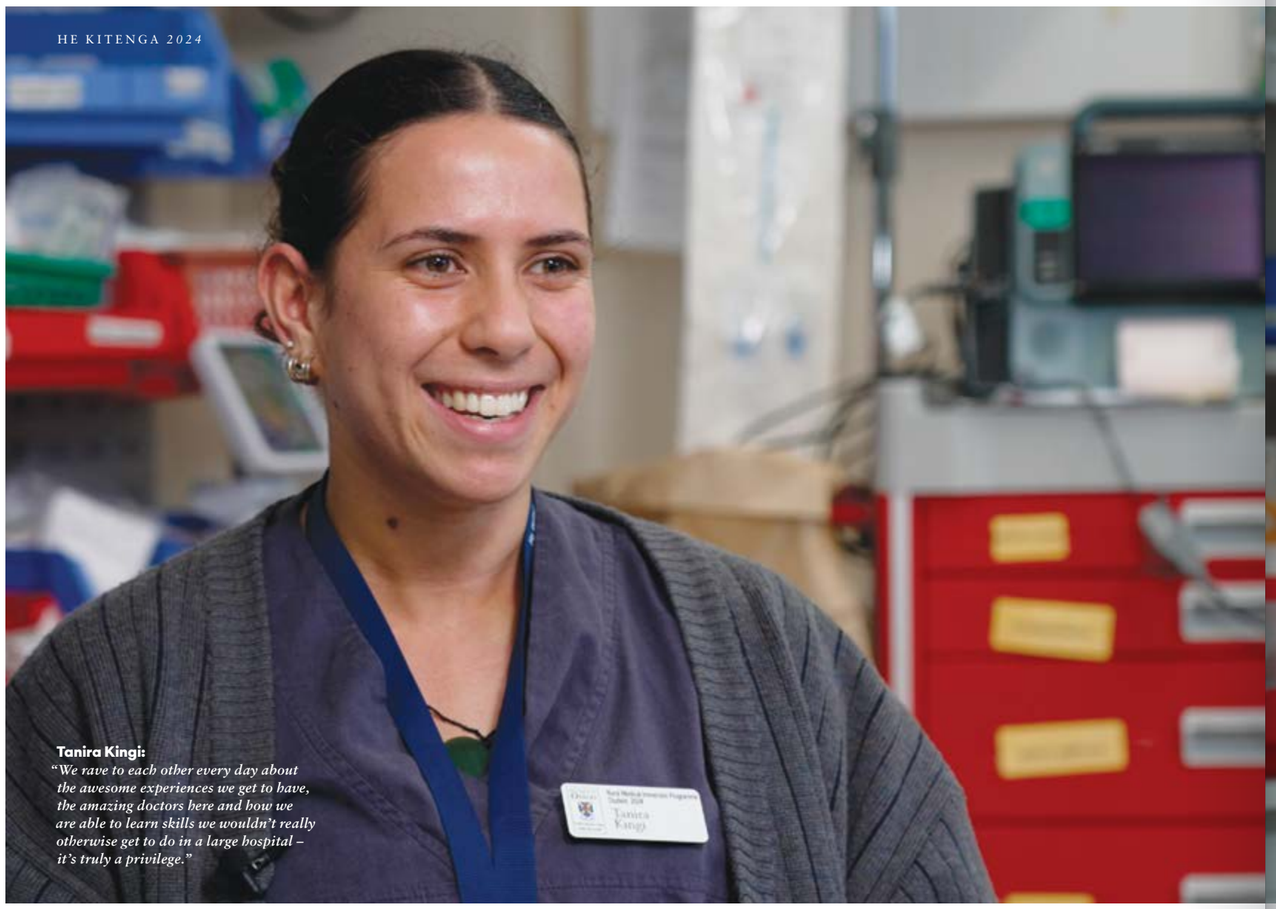
"We are committed to meeting the needs of the communities we serve, and rural health is a really important part of that.

"We know that if students learn in rural communities they are much more likely to come back and practise there. They feel supported, they feel

IMPACT:

AOTEAROA NEW ZEALAND

Dr Rachel Lynskey:
"I think rural medicine is a really exciting pathway – you have to know a little bit about everything, you get to work with a small cohesive team managing all sorts of things that come in the door."



Tanira Kingi:
"We rave to each other every day about the awesome experiences we get to have, the amazing doctors here and how we are able to learn skills we wouldn't really otherwise get to do in a large hospital – it's truly a privilege."

committed to that region, the region likewise supports them and feels supported by them. For me it's a win-win."

And return they do. In fact, graduates from the programme are nearly six times more likely to return to rural practice after graduation.

Research has also shown Otago rural entry students are nearly four times as likely to become rural doctors than non-rural entry students.

The investigation into outcomes of all New Zealand medical graduates between 2011 and 2019 highlighted just how effective affirmative action schemes for rural origin students are.

One such success story is Dr Rachel Lynskey.

She was one of the first RMIP students in 2007 and is now a rural hospital specialist working at Dunstan Hospital.

"The programme really opened my eyes to the world of rural medicine and what felt like a real experience that existed outside of the tertiary centres.

"Prior to the programme I had no idea how much more there was to medicine. I think rural medicine is a really exciting pathway – you have to know a little bit about everything, you get to work with a small cohesive team managing all sorts of things that come in the door. It's a really nice way to be able to look after your own community," she says.

Tanira Kingi is following in her footsteps as one of three students undertaking RMIP in Wairoa this year.

"We rave to each other every day about the awesome experiences we get to have, the amazing doctors here and how we are able to learn skills we wouldn't really otherwise get to do in a large hospital – it's truly a privilege," she says.

"We know that if students learn in rural communities they are much more likely to come back and practice there. They feel supported, they feel committed to that region, the region likewise supports them and feels supported by them ... it's a win-win."

Professor Tim Wilkinson

Professor Tim Wilkinson:
"We are committed to meeting the needs of the communities we serve, and rural health is a really important part of that."

She encourages other students to get outside their comfort zone and consider the programme.

"Don't be afraid to put yourself out there and to be uncomfortable. I think a lot of students steer away from rural placements because you're isolated, you might not be with people that you know very well. But I feel that this year in my entire medical journey has been the most transformative.

"I've formed such close friendships and I've had the opportunity to be immersed in a Māori community. It's just so beautiful being able to connect and establish some whakawhanaungatanga with our community."

Lander says rural medical education has come a long way since RMIP was first established, but knows there is much more to be done to ensure New Zealand has equitable healthcare for all.

"It's heartening to see the increasing numbers of junior doctors committing to rural generalist training and the attention paid to rural health equity at government level.

"However, there's still much work to be done to attract health professionals to, and ensure sustainable quality health services within, all our rural communities – it's a whole pathway.

"At Otago, our focus is on the selection processes that include rural-origin students, followed by high-quality rural placements for all medical students and extended ones for those interested, then offering suitable postgraduate training courses and experiences. Finally, the job conditions have to be right to ensure rural practitioners can thrive in their personal and professional lives within their communities."

Watch this video for more:

Keeping the lights on

Physics Professor Craig Rodger caught the media's attention this year for work he and postdoctoral fellow Dr Daniel Mac Manus have done to protect Aotearoa New Zealand's power grid from space weather events.

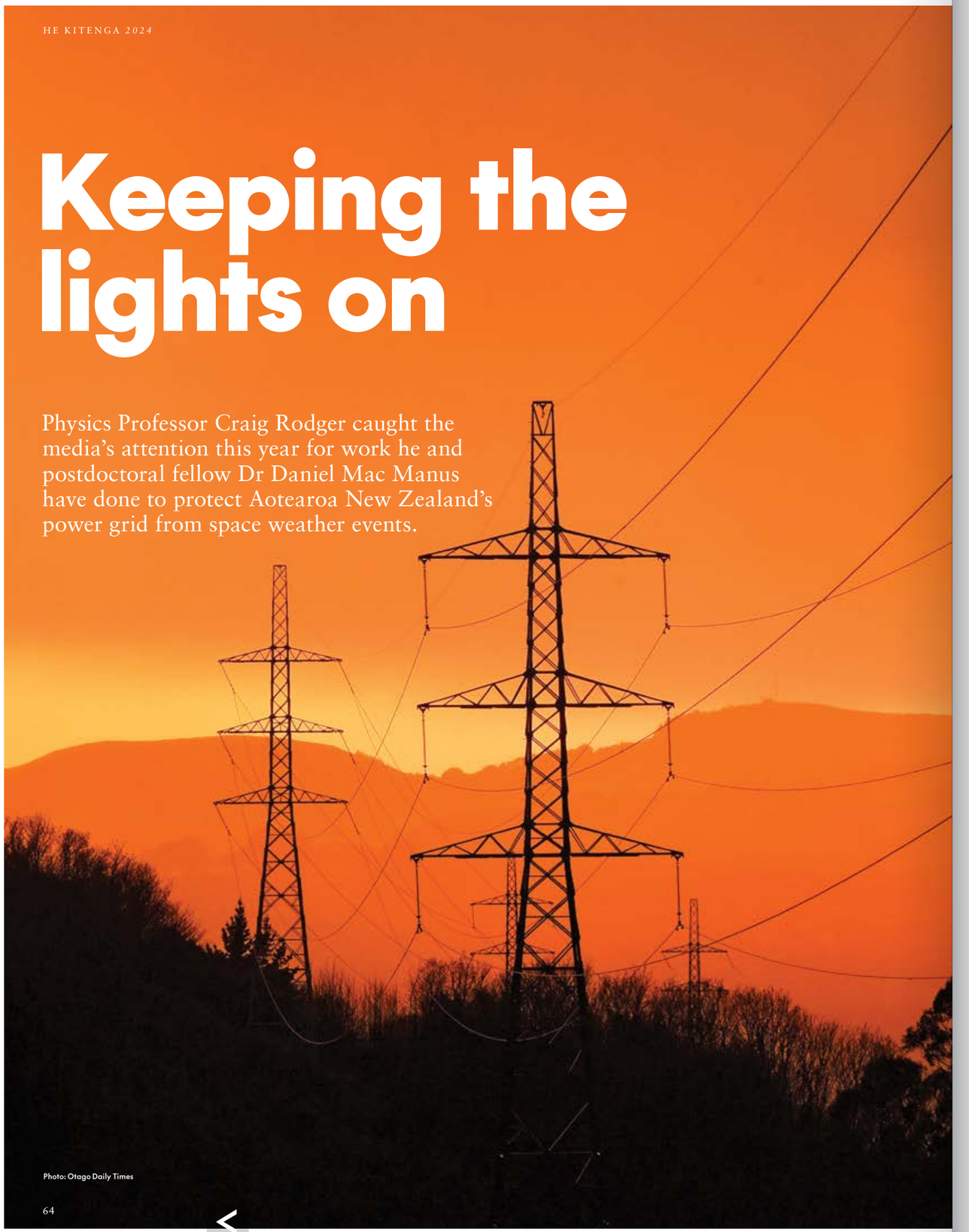


Photo: Otago Daily Times

IMPACT:
GLOBAL

On Saturday 11 May 2024, while many New Zealanders were enjoying the spectacular light show of the Aurora Australis, Professor Craig Rodger and Dr Daniel Mac Manus were crossing their fingers that the strategy they had helped electricity transmission company Transpower put in place would protect Aotearoa New Zealand's power grid from the beautiful but potentially destructive solar storm.

It did. In fact, it worked so well that by the Sunday evening, New Zealand and international media were contacting Rodger for comment, and even in August, when he meets *He Kitenga* for a Zoom interview, he is keeping an eye on the clock as he is set to be interviewed by *The Economist* straight afterwards. In late October he spoke at a National Science Foundation sponsored workshop in Maryland in the United States.

Rodger and Mac Manus have been working with Transpower since receiving a Ministry of Business, Innovation and Employment (MBIE) Emerging Hazards grant in 2015, developing protocols to protect New Zealand's power grid from solar storms, which can induce electrical currents and damage vital equipment like transformers.

Professor Craig Rodger and Dr Daniel Mac Manus:
"Space weather is being recognised as more and more important globally. Most countries don't have a plan for dealing with it, but New Zealand's electricity grid did."

Photo: Graham Warman

With the world becoming increasingly reliant on electrical networks – be they power or data – tracking, predicting and understanding space weather has also become increasingly important, as has creating systems to mitigate its impacts.

"Electricity is the lifeblood of the modern economy. We need electricity for our fridges, freezers, and for keeping people alive. Losing power has real socioeconomic impacts."

In 2020, backed by a $15 million Ministry of Business, Industry and Employment (MBIE) Endeavour Fund grant, Rodger and Mac Manus continued their work with Transpower, planning mitigation strategies for extreme solar weather events.

"We worked with Transpower on a strategy for turning off certain circuits if there was a really big event. In fact, we planned for something 10 times bigger than happened in May.

"In 2022 we travelled to Transpower's headquarters in Wellington and worked through a simulation of putting huge currents in certain transformers. We were sitting there, and they'd ask 'Daniel, is this change good or bad?' and he'd model that and tell them."

Through this simulation, they worked out how they could distribute currents through the power network, so that particular locations did not become overloaded. They disconnected some power lines to decrease the impact of the currents while ensuring the network remained stable so there were no blackouts.

Over most of a day they built a list of North and South Island circuits that Transpower would disconnect, such that the power network would stay on and be stable, but the size of the hazardous currents would go down. The plan was later made official and control room staff were trained to implement it in case of a major event.

The theory became reality on 11 May, and Rodger and Mac Manus were involved in Transpower's Aurora response as Science Advisors. They received a message about noon that there was a potential grid emergency coming and that their plan was being enacted. By early afternoon they were briefing 220 people on a Teams call.

"That was great. We were all in it together, and we could get our best feedback to them."

This response caught the nation and the world's attention.

"That evening, I was watching Aurora from home, when Transpower's main communications person asked if it was OK to share my contact details with media. On Sunday the phone started ringing, and from that point onwards it was overwhelming."

Along with the media response has been the interest from overseas, as other countries look to what New Zealand did, and ask what they can do to plan for extreme space weather events.

"Space weather is being recognised as more and more important globally. Most countries don't have a plan for dealing with it, but New Zealand's electricity grid did."

As he points out, space weather is global. If there was an earthquake in New Zealand, we can expect other countries to step in and help. If there is a global space weather emergency, then everyone will be affected simultaneously.

"It's listed as one of the top five global risks – alongside nuclear war and asteroid strikes. A global space weather catastrophe will be a bad day all over the world."

Rodger's industry and media popularity might have something to do with his contagious enthusiasm, and for the light touch he takes when describing tricky science. A self-confessed Physics nerd, he says it has been extremely satisfying doing research that impacts other people.

"Researchers in other areas of the University, for example Health Sciences and Humanities, are used to helping people, but for me with my physics research into Earth's radiation belts, it wasn't unimportant, but it wasn't having a direct impact on people. This does."

FUNDERS: Ministry of Business, Innovation and Employment • University of Otago

Supporting Māori vaccination

Otago research shows that targeted mobile services can enhance vaccination access and equity for Māori communities.

IMPACT:
AOTEAROA NEW ZEALAND

Researchers in the University's Department of Māori Indigenous Health Innovation (MIHI) are investigating the challenges and strengths of their mobile vaccination service which helped provide equitable care to Māori during the COVID-19 pandemic.

The 18-month research project aims to create a template for how the health system can better support Māori when it comes to future vaccinations.

In early 2021, the Pfizer vaccine became available in Aotearoa New Zealand, but the country's rollout plan failed to properly deliver on Māori needs, especially tāngata whaikaha (Māori people with disabilities).

The MIHI team collaborated with Mana Whenua Ki Waitaha to develop the mobile vaccination service – MIHI COVID-19 Mobile Vaccine Clinics – to make it easier for the Māori community to get vaccinated.

"We could see Māori being completely underserved in the vaccination rollout, so that made us roll our sleeves up and get out into the community," MIHI Head of Department Dr Maira Patu says.

To reach members of the community, the mobile clinic went to 37 sites around the motu, including Papatipu Rūnanga marae, urban marae, kura kaupapa Māori, Ngai Tahu special charter education settings and tertiary education providers.

"We were concerned about our whānau who are incarcerated so we reached out to the Ministry of Justice and offered our services, which they accepted.

MIHI team members (from left) Trilly Stewart, Maira Patu and Amber Phillpott.

Photos: Supplied

"Our whānau who are on preventative detention were also very much forgotten about because they couldn't leave their home to go to a clinic to get vaccinated. So, we collaborated to provide an education session and clinic."

Patu says they reached a range of people, often those who are overlooked.

"Some of the communities who engage with our vaccination service included communities who are marginalised by the current health system. These include people who had gang affiliations, Tangata Whaiora and their whānau accessing specialist mental health services, and people who call the streets their home."

Overall, they delivered more than 9,000 vaccinations, and more than 50 per cent of those were to Māori.

"We also helped train other Māori providers because we were up and running so quickly. We were all working together – it was awesome."

The mobile clinic started in May 2021 and finished in July 2022.

Due to its success, Patu and the team were awarded a $400,000 Te Whatu Ora COVID-19 Research Fund grant to undertake an assessment of how effective the service was and whether the same approach could be useful for future vaccine rollouts.

"Our goal is to outline a clear and actionable plan for how this system can finally step up, stop failing, and better serve the Māori community."

Dr Maira Patu

Called Ngā Hua Akoranga, the four-phase project identified the challenges and solutions associated with establishing and maintaining the service.

The kaupapa Māori research methodology prioritised connecting with whānau who attended the clinics to document their experiences and insights about the utility of that service.

"We formed some focus groups with our community partners, other service providers and then with agencies that provided funding and support," Patu says.

"One of the main themes that arose from those conversations was systematic racism. Services were treated as if they were not capable of delivering vaccinations."

While some of the data is still being analysed, preliminary findings from the 12-month study show that strong relationships with mana whenua and the mobile approach allowed MIHI to respond quickly during the pandemic.

Not only did it deliver the first (and subsequent) doses of the vaccine to a higher proportion of Māori people earlier than other providers in Ōtautahi, but it also had the highest proportion of Māori clients compared to other services in the rohe.

Findings also show the three key reasons why Māori chose to use the service: it was held in Māori settings, designed and delivered by a Māori for Māori vaccination team, and the kaupapa Māori delivery model was whānau-centred and whānau-inclusive as opposed to being individualistic.

Patients valued the kaupapa Māori approach because it provided an open and welcoming environment adaptable to privacy concerns, an experience that normalised the correct pronunciation of Māori names, an integration of tikanga as best practice into the clinic operations, and an ability to use te reo Māori with staff during the vaccination.

Patu says the success of the clinic and the positive reaction it has received is heartening, but not unexpected.

It was not a new strategy and there was plenty of previous evidence showing this approach worked.

"It just further demonstrates how amazing our kaupapa Māori services are."

It is hoped the mobile clinic can be used as a template for other services that will improve the equitable delivery of vaccinations to Māori in the future.

"The health system has fallen short in delivering vaccinations to Māori for decades. Our goal is to outline a clear and actionable plan for how this system can finally step up, stop failing, and better serve the Māori community."

While the project has been completed, researchers are in the writing stage and hope to share some more findings by the end of this year.

Until then, Patu is proud of the work the team has done and continues to advocate for equitable healthcare for Māori.

"Research has identified the barriers Māori services face in accessing vaccinations. The integration of mobile services, led by health professionals who excel in communication, cultural competency and safety, is crucial. These services should be provided in environments that are safe and welcoming for Indigenous communities, centred around whānau, allowing them to express themselves, speak their language, and follow their own tikanga. This approach is essential and a clear path forward."

FUNDER: Ministry of Health

Vaccinator Cassandra Stapps at a mobile clinic.

Indexing need

For more than 25 years, the allocation of resources in health and many social organisations has been shaped by the New Zealand Deprivation Index (NZDep) – led by a University of Otago team.

Professor Peter Crampton, one of the NZDep team of five, works at the Kōhatu Centre for Hauora Māori, and has been involved in the project from the start, when it was initially led by George Salmond, Professor at Otago and Victoria's joint Health Services Research Centre in Wellington, where Crampton worked at the time.

"There was a widely held view that we needed a tool to assist with resource allocation. A tool which could assist in directing resources, in a fair way, into high need communities or areas," Crampton says.

"NZDep initially had three aims. It was to be a small-area-based index that could be used for resource allocation formulas; as a tool for research; and as a tool for community advocacy and service planning."

It has been widely used since as a tool for all those purposes by the Ministry of Health and other government agencies, researchers, community groups and local councils.

Crampton says needs-based resource allocation was still a relatively new policy at that time.

Occupational-based indices had been used previously as a means of measuring socioeconomic position but dropped out of use because the meaning of different occupational groups changed, and the approach also excluded people who are not in the formal labour force.

Crampton says NZDep was built on the foundations of previous work by New Zealand epidemiologist Judy Reinken, and research from the United Kingdom.

At the time work began on the index, there was a need for a new language to describe poverty and new ways of measuring it.

"We thought we needed to introduce a language which would allow poverty to be discussed properly. Socioeconomic deprivation was the approach we took," Crampton explains.

NZDep was initially developed based on the 1991 census, followed by the second version based on the 1996 census.

Crampton says an updated version has been produced following every successive census, but they have tried to keep it as stable as possible with minimum changes, so they can track changes over time.

"It has nine input variables and that means it is robust to changes of context. It measures differences in socioeconomic position in a very wide variety of contexts. That means NZDep can be easily plugged into resource allocation formulas.

"There is complex statistical programming behind the scenes, but it produces easy-to-use numbers. So, for example, parts of South Dunedin would receive more funding per capita, based on socioeconomic need compared to other parts of Dunedin. That's how it works.

"But it also allows us to untangle, for example, how poverty plays out in rural areas and the associated health needs. This is a neglected issue in Aotearoa New Zealand from a policy point-of-view," he says. "For example, much of what we think of as rural poverty is actually Māori poverty in rural areas. So, it allows us to disentangle some of that."

"The NZDep work has helped to ensure that communities most in need receive funding that, at least to some extent, acknowledges that need. For me, that has been an important contribution."

Professor Peter Crampton

NZDep is used widely in research, so researchers can understand how much of a population's health status difference is due to relative socioeconomic deprivation and how much is due to other factors.

Work is well underway on the next index, based on the 2023 census, but Crampton and his four colleagues also have an eye on the 2028 census.

It may be carried out partly or largely as an administrative census, using data gathered through Stats NZ's IDI (integrated data infrastructure), which includes a range of data, from educational and employment data to tax and justice information.

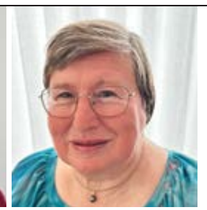
While it is possible for Stats NZ to recreate aspects of the census using the IDI, Crampton says most of the variables they find useful for creating NZDep are not available in the IDI.

For example, households are poorly identified in the IDI and there is a lack of household information recorded in administrative data. Therefore, variables such as equivalised household income, household crowding and whether houses are damp and mouldy are unavailable.

In parallel with creating NZDep2023 based on last year's census, the team will also create what they believe is the best version that can be created from the IDI.

"We're going to compare the two versions head-to-head using outcome data we have available to us, to see how the IDI version performs."



The rest of the NZDep team (from left) Kura Lacey, Clare Salmond, Helen Viggers and June Atkinson.

FUNDERS: Health Research Council • Ministry of Health • Statistics New Zealand • University of Otago

"In the 1991 census, 71% of Māori were recorded as living in areas that were the most socioeconomically deprived *(NZDep91 deciles 7-10)*; in the 2018 census the percentage had hardly reduced at 66% *(NZDep2018 deciles 7-10)*. The effects of colonisation are long lasting and resistant to change."

NZDep team member Professor Peter Crampton: *"It measures differences in socioeconomic position in a very wide variety of contexts. That means NZDep can be easily plugged into resource allocation formulas."*

Photo: Alan Dove

Global health

Professor Philip Hill specialises in bringing people together to find solutions to global health problems. He's just one of Otago's Leading Thinkers who is making an impact.

IMPACT:
GLOBAL

"Our vision is for health problems worldwide to be solved by those most affected by them. We build the careers of people from the places we collaborate with as a major priority."

Professor Philip Hill

Otago is, this year, celebrating 20 years of world-changing research from its Leading Thinkers' Initiative, a highly successful partnership between the University, the government, and the private sector.

Working with public and private funding has allowed the University to recruit internationally renowned academics to lead future-focused projects – drawing on already recognised strengths in areas such as health sciences, science and biotechnology, industry, business and management and sustainability.

Private donors matched the government's initial funding of $25 million, enabling the University to invest in attracting the right people to the right place.

Since 2004, dozens of projects have resulted in world-class research excellence, garnering national and international recognition for its impact both in New Zealand and overseas.

Professor Philip Hill joined the Leading Thinkers' Initiative in 2008 as the first holder of the McAuley Chair in International Health and founding director of the Centre for International Health.

He went on to establish and direct the Otago International Health Research Network, which was renamed the Otago Global Health Institute (OGHI), to reflect its 'whole University' approach and worldwide focus.

Hill's own experience includes qualifications as a medical practitioner, specialist public health physician, specialist infectious diseases physician and gaining a doctorate in the epidemiology of tuberculosis in The Gambia, where he worked for the United Kingdom's Medical Research Council.

On taking up the McAuley Chair endowed by Mercy Hospital, Dunedin, he invited colleagues from all four divisions of the University – Business, Health Sciences, Humanities and Sciences – to join the initial network to work on health research in low- and middle-income countries, with more than 100 becoming involved.

"People of the global health community working at Otago to solve challenging health problems come from multiple disciplines," Hill says.

"Working on infectious diseases alone involves people from the Centre for International Health, Medicine, Public Health, Mathematics and Statistics, Human Nutrition, Pathology, Pharmacy, Economics, Biochemistry,

Genomics, Geography, Pathology, Politics, Paediatrics, Bioethics and Microbiology and Immunology. It's a true cross-discipline effort."

OGHI is now one of the University's 12 flagship Research Centres and 14 Research Themes. Hill co-directs the Centre with Professor Patrick Vakaoti (Te Tumu: School of Māori, Pacific and Indigenous Studies). It fosters partnerships in Aotearoa New Zealand and abroad for researchers to work together to find solutions to global health problems, with a major focus on assisting collaborators in under-resourced countries to build capacity to be competitive global health researchers.

"Our vision is for health problems worldwide to be solved by those most affected by them," Hill says. "We build the careers of people from the places we collaborate with as a major priority. Research collaborations should strongly benefit our local partners in low-resource settings."

Projects with New Zealand and overseas collaborators are running in Africa, Asia and the Pacific, largely funded by international agencies. OGHI researchers are engaged across the world.

OGHI has an impressive record for training people from low-resource settings at PhD level, assisting them to become internationally competitive academic leaders in their home countries.

"Otago has a very strong PhD offering and we can offer scholarships strategically, enabling students from disadvantaged backgrounds to join us," Hill says.

"We are also working to establish a 'whole University' Master's of Global Health degree. Adding that to our postgraduate programmes will help to meet a huge global demand and our approach could be a real point of difference for Otago."

As part of OGHI's outreach, Hill is an Adjunct Professor helping to develop a new Communicable Diseases Research Centre at the Fiji National University. He is also involved in a major collaboration with the TB-HIV research centre of the University of Padjadjaran in Bandung, Indonesia.

He is particularly proud of the research capabilities developed in Indonesia along with collaborators at Radboud University in the Netherlands. At least 15 international PhDs have been gained by local candidates, providing something of lasting value to the host country.

"What we are doing is counter-colonial. It's a good model for other global health initiatives to follow."

Otago's global health alumni are spreading out around the world. Many of them have risen to have significant influence in their country of origin and still maintain connections with their alma mater.

"Many have gone far beyond PhD level. They have senior positions in their home countries and are having a huge impact in their own health systems and research institutions, as well as at a global level.

"We certainly want to build further on our alumni network," Hill says. "There is still a huge unfulfilled potential for Otago to engage more in global health. We need to build stability to outlast changes in leadership and funding attitudes over time.

"Ideally, we would like to set up an endowment fund to give OGHI permanent stability to invest in our global future.

"We already have many well-placed researchers with very specific strengths, which can be combined to build multidisciplinary collaborative approaches to global health problems. The endowment, which we're working towards with the Development Office, would help stimulate such initiatives."

Hill is confident of where global health is heading at Otago. "What we are doing is part of something that Otago can be very proud of – the desire to make a difference for those less fortunate than ourselves is part of Otago's psyche. It's buried deep within Otago's foundation stones."

It is also part of the DNA of the Leading Thinkers, from the first appointee in 2004, Professor Jim Mann, to what is now a very substantial group of senior academics and initiatives.

50+

New Zealand's leader in Global Health research with 50+ journal articles annually.

"I think we have made significant contributions to the application of research to major issues in TB control in particular, and most importantly the research capacity building has contributed to the postgraduate trained workforce in institutions we partner with – which will hopefully have lasting impact."

Professor Philip Hill

FUNDERS: Mercy Hospital • Gates Foundation • European Union • Department of Foreign Affairs and Trade, Australia • Health Research Council • Marsden Fund • Te Niwha Infectious Disease Research Platform • e-Asia Fund • Maurice Wilkins Centre for Molecular Biodiscovery • Cure Kids • Canadian Institutes for Health Research • University of Otago Foundation Trust • Medical Research Council, United Kingdom

Otago's Leading Thinkers Chairs and their current holders:

Leading Thinkers Chairs	Leading Thinker/Recipient
Carney Centre for Pharmacogenomics	Professor Martin Kennedy
Howard Paterson Chair in Theology and Public Issues	Professor David Tombs
NZICRT Chair in Cancer Pathology	Professor Mike Eccles
Baier Chair in Early Modern Philosophy	Professor Michael Le Buffe
Stuart Chair in Science Communication	Professor Lloyd Davis
Stuart Chair in Scottish Studies	Professor Liam McIlvanney
AgResearch Chair in Reproduction and Genomics	Professor Neil Gemmell
Robert & Marjorie Webster Chair in Viral Pathogenesis	Professor Jemma Geoghegan
Cure Kids Chair of Paediatric Genetics	Professor Stephen Robertson
Alexander McMillan Chair in Childhood Studies	Professor Nicola Taylor
Dunedin City Chair in Entrepreneurship	Professor Nathan Berg
Eamon Cleary Chair in Irish Studies	Currently vacant
Edgar National Centre for Diabetes Research Accessibility	Professor Jim Mann
McKenzie Chair in Clinical Science	Professor John McCall
Ron Lister Chair in Geography	Professor Tracey Skelton
McAuley Chair in International Health	Professor Philip Hill
TD Scott Chair in Urology	Recruitment underway
Cure Kids Chair of Paediatric Research	Professor Andrew Day
New Zealand Law Foundation Chair in Emerging Technologies	Currently vacant
Chair in Peace & Conflict Studies	Professor Kevin Clements
McKinlay Chair in Global Health	Chair closed
Chair in Earthquake Science	Professor Mark Stirling
Otago and Southland Chair in Neurosurgery	Professor Giles Critchley
Dame Carolyn Burns Chair in Freshwater Sciences	Professor Ross Thompson

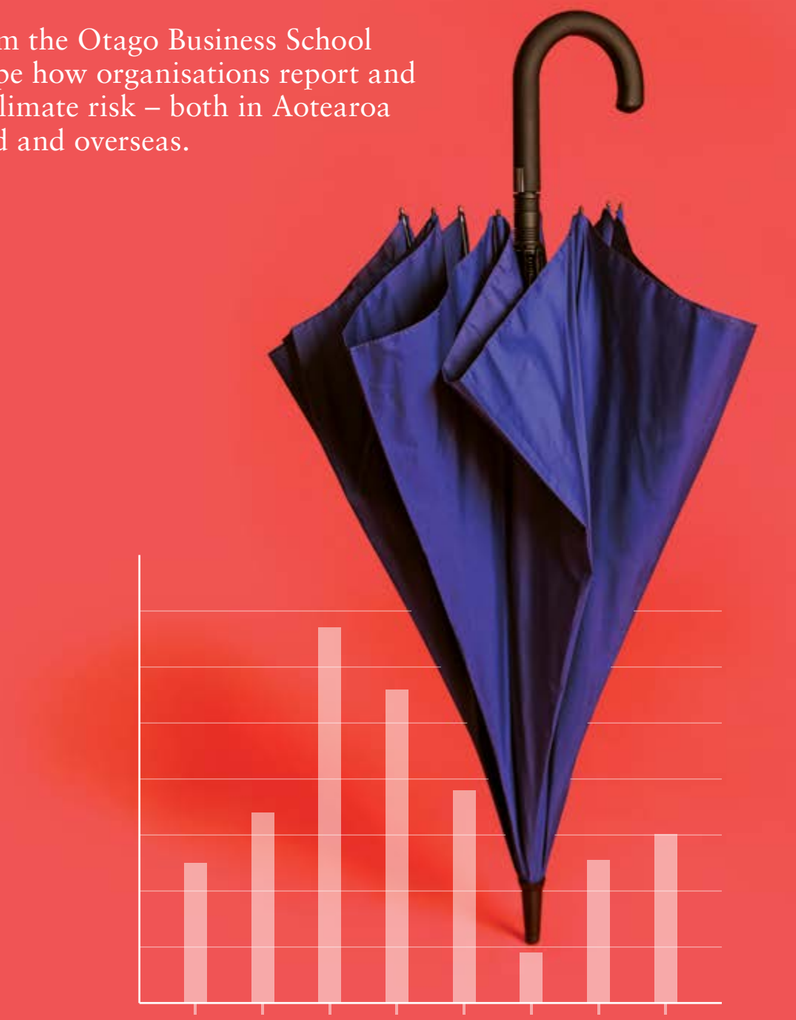
Leading Thinker Fellowship	Leading Thinker/Recipient
Caroline Plummer Fellowship in Community Dance	Professor Stuart Young
Centre for Development Studies	Associate Professor Douglas Hill
Gama Research Fellowship in Bipolar Disorder	Dr Maree Inder
Karitane Senior Research Fellowship in Early Childhood Obesity	Professor Rachael Taylor

Philip Hill (front, second from right) and Dr Sue McAllister (centre back) with a group of Indonesian postgraduate and postdoctoral students whom they have helped to supervise.

Photo: Supplied

Testing climate disclosure rules

Research from the Otago Business School will help shape how organisations report and understand climate risk – both in Aotearoa New Zealand and overseas.



Dr Sebastian Gehricke:
"Investors, lenders and stakeholders are eager to shift away from high climate risk companies … but until now there has been a lack of reliable data to help make comparisons and decisions."

Otago researchers are investigating how effective new mandatory climate-related disclosure rules are in supporting Aotearoa New Zealand's transition to a low-emissions future.

New Zealand was one of the first countries in the world to legislate for such disclosures, tasking the government's External Reporting Board (XRB) with developing and issuing standards for a climate-related disclosure framework.

Otago won a contested contract to monitor around 200 organisations' responses to see how they understand and report on their climate risk obligations and how this affects the transition.

Principal investigator Dr Sebastian Gehricke (Finance) is a director of Otago's Climate and Energy Finance Group (CEFG), which researches climate finance, sustainable investing, sustainability reporting and energy and carbon markets.

As one of the world's largest sustainable finance and accounting teams, CEFG is strategically placed to support efforts for sustainability in Australasia and Asia.

"Climate risk disclosures are increasingly important for business transparency," Gehricke says. "Investors, lenders and stakeholders are eager to shift away from high climate risk companies towards the leaders of tomorrow, but until now there has been a lack of reliable data to help make comparisons and decisions. Now, in New Zealand, that's all changing."

Gehricke's multidisciplinary team has designed a multi-year programme to study the impacts of climate reporting. It has just completed a baseline study employing interviews and surveys and is now collaborating with the University of Zurich to develop a new AI model to analyse the disclosures as part of the initial evaluation.

"We're measuring how effective the XRB's climate disclosure policy is in encouraging companies to address the risks and opportunities that climate change has for their future and in shifting capital (investments)," Gehricke says.

Interim results indicate that organisations are increasingly aware of climate-related risks, which are quickly catching up with concerns about financial risks.

Professor Sara Walton (Management, Director of the Master of Sustainable Business programme), has been handling the more qualitative aspects of the project, interviewing 20 companies with a variety of reporting skills.

"We have been pleasantly surprised with the general level of knowledge about climate-related disclosures in a global sense," Walton says. "Organisations that may have started with appointing managers to deal with the climate challenge are now involving the whole organisation because most parts will be impacted by risks such as what is likely to happen if they don't act.

"Some have been getting prepared for this for many years, particularly those in the financial sector, which needs the knowledge for investment risk management. It will be interesting to see how our baseline results compare with next year's data."

IMPACT:
GLOBAL

"As New Zealand is one of the first nations to implement mandatory reporting, this research will provide important lessons to regulators, business leaders and investors as similar reporting regimes are put in place globally."

Professor Sara Walton:
"Organisations … are now involving the whole organisation because most parts will be impacted by risks such as what is likely to happen if they don't act."

FUNDERS: Te Kāwai Ārahi Pūrongo Mōwaho External Reporting Board

Breathing easy

Two researchers on Otago's Wellington campus have, in their separate ways, helped to radically improve the lives of asthma patients both in Aotearoa New Zealand and overseas.

30 years

12,000+

whānau visits

40+

kura, schools and Te Kohanga Reo

IMPACT:

GLOBAL

In the Department of Medicine, Professor Mark Weatherall has played a key role in an international research collaboration which brought about a major change in the treatment of asthma in adults – giving patients more control over the management of their condition and halving their risk of asthma attacks.

Meanwhile public health researcher and Manager of the Tū Kotahi Māori Asthma Trust Cheryl Davies has quietly pioneered by-Māori, for-Māori care for asthma patients and their whānau in the community.

In 2016, Weatherall and colleagues from the Medical Research Institute of New Zealand (MRINZ), including Otago Adjunct Professor and MRINZ Director Richard Beasley and Mark Holliday, were part of an international team looking for a better way for people with asthma to take inhaled corticosteroids, the mainstay of asthma treatment.

Weatherall explains that patients with asthma symptoms had been taking regular doses of inhaled steroids and if their asthma symptoms deteriorated, they visited a doctor to get the dose increased, and also typically increased the dose of their 'reliever' therapy, usually salbutamol.

"There were some very practical problems with that approach, including the difficulty of accessing medical care and knowing how much to increase the dose. It was also hard to get people to use regular inhaled steroids because they couldn't see an immediate benefit. It is also the case that excessive use of salbutamol can be harmful."

The team embarked on two, large, multi-centre trials across sites in Aotearoa New Zealand, Australia, Italy and the United Kingdom. The first, the Novel START study, examined the effect of patients with mild asthma taking a 'combination' inhaler containing both a corticosteroid 'preventer' and a bronchodilator 'reliever' when they needed to. They found the combination budesonide-formoterol

inhaler used by patients on an 'as needed' basis halved their risk of having a severe asthma attack, compared to patients who took a preventer inhaler every day plus a reliever inhaler when required.

Their second study, PRACTICAL, focused on patients with more severe asthma and found that they, too, benefited from using the combination inhaler.

The findings of the two studies were published in 2019: the Novel Symbicort Turbuhaler Asthma Reliever Therapy (Novel START) study in the *New England Journal of Medicine*; and the Personalised Asthma Combination Therapy with an inhaled corticosteroid and fast-onset long-acting beta agonist (PRACTICAL) in *The Lancet*.

The new treatment regime, known as AIR (anti-inflammatory reliever) therapy was adopted into Global Initiative for Asthma (GINA) and New Zealand guidelines within a year of the research being published, marking the most significant change to asthma management in 30 years.

The work earned Weatherall and Holliday the Health Research Council's prestigious Liley Medal in 2020, and AIR therapy is now the mainstay of asthma treatment for most patients.

Weatherall says the new treatment plan is a much more practical approach, particularly given the difficulty of accessing primary health care.

"Instead of waiting for an unpredictable length of time to see a GP or other primary care practitioner to get their asthma treatment fine-tuned, if they are on this take-it-as-required regime, they are already self-managing their asthma in an optimal way.

"It gives patients control over their own treatment – and they do better."

He puts their success in getting the new therapy adopted down to working with an international network of researchers, and of having GINA Science Committee chair Macquarie University Professor Helen Reddel, on their team.

"It shows what can be done from New Zealand, coordinating international research and getting new treatment approaches into international and national guidelines."

"The treatment studied in these studies leads to more patient control over their treatment and better outcomes. This is patient-centred care."

Professor Mark Weatherall

Out in the community, Cheryl Davies (Ngāti Raukawa, Ngāti Mutunga ki Te Wharekauri), says the combination inhalers have proven to be a practical and effective way for whānau to manage their asthma.

Davies has managed the Tū Kotahi Trust since it was established in 1995 with the aim of addressing the high rate of hospitalisations and deaths from asthma among Māori.

The Trust, the first Māori asthma service in Aotearoa New Zealand, was set up in response to the 1991 Māori Asthma Review headed by the late Otago Professor Eru Pōmare. The review found a major improvement in Māori asthma could only occur through the more effective involvement of Māori people in the planning and delivery of asthma care. It recommended by-Māori, for-Māori asthma services be set up in the community.

Tū Kotahi began by offering training for lay asthma educators to work in the community.

Davies remembers Emeritus Professor Julian Crane from Otago's Department of Medicine, and then Director of the Wellington Asthma Research Group, providing evening training at marae on a voluntary basis.

"He would bring sheep's lungs to teach us about physiology. I always remember that because it makes me laugh."

Funding from Te Whatu Ora: Health New Zealand now allows them to focus on delivering asthma services to Māori in the community and provide support to improve housing.

Davies says the emphasis is on providing practical, individualised asthma management plans for whānau.

"You often have to take into account what's happening for that whānau, so if the Mum has got four children under the age of seven, then giving her a plan for two of her children that is practical means photocopying it, putting it up on the fridge with a fridge magnet so it is very visible, so she doesn't have to go and look for it anywhere.

"We have a pictorial plan, we have photos of the asthma medication, so it is very clear for anyone that visits. We provide copies for nanny and koro in case the children go and stay there for weekends. These practical supports are really important, and it just makes it more solutions focused."

The two community nurses take the time to explain how to use a spacer and how to give the medications, and are able to provide spirometry lung function tests – often the only way to ensure patients are on the right medications.

The trusted relationships Davies has formed in the community have led to her working closely with other Wellington campus staff on key research studies involving Māori, in areas including asthma, respiratory health and housing.

For Davies, though, the practical support always comes first.

"From the whānau that we work alongside, I can see there have been reductions in hospitalisations. It might be, too, because we address housing issues, because we know if we don't address some of these other issues nothing is going to change for their whānau. Even if they are on the right medications, if they are still living in a damp, cold house then their hospitalisations are probably going to continue."

Over the past 30 years, Tū Kotahi has provided asthma and respiratory support and education to more than 12,000 whānau.

Davies says the greatest feedback has been from whānau who say Tū Kotahi support has changed their lives.

"Our biggest referrals are still word of mouth, and I am really proud of that because that tells me that whānau are happy with the services and that we have made a difference in their lives."

Cheryl Davies and Professor Mark Weatherall.

Photo: Luke Pilkinton-Ching

FUNDERS: Te Whatu Ora: Health New Zealand

FUNDERS: Health Research Council

Sharing knowledge through play

Researchers at Otago's Wellington campus are part of a world-first, Indigenous-led collaboration to improve holistic wellbeing for Indigenous children and their families through play.

The Indigenous groups involved in the project share the view that play is an intergenerational activity which is used to share knowledge.

Photo: Te Hou Ora Whānau Services/ Isabella Harrex Photography

IMPACT:

AOTEAROA NEW ZEALAND
AUSTRALIA
CANADA
UNITED STATES

The researchers from the Eru Pōmare Māori Health Research Centre are working with Indigenous partners from the United States, Canada and Australia on the LEGO SPIRIT (Supporting Play and Intergenerational Relationships with Indigenous Tradition) project led by the Johns Hopkins Center for Indigenous Health.

It is the first time Indigenous groups have been able to work together on wellbeing for Indigenous children and families through play on such a global scale. The project is being funded by a US$28 million (NZ$43 million) five-year grant from the LEGO Foundation Build a World of Play Challenge.

The New Zealand arm of the collaboration is led by Otago Associate Professor Paula Thérèse Toko King (Te Aupōuri, Te Rarawa, Ngāpuhi, Ngāti Whātua, Waikato Tainui, Ngāti Maniapoto).

Since the project began in January last year, she and fellow researchers from Aotearoa New Zealand have been travelling to annual hui with their international research partners, visiting the Navajo Nation in 2023 and the Batchelor Institute of Indigenous Tertiary Education in Mparntwe Alice Springs in August this year.

King says the indigenous groups share the view that play is an intergenerational activity which is used to share knowledge, whether it is knowledge about language, the environment, ancestral histories, gardening or about keeping well.

It is quite a contrast with the western view of play as a sporting endeavour, or as something which is just for children.

"Tākaro (play) is very nature based, so the resources come from nature, and you participate in tākaro within the environment," she says. "It really is across the board and encompasses weaving, waiata, carving and taonga puoro (Māori musical instruments). It makes it a great space to be in, because you have access to so much Māori knowledge."

At the Eru Pōmare Māori Health Research Centre, the rangahau (research) is focused on four questions related to te ao tākaro (the world of play): examining the function of tākaro in te ao tawhito (the ancient world); the relationship between tākaro and hauora in te ao tawhito and in te ao hurihuri (the contemporary world); how tākaro supports the intergenerational transmission of mātauranga Māori (Māori knowledge); and how tākaro can support the intergenerational transmission of mātauranga Māori to improve hauora for mokopuna and whānau Māori.

Their focus is to fill in the gaps in the knowledge base, King says.

"We know there is a link between tākaro and wellbeing, but it is providing the evidence for that, and that is what is needed to advocate for local and central government policies that do put Indigenous play forward.

"We want to embed this knowledge in the evidence base. We very much believe that tākaro should be a way of life. It is a way of bringing together all aspects of mātauranga Māori for children and families."

Associate Professor Paula Thérèse Toko King

We see Kaupapa Māori rangahau as having an important role in this space."

Lead kairangahau (researcher) Marama Cole (Ngāti Porou, Ngāti Kahungunu) points out the kōhanga reo (language nest) movement offers a great example of using play for language learning, and has increased awareness around how much better whānau and tamariki do when they have their language.

The global SPIRIT project has been designed to be flexible enough for each of the international partners to develop projects depending on the needs of their communities.

King says their Aboriginal and Torres Strait Islander partners are focusing on language renaissance, and are drawing inspiration from the kōhanga reo movement.

"They have more than 250 languages and our partners have shared with us that quite often only one living elder left out of their tribe holds the knowledge of their language, so they will be using play as a way of reclaiming their language."

In Aotearoa New Zealand, the Eru Pōmare Māori Health Research Centre is working with three local partners, Tū Kotahi at Kōkiri Marae and Wainuiomata Marae in the Hutt Valley, Toi Matarua Indigenous Rangatahi Research in Napier and Te Hou Ora Whānau Services in Dunedin. All three partners will also focus their work according to local community priorities.

For Tū Kotahi, the project has provided the opportunity to develop an Indigenous play space at the community-based Wainuiomata Marae. The hope is that their work can be used as a model for other marae to follow on from, or adapt, for their own needs.

It fits with the Tuakana-Teina approach to the project, where knowledge is shared between the Tuakana (older sibling) and the Teina (younger sibling), and vice versa, with all the partners considered both Tuakana and Teina, King says.

The New Zealand group has learnt much from working with Indigenous peoples from across the globe.

Cole says genuine, deep relationships are building between the partners, and have been since they first met on Navajo Nation land.

"I haven't experienced that 'straight in at the heart' level of closeness before."

King says the groups have a lot in common, including a deep connection with the land and societal values which place the child at the centre of the whānau.

One of the most striking differences has been the contrast between the relatively recent history of the Māori people, and the 70,000 year-long history of Aboriginal and Torres Strait Islander people in Australia.

"In Aotearoa, we talk about tākaro as a way of ensuring that our whānau, our generations, will continue as Māori for the next 1,000 years. The Australians have said, 'for us, it will be for the next 30,000 years'."

One of the Eru Pōmare Māori Health Centre's roles is to assist with the cross-site evaluation for the project, as well as to support local partners in Aotearoa New Zealand with their evaluations as they need.

"We are the first Indigenous collective that LEGO has invested in, so a big part of the evaluation is about how we work together. We can learn from the cultural exchange, about how others are knowing, being, doing and relating on their own whenua (lands)."

The Eru Pōmare Māori Health Research Centre team is working towards Indigenising the research process too, focusing on Indigenous evaluation processes, and Indigenous theories of change and research methodologies.

The knowledge that comes from the project will be shared in different ways, including in research papers in academic journals, via podcasts, zines, art and design artefacts. King says this opens up the opportunities for other Indigenous communities to see the research and other work that everyone is doing, giving their work a global reach.

"We want to embed this knowledge in the evidence base. We very much believe that tākaro should be a way of life. It is a way of bringing together all aspects of mātauranga Māori for children and families."

The Aotearoa New Zealand team has a list of outcomes to achieve by the end of the five-year project, including a shift on the part of local councils and central government towards a recognition of the importance of tākaro for wellbeing. They also aim to continue their conversations with overseas philanthropic networks, to ensure Indigenous communities locally and internationally can sustain an Indigenous play renaissance.

But all of the Indigenous partners envisage the work continuing far beyond the fixed term of the project.

"One of the biggest things we've all learnt is that to do things with integrity, and honour the whakapapa of the project, it needs to work outside the time frame of five years," King says.

"We are thinking of this as a forever project."

4 countries

22 current partners

5 Global Council members per country

5 years of project funding

Goal of **20,000** children and **12,000** caregivers to be served

Associate Professor Paula Thérèse Toko King:
"*We know there is a link between tākaro and wellbeing, but it is providing the evidence for that, and that is what is needed to advocate for local and central government policies that do put Indigenous play forward.*"

Photo: Luke Pilkinton-Ching

FUNDERS: LEGO Foundation

University of Otago

2024 Research awards

Photo: Alan Dove

2024 DISTINGUISHED RESEARCH MEDAL
PROFESSOR JOHN CRUMP

Global health everyone's concern

Otago global health expert Professor John Crump thinks big and would like others to do the same.

Crump is the 2024 recipient of the University's top research honour – the Distinguished Research Medal. He wants people to look outside of their own countries and conditions to tackle global challenges together.

"In global health, all humans have equal value. This means local obligations often linked to being members of a family, ethnic or religious group, or a nation, should not crowd out our responsibilities to distant others," he says.

Professor of Medicine, Pathology, and Global Health, Crump is a global expert on infectious diseases. He is a leadership group member of the Otago Global Health Institute (OGHI), one of the University's 12 research centres, and served as its inaugural co-director. He is also co-director of Otago's Centre for International Health. See pages 74 to 77 for more on the OGHI.

Crump is considered the leading global authority on non-malaria fever in the tropics, and is highly respected for his world-class research and mentoring of early career scientists – especially in low- and middle-income countries.

Colleagues say his work has led to major changes in global health policy and practice, improving the lives of millions of people.

Crump, who has worked in his field for close to 30 years, says receiving the Distinguished Research Medal reaffirms that global health is important to the University of Otago.

"I hope that it reflects a recommitment to that way of working, collaboratively across disciplines and cultures with a vision for a world where health problems are solved by those who are most affected by them, regardless of their citizenship.

"Our partners and students are the basis of our global health contributions and should rightly share in any recognition."

Crump says a global health mindset is a cosmopolitan one. This means people are the objects of moral concern, irrespective of who they are or where they live. This concern extends to everyone and is not restricted to compatriots or regional neighbours.

Aotearoa New Zealand is not always an easy base from which to work in global health as it is particularly focused on domestic health concerns, and global health tends to hit the headlines only when there is a perceived threat to the health of New Zealanders. By contrast, global health work seeks reciprocal benefit rather than self-interest.

"If we want to solve the really big, complicated issues like pandemics, poverty and environmental problems we need to be exchanging ideas and working together globally."

Crump graduated MB ChB and MD from Otago and trained in both infectious diseases and medical microbiology in Aotearoa New Zealand, the United Kingdom, South Africa, Australia and the United States. He worked for a decade in Tanzania where he continues a partnership with local researchers.

Crump has won numerous prestigious awards, including the 2012 American Society of Tropical Medicine and Hygiene's Bailey K. Ashford Medal for distinguished work in tropical medicine and the 2022 Chalmers Medal from the Royal Society of Tropical Medicine and Hygiene. He is the only New Zealander to have received either medal.

A frequently cited author, Crump has published more than 300 scientific manuscripts and has leadership and advisory roles for institutions such as the World Health Organization.

2024 ROWHEATH TRUST AWARD AND CARL SMITH MEDAL
ASSOCIATE PROFESSOR ANNA HIGH

Legal scholar wins top early career award

"Groundbreaking" and "brave": words used to describe the work of legal scholar Associate Professor Anna High in her successful nomination for the 2024 Rowheath Trust Award and Carl Smith Medal.

The annual Otago award recognises early-career research staff who demonstrate outstanding scholarly achievement that enhances the understanding, development and wellbeing of individuals and society.

Since joining Otago's Faculty of Law in late 2017, High has established herself as an expert in evidence law, criminal law, feminist theory/sexual violence, Chinese law and socio-legal research methods.

"What links my research is an interest in vulnerable populations, how the law can often let certain people down, and how it can be reformed in a way to redress that," High says.

In her socio-legal fieldwork in China she looked at quasi-legal orphanages, including how they negotiated their existence with the state and the implications of this for the children in their care. In sexual violation law, she says there is a history of laws that are very gendered in terms of their impact on women and sexual minorities. She is interested in how we can move toward a more updated conception of consent and the power for legal reform to contribute to societal changes.

A distinguishing feature of her research is its impact on law outside the academy. In 2023, she was a member of the New Zealand Law Commisson's Expert Advisory Group on its Third Review of the Evidence Act 2006, a key piece of legislation governing the admissibility of evidence in New Zealand civil and criminal trials. She is also active in continuing professional education for lawyers. Additionally, she is a co-founder of the Aotearoa New Zealand Mindfulness in Law Society.

High's research has been recognised at a national level, with a 2022 Royal Society Te Apārangi early career research award for excellence in Humanities research.

Her teaching is also strongly research-led, and an area where she also excels, winning a Te Whatu Kairangi Aotearoa Tertiary Education Award last year for her initiatives for progressing hauora and wellbeing in education.

High says she is honoured to receive the University's 2024 Rowheath Trust Award and Carl Smith Medal, especially looking at the list of incredible past recipients.

"I'm excited to use the award funds to pursue various research interests, including gender equality, mindful pedagogy and evidentiary reforms."

Photo: Graham Warman

2024 EARLY CAREER RESEARCH AWARDS FOR DISTINCTION IN RESEARCH

Six early career researchers from across Otago's campuses were rewarded in 2024 for their commitment to research excellence, leadership in their fields and engagement with their communities.

Dr Jude Ball
(Department of Public Health, Wellington)

Since embarking on her doctoral studies in 2016, Dr Ball has rapidly built a national and international research profile in youth public health research and has shown exceptional leadership in this field. Her award-winning research has attracted international recognition and has informed policy development and practice in Aotearoa New Zealand.

Dr Olivia Harrison
(Department of Psychology)

Dr Harrison is a neuroscientist based in the Department of Psychology, having returned to Aotearoa New Zealand on a Rutherford Discovery Fellowship in 2020. Her research investigates mental health with a focus on anxiety. The prevalence of anxiety is sharply rising as we all experience the repercussions of the global COVID-19 pandemic, and Dr Harrison's research aims to help patients, clinicians, friends and whānau to better understand and manage anxiety.

Dr Daniel Pletzer
(Department of Microbiology & Immunology)

Dr Pletzer is at the forefront of addressing pressing health challenges through multidisciplinary research endeavours. His research spans diverse areas of molecular microbiology, immunology, animal research and bioinformatics, with a primary focus on combating antimicrobial resistance and discovering novel drug therapies for infectious diseases.

Dr Rose Crossin
(Department of Population Health, Christchurch)

Dr Crossin's research specialty is the public health aspects of drugs and alcohol. Her work aims to quantify drug and alcohol harms, identify social and structural determinants of drug harm, and measure the impacts of drug policy.

Dr Nathan Kenny
(Department of Biochemistry)

Dr Kenny moved to Otago as a Rutherford Discovery Fellow in 2021 and has quickly established a research niche at the intersection of comparative genomics and evolutionary biology, often working alongside hapori Māori. His current research focus is the molecular origins of resilience to the effects of climate change in the green-lipped mussel, *Perna canaliculus*.

Dr Andrew Reynolds
(Department of Medicine)

Dr Reynolds is a nutrition epidemiologist working with achievable lifestyle and environment change in the prevention and management of non-communicable diseases. Much of his work aims to inform evidence-based guidelines, policy and lifestyle change.

MĀORI AND PACIFIC AWARDS

A further three early career researchers were recognised with early career awards for Māori and Pacific kaimahi. These awards were introduced in 2023 to celebrate distinction in research undertaken by Māori and Pacific researchers as they develop their careers, which in many cases involves significant active and positive engagement with communities. The term *Tofā Sāili*, gifted for Otago's Pacific Early Career Awards, refers to the wisdom gained through the constant search for truth.

2024 MĀORI EARLY CAREER AWARDS FOR DISTINCTION IN RESEARCH

Dr Amanda Clifford
(Kāi Tahu, Waitaha, Kāti Māmoe) (Department of Psychology)

Dr Clifford's PhD explored how parents and educators teach about socio-emotional concepts important to mental health. Post-PhD, her research focus has extended to how kaupapa Māori and qualitative research approaches can help us address mental health inequities and also promote positive wellbeing and flourishing for ngā iwi katoa in Aotearoa New Zealand. She also has a specific focus on meeting the needs of Māori communities and maternal mental health.

Dr Amber Young
(Taranaki) (School of Pharmacy)

Dr Young's research focuses on health equity and vaccination coverage, investigating ways to increase immunisation uptake in pēpi, tamariki, and tangata hapū. Dr Young's other research interests include improving peoples' understanding about their medicines and medicines' accessibility. Her research projects all have a strong emphasis on health equity and Māori health.

2024 TOFĀ SĀILI PACIFIC EARLY CAREER AWARD FOR DISTINCTION IN RESEARCH

Dr Emma Powell
(Te Tumu: School of Māori, Pacific and Indigenous Studies)

Dr Powell's current research focuses on Indigenous and Pacific research methodologies in the study of regional histories, citizenship and nationhood and Indigenous futurities. She also works on collaborative projects that explore Cook Islands language varieties, nationhood and history. In her nomination, Dr Powell is described as someone who epitomises an outstanding, yet grounded, early career Pacific researcher who has demonstrated excellence in her research activities.

2024 RESEARCH GROUP AWARD

PHAGE-HOST INTERACTIONS (PHI) LABORATORY

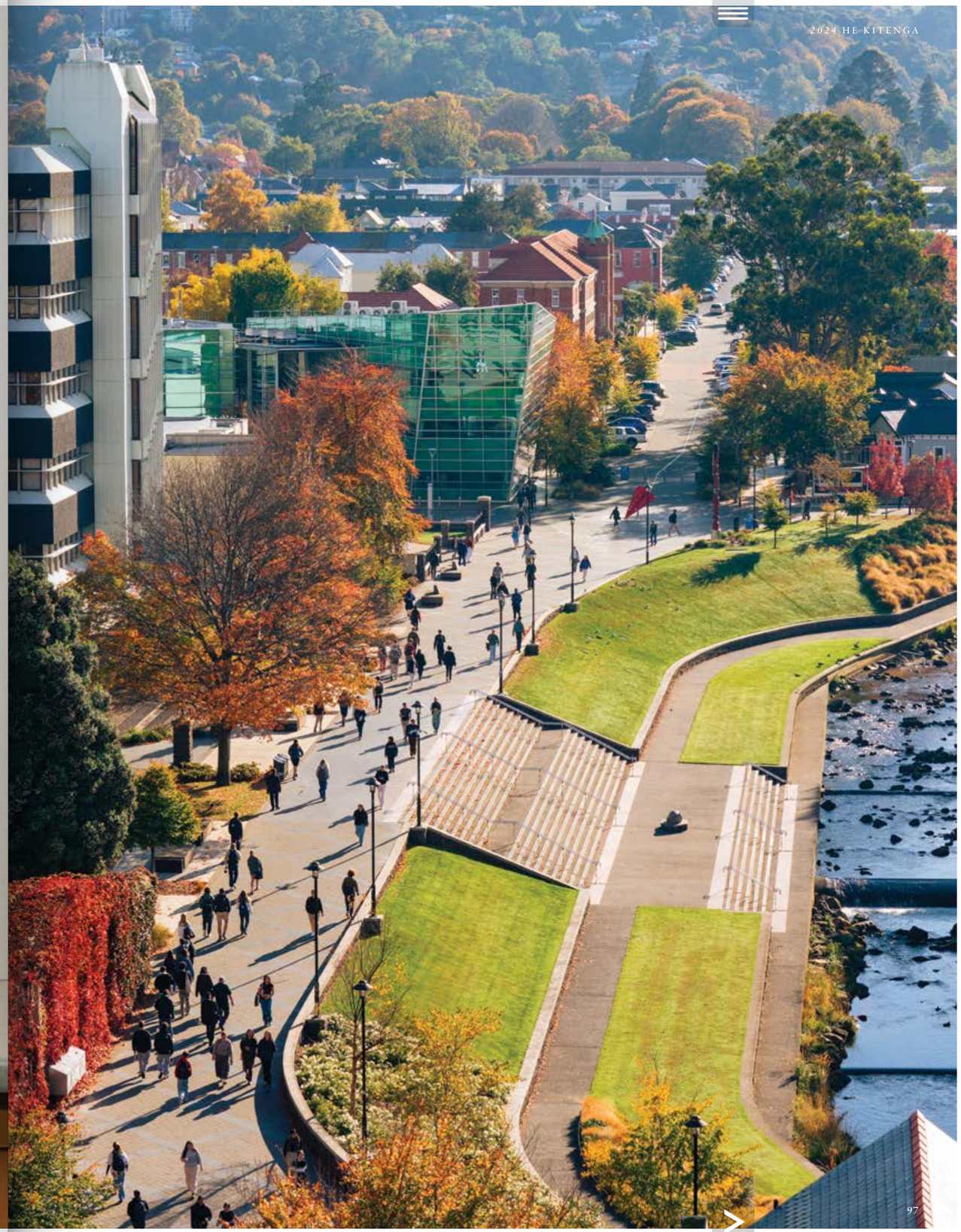
*(Led by **Professor Peter Fineran**, Department of Microbiology and Immunology)*

The Phage-host interactions (Phi) research group has made world-leading discoveries that enhance the understanding of phages and their interactions with bacteria.

Phages are viruses that infect and specifically kill bacteria. A major strength of the group that underlies its success is its interdisciplinary and complementary skills and its collaborative approach.

The Phi lab currently has 18 researchers, led by Professor Peter Fineran, and their expertise spans genetics, microbiology, biochemistry, structural biology, bioinformatics, high-throughput screens and surface chemistry. See pages 32 - 33 for more on the group's work.

Photo: Alan Dove



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University of Otago Campuses:

Dunedin

Main Campus

Undergraduate and postgraduate programmes

- Humanities
- Sciences
- Commerce (Business School)
- Health Sciences

Research and clinical training

Centre for Innovation

Administration

Wellington

University of Otago, Wellington

Research and clinical training

Postgraduate programmes

Christchurch

University of Otago, Christchurch

Research and clinical training

Postgraduate programmes

Invercargill

Southland Campus

University of Otago
College of Education

Auckland

Auckland Centre, University of Otago House

External Engagement

Research and Enterprise

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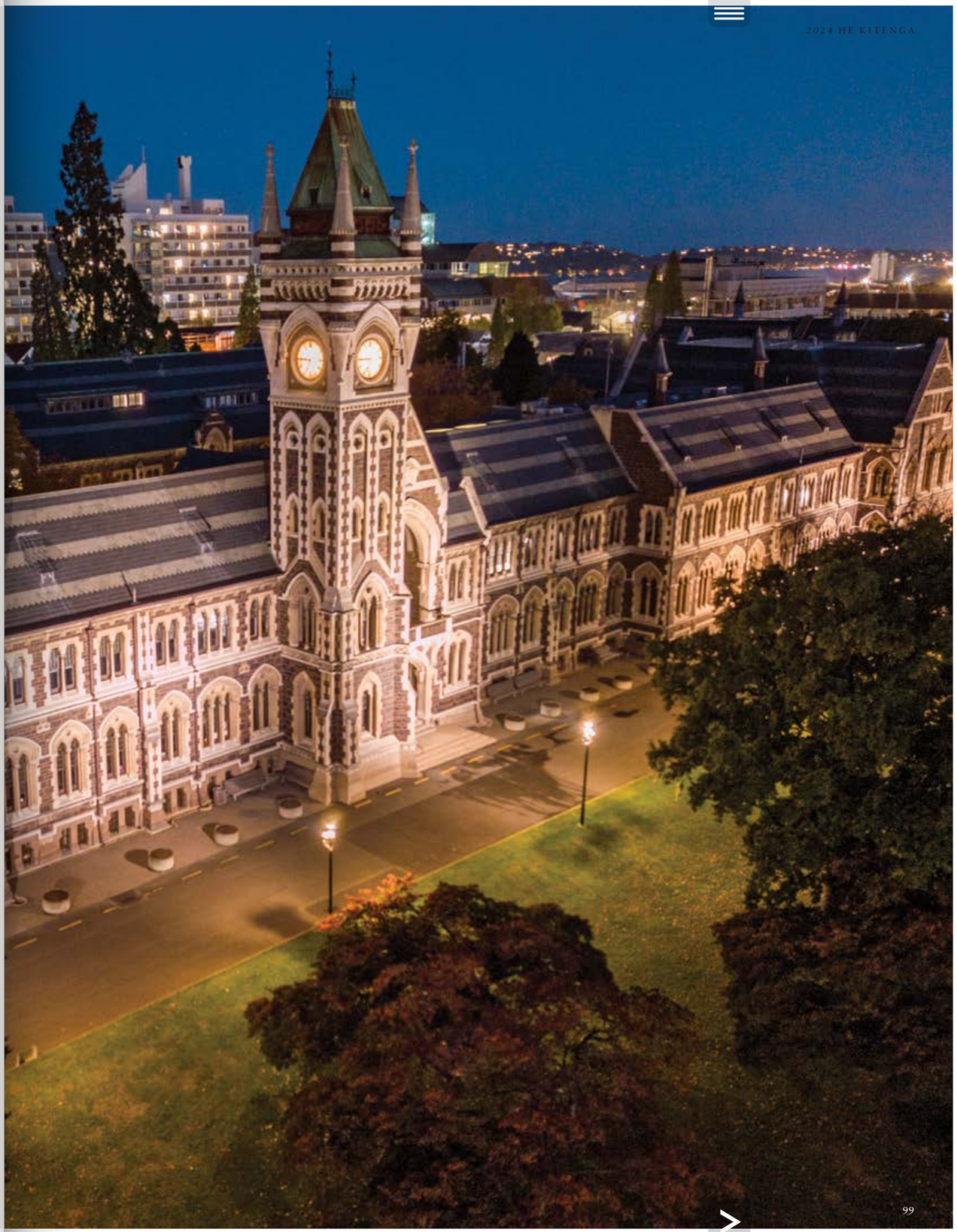

***He Kitenga* was published by the University of Otago, November 2024.**

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