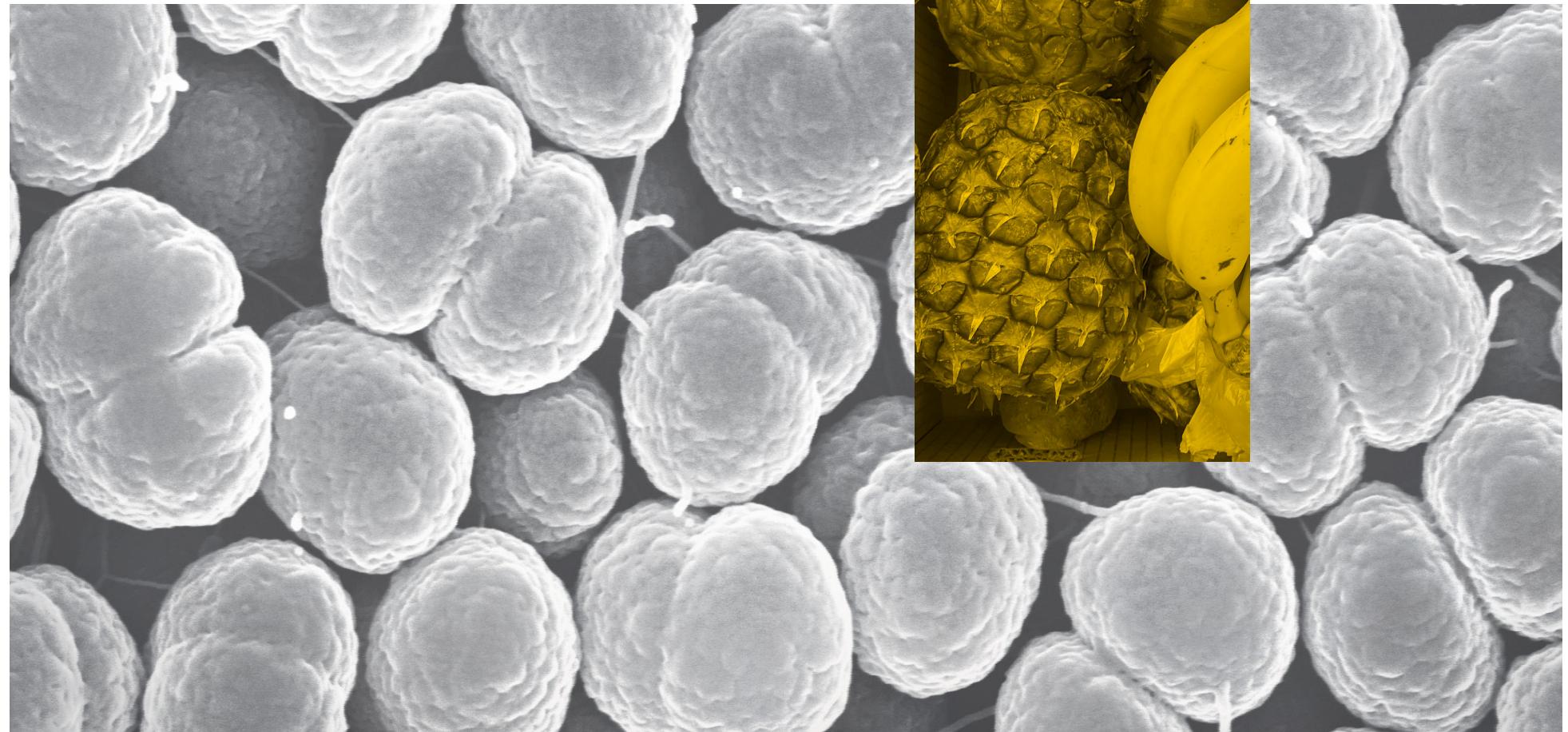


ANNUAL REPORT 2022

Mahi Tahi 4

Office of the Prime Minister's Chief Science Advisor
Kaitohutohu Mātanga Pūtaiao Matua ki te Pirimia



Ngā kai a Matariki nana i ao ake ki
runga

TE KARERE A TE PIRIMIA

Opening remarks

From the Rt Hon Jacinda Ardern

COVID-19 is still creating challenges and conundrums. Juliet and the team of Chief Science Advisors continue to provide invaluable advice to inform and test the Government's thinking and responses. They've been active in connecting ministers and government agencies to developments in science and knowledge here and abroad, and linking us to other science networks.

As I noted last year, it's been through the efforts of the global scientific community that key tools in the fight against COVID – such as vaccines – have been developed. So it is important that our scientists and science communicators have the networks and the opportunities to discuss, debate and collaborate with international peers and colleagues.

While COVID may seem to dominate everyday discussions and debates, research, science and innovation are core to other parts of the Government's programme as well.

The Prime Minister introducing the Office's report *Kotahitanga: Uniting Aotearoa against infectious disease and antimicrobial resistance* in March 2022



As this year's Annual Report from Juliet shows, scientists and science communicators remain at the forefront of a range of issues that impact our communities and our collective wellbeing. The project on food waste is one that I am particularly interested in, and I am really looking forward to

Scientists and science communicators remain at the forefront of a range of issues that impact our communities and our collective wellbeing.

reading further reports from this project. As Juliet's initial report on food waste shows, it's a great example of a challenge where success can deliver environmental, social, and economic benefits for Aotearoa New Zealand.

The intern and fellowship programme continues to impress with the breadth and inventiveness of their research topics and methodologies. A big focus for the science system and for Juliet has been on increasing diversity, equity and inclusion in science. A tangible and welcome step was Juliet and her Australian counterpart, Dr Cathy Foley AO PSM, witnessing the Indigenous Trans-Tasman Strategic Alliance Agreement on Science & Innovation. Finally, thank you Juliet and all of our science community for your contributions over the past year. I think the value of greater connections between science and policy making is evident to all.

**Rt Hon Jacinda Ardern
Prime Minister**

Contents

Message from the Prime Minister.....	1	Internship and fellowship programme.....	26
Contents	2	Holistic ecosystem management.....	30
Foreword	4	Tairāwhiti Internships.....	32
The year in numbers	6	Knowledge sharing between academics and policymakers	34
Who we are: The team	8	Increasing research impact: an open access revolution.....	35
Who we are: Chief Science Advisor Forum	10	Out and about	36
Responding to the eruption of Hunga Tonga-Hunga Ha'apai.....	12	Finances 2021–2022	40
COVID-19 reponse.....	14		
Building a science system fit for the future.....	16		
Kotahitanga: Uniting Aotearoa against infectious disease and antimicrobial resistance	18	Right: A garden on a Waiheke vineyard fuelled by compost produced from local food waste by the Waiheke Resources Trust.	
Combatting food waste	20	Cover Images: Food rescued by Kiwiharvest ready to go to a recipient, colourised scanning electron micrograph of <i>Neisseria gonorrhoeae</i> bacteria	
Nitrates in drinking water	22	Image credit: National Institute of Allergy and Infectious Diseases, National Institutes of Health/Flickr (CC by - NC 2.0).	
Tackling rheumatic fever.....	24		

Right: A garden on a Waiheke vineyard fuelled by compost produced from local food waste by the Waiheke Resources Trust.

Cover Images: Food rescued by Kiwiharvest ready to go to a recipient, colourised scanning electron micrograph of *Neisseria gonorrhoeae* bacteria
Image credit: National Institute of Allergy and Infectious Diseases, National Institutes of Health/Flickr (CC by - NC 2.0).

Page 7 bottom right image: Credit NZISF/
Alex Lovell-Smith



FOREWORD

Ka mua, ka muri

Looking back at her fourth year as Kaitohutohu Mātanga Pūtaiao Matua ki te Pirimia, Juliet reflects on the past year of science advice, evidence, communication and conversation.

Tēnā koutou katoa, ngā mihi o te wā ki a tātou.

Ahakoa ngā ārai, ahakoa ngā aupiki me ngā auheke, mā te āta wānanga me te mahi tahi e whai rongoā, e whai rautaki kia anga whakamua ai tātou katoa.

Kei te ao hurihuri tātou e noho nei engari mā te titiro ki ngā rā o mua me ngā kōrero o nehe, kei reira kitea ai he oranga mō tātou.

Nā reira, anei ētahi pitopito kōrero.

My fourth year in the role has once again been dominated by the pandemic. First Delta, and then Omicron, made sure that COVID-19 has remained a focus for our science advisory community across the motu, with vaccines and variants driving changes in our pandemic management strategy. Another hat tip to Ian Town, who continues to provide advice to the Ministry of Health in an ever-changing landscape. It also meant that we were



Above: The Prime Minister and Juliet visiting scientists at the University of Auckland.

locked down again for much of the year – I'd like to acknowledge the OPMCSA team for soldiering on, managing to engage with experts and stakeholders remotely and still deliver reports on time while working in their PJs at home.

The circumstances at least provided a very apt backdrop for our major project for 2021, Kotahitanga: Uniting Aotearoa against infectious disease and antimicrobial resistance, which we had the pleasure of launching virtually at the start of 2022, along with our expert panel. A huge thanks to them for prioritising this work in a challenging year. The recommendations are currently sitting with the Antimicrobial Resistance Cross-Government Governance Group, and it was encouraging to see funding for antibiotic resistance in food systems in this year's budget. We have also been heartened to see progress on the recommendations from our previous reports on plastics and fisheries.

As in past years, this report reflects the work



The new members of the CSA Forum.

From left:

Chris Daughney | Chief Science Advisor | The Regional and Unitary Councils Aotearoa.

Tom Wilson | Chief Science Advisor | National Emergency Management Agency.

Rodney Scott | Chief Policy Advisor and Chief Science Advisor | Public Service Commission.

Erica Gregory | Chief Mātauranga Advisor | Environmental Protection Agency.

of many. Now in my second term, I continue to work to connect the Chief Science Advisor (CSA) Forum and academic and policy communities, and am grateful to everyone who has contributed to the formation of evidence-based policy in Aotearoa. This year, we were delighted to welcome four new members of the CSA Forum in new roles. Erica Gregory, from the Environmental Protection Agency, joined us as Chief Mātauranga Advisor; Chris Daughney joined as the inaugural CSA to Te Uru Kahika, the Regional and Unitary Councils Aotearoa; Rodney Scott joined as the newly appointed CSA to the Public Services Commission; and Tom Wilson took up the newly created position on CSA to the National Emergency Management Agency. These are exciting developments, and I'm looking forward to working with all of them in the coming years.

We also enjoyed hosting more fellows and interns this year, despite the challenges of working remotely,

and are delighted to highlight some of their work in this report.

Our major project for 2022 tackles food waste, and is well underway. Combatting food waste has scope to deliver social, environmental and economic wins for Aotearoa, so in the months ahead we'll be digging into the evidence base and engaging with the country's many experts and stakeholders to understand how to minimise food surplus in the first instance, and ensure that any remaining food is used to maximum possible benefit, respecting the food recovery hierarchy and principles of a more circular food system. A big thank you to the enthusiastic experts and stakeholders who are supporting this mahi.

We will also be undertaking several smaller projects, including another in our series of webpages aimed at providing balanced information to the public on contentious topics, this time on nitrates. More on that later in the report.

I'm also excited to be back in a multitude of kanohi ki te kanohi meetings and conferences which have reappeared in my diary with a vengeance, largely thanks to the role played by vaccines (and vaccinators!) in reducing the impacts of COVID-19. I've missed these connections: I'm enjoying opportunities to once again gather in-person, and am looking forward to extending this to meeting with overseas colleagues soon.

Ngā manaakitanga,

Juliet

IN BRIEF

The year in numbers



20.6k
followers



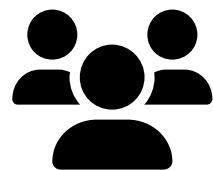
5.4k
followers



60k+
unique web visitors



19 +
media interviews



11
interns and fellows



32
vaccinations
in our team



15
blog posts



32+
talks and presentations



WHO WE ARE

The team

Te amorangi ki mua, te hapai o ki muri.

The Prime Minister's Chief Science Advisor (PMCSA) advises the Prime Minister on scientific evidence, acts as a conduit between the research community and government, and engages in activities to raise the profile of science in Aotearoa New Zealand. The Office, based at the University of Auckland, is non-partisan and independent of government, working to create a trusted bridge between science, society and government.

Juliet is supported by a team of analysts and advisors. Last year the team said haere rā to Ellen Rykers and Dr Rachel Chiaroni-Clarke and welcomed Emily McCarthy, Colson Verdonk, and Dr Emma Brown.

Read more about the team:

pmcsa.ac.nz/who-we-are/our-office



Professor Dame Juliet Gerrard DNZM FRSNZ HonFRSC started her second term as the Prime Minister's Chief Science Advisor in July 2021. COVID-19 has remained a focus, with Juliet connecting experts and decision makers to ensure Aotearoa's COVID-19 response is supported by the best available evidence. Guided by the principles of rigour, inclusivity, transparency and accessibility, she has continued to convene the cross-agency CSA Forum and spent much of 2021 working with a panel of experts on a report about infectious disease and antimicrobial resistance. Juliet is also a Professor at the University of Auckland.



Dr Susie Meade is Juliet's principal advisor. With a PhD in Chemistry, more than 20 years' experience in research and management, a true passion for science, and an eye for detail, Susie is crucial to our mahi. She plays a key role in running the CSA Forum and has become expert at facilitating Zoom meetings during the course of the pandemic. Susie splits her time between Tāmaki Makaurau Auckland, Te Whanganui-a-Tara Wellington and Ōtautahi Christchurch.



Dr George Slim, is a consultant with the Office. With over 30 years' experience in academia, government, small business and the public research sector, George is fluent in Academic, Bureaucrat and Commercial, and an able translator between them. This past year has seen George support our interns, contribute to the Office's COVID-19 work, and keep us connected to folks in the capital from his base in Te Whanganui-a-Tara Wellington.



Emily McCarthy is a senior research and policy analyst. She joined the team as we worked to get the infectious disease and antimicrobial resistance report across the line, with her efforts helping it all come together. She has an academic background in cell pathology and politics and worked for the Department of the Prime Minister and Cabinet (DPMC) prior to joining Juliet's team, giving her the experience and insights needed to build connections between researchers and policymakers.



Dr Emma Brown (Ngāpuhi, Ngāti Maru, Ngāti Pūkenga, Ngāi Te Rangi) is a research analyst and writer. She completed her BE(Hons) at the University of Auckland in 2013 and went on to work in the steel industry as a process engineer. Emma returned to the University of Auckland in 2017 to complete a PhD in the Chemical and Materials Engineering department, with a specific focus on biological tissue mechanics. While carrying out her PhD studies she was also worked as a Professional Teaching Fellow with a focus on engineering communication, innovation and project management.



Celia Cunningham, a research analyst and writer with the Office, has spread her talents across a wide range of projects this year. She manages our website, creates visual aids to help us communicate science effectively, and was instrumental in the infectious disease and antimicrobial resistance project. Her diverse background in biology, the arts, risk management, and policy makes her an invaluable asset to the team.



Colson Verdonk is a research analyst and writer. Prior to joining the office, he worked as an advisor to a Member of Parliament. He brings a passion for policy, community kōrero, and science communication. Colson has an academic background in environmental science, geography, politics and international relations and social science. In his spare time, Colson is working on a Master of Public Policy at the University of Auckland.

WHO WE ARE

Chief Science Advisor Forum

He Rauhinga Tohu Pūtaiao. Ehara taku toa i te toa takitahi, engari he toa takitini.

The Prime Minister's Chief Science Advisor convenes a forum of Chief Science Advisors from across government departments, ministries and agencies. The Forum, which meets around ten times a year, receives additional support from co-opted members and connects widely with the research community to ensure it can provide comprehensive advice, drawing on an extensive range of expert contacts. Subgroups of the Forum also come together periodically to provide specific advice on cross-sector issues.

This year we said haere rā to Prof. Michael Bunce, Diana Cook, Dr Gill Jolly, Prof. Richie Poulton and Prof Hamish Spencer. We also acknowledge Prof. Ken Hughey and Prof. Tahu Kukutai, who stepped off the Forum on 30 June. In the past year we were pleased to welcome Dr Chris Daughney, Erica Gregory, Dr Rodney Scott, and Prof. Tom Wilson, as well as welcoming back Tim Ng.



Photos: The CSA Forum in May, hosted by the Institute of Geological and Nuclear Sciences Limited (GNS).

Meet the CSA Forum

Professor Dame Juliet Gerrard DNZM FRSNZ HonFRSC – PMCSA, Kaitohutohu Mātanga Pūtaiao Matua ki te Pirimia

Dr Alison Collins – Departmental Chief Science Advisor, Ministry for the Environment | Manatū Mō Te Taiao

Dr Chris Daughney – Chief Science Advisor, Regional and Unitary Councils Aotearoa | Te Uru Kahika

Professor Gary Evans MNZM – Chief Science Advisor, Ministry of Business, Innovation and Employment | Hīkina Whakatutuki

Vince Galvin – Chief Methodologist, Statistics New Zealand | Tatauranga Aotearoa

Erica Gregory (Waikato, Ngāti Maniapoto) – Manahautū, Environmental Protection Agency | Kaupapa Kura Taiao

Professor Ken Hughey – Chief Science Advisor, Department of Conservation | Te Papa Atawhai

Professor Simon Kingham – Chief Science Advisor, Ministry of Transport | Te Manatū Waka

Professor Tahu Kukutai (Ngāti Tiipa, Ngāti Kinohaku, Te Aupōuri) – co-opted CSA forum member, Professor of Demography at the National Institute of Demographic and Economic Analysis | Te Rūnanga Tātari Tatauranga

Professor Ian Lambie ONZM – Chief Science Advisor, Ministry of Justice | Tāhū o te Ture

Professor Tracey McIntosh MNZM (Ngāi Tūhoe) – Chief Science Advisor, Ministry of Social Development | Te Manatū Whakahiato Ora

Professor Stuart McNaughton ONZM – Chief Education Scientific Advisor, Ministry of Education | Te Tāhuhu o Te Mātauranga

Dr Rob Murdoch – Departmental Science Advisor, Ministry of Business, Innovation and Employment | Hīkina Whakatutuki

Tim Ng – Strategic Economic Advisor, The Treasury | Te Tai Ōhanga

Dr John Roche – Chief Science Advisor, Ministry for Primary Industries | Manatū Ahu Matua

Dr Kay Saville-Smith MNZM – Chief Science Advisor, Ministry of Housing and Urban Development | Te Tūāpapa Kura Kāinga

Dr Rodney Scott – Chief Policy Advisor and Chief Science Advisor, Public Service Commission | Te Kawa Mataaho

Hema Sridhar – Chief Advisor Industry and Science, Ministry of Defence | Manatū Kaupapa Waonga

Professor Ian Town FRACP – Chief Science Advisor, Ministry of Health | Manatū Hauora

Professor Tom Wilson – Chief Science Advisor, National Emergency Management Agency | Te Rākau Whakamarumaru

For full bios and more info on the CSA Forum, visit

pmcsa.ac.nz/who-we-are/chief-science-advisor-forum/

WHAT WE DO – CSA FORUM

Responding to the eruption of Hunga Tonga-Hunga Ha'apai

Science advice and collaboration across disciplines was crucial following the eruption of Hunga Tonga-Hunga Ha'apai in January 2022.

When Hunga Tonga-Hunga Ha'apai began to erupt on 20 December 2021, GNS Natural Hazards and Risks theme leader, Dr Gill Jolly, was reminded of the same volcano's activity eight years prior. Back in 2014–15, the hulking underwater volcano in the Southwest Pacific spent a few months erupting in a relatively controlled manner, with gradually surfacing magma giving rise to new land that connected two previously separated islands into one crescent-shaped island.

But three weeks after the 2021–22 eruption began, volcanologists and tsunami scientists were forced to throw their textbooks aside when two “incredibly explosive” eruptions in mid-January obliterated much of the island. Gill was one of the experts on call as ash billowed into the air, reaching heights at least three times greater than the cruising altitude of a jet plane and leaving Tonga's landscape looking like a black-and-white photograph. The

eruption, the world's most explosive in 30 years, generated tsunami waves that crashed onto Tonga's coastlines, obliterating infrastructure and killing at

least four people. Unusual swells triggered warnings and caused coastal damage in Aotearoa and even reached places as far afield as Japan, the US, and





Peru, where two swimmers were killed by large waves. “Both the tsunami and volcano communities were gobsmacked,” says Gill.

Tsunamis are normally triggered by earthquakes, so most modelling and response systems are set up to calculate trajectories based on parameters like earthquake magnitude and epicentre. As the unusual character of the event became clear, experts in Aotearoa worked together across disciplines to understand what was going on and the immediate threats to Aotearoa and the Pacific. Volcano experts were quickly invited to join the Tsunami Expert Panel meetings, and the Ministry of Foreign Affairs and Trade helped to establish a connection between experts here and in Tonga to allow the flow of science information and advice despite the damage to Tonga’s undersea communication cable caused by the force of the eruption.

Tropical Cyclone Cody added extra challenges, damaging tidal gauges and making it hard to isolate storm signals from tsunami signals in data analysis. The confluence of a cyclone, eruption, and tsunami, all in the context of a global pandemic that had to be factored in when facilitating aid, was a clear reminder that disasters rarely play out in silos: collaboration between disciplines is key.

There’s still plenty about the eruption that remains to be understood, from why it was so violent, to the mechanisms underlying the tsunami swells that followed. Upon receiving ash samples gathered by the New Zealand Defence Force, scientists started working late in labs throughout the country to decode the stories hidden in the magma. “When we’re doing this kind of research,” Gill says, “it’s to understand the physical mechanisms for this kind of event and to understand the risk going forward.” By

studying natural disasters of the past, we can walk into the future with more knowledge and readiness.

Read more about the eruption in a New Zealand Geographic article written by former team member Ellen Rykers:

nzgeo.com/stories/the-island-that-blew-up/

Above: Image of the ash from the eruption taken from the International Space Station. Photo credit: NASA.

Previous page: The team at National Crisis Management Centre during the response to the eruption.

WHAT WE DO - CSA Forum

COVID-19 response

In our third year with COVID-19, decision makers in Aotearoa continue to have a need for the latest scientific evidence, keeping experts throughout the country as busy as ever.

With the arrival of Delta and Omicron variants on our shores and the rollout of highly effective COVID-19 vaccines, Aotearoa has shifted from an elimination strategy to a mitigation strategy, heralding a new phase of pandemic management. The majority of New Zealanders have been vaccinated, boosted and taken public health guidelines to heart, reducing the impacts of COVID-19 despite the presence of the virus in the community. At the time of writing over 1600 lives have been lost to COVID-19 and, while each one is a tragedy, our cumulative fatality rate remains one of the lowest in the world thanks to maintaining our elimination strategy until the bulk of the population was vaccinated.

As CSA to the Ministry of Health, Professor Ian Town has continued to inform government decision-making, supported by Juliet, the wider CSA Forum, and countless experts from throughout Aotearoa within formal and informal

The vaccination effort has been monumental: never before has Aotearoa rolled out so many vaccines in such a short period of time. Super Saturday in October 2021 saw over 130,000 doses administered in a single day.

advisory groups. This supported the government's efforts to suppress Delta and mitigate the impact of Omicron.

Modellers like Professor Michael Plank and the Te Pūnaha Matatini team helped decision makers and the public explore the range of possible scenarios and relevant variables in the face of Delta and Omicron. Experts like ESR's Professor Mike Bunce and Dr Jemma Geoghegan worked to understand the new variants by analysing their genetic signatures before they reached our shores.



And a large group of scientists and public health experts, convened by Juliet and Ian, reviewed a draft of the Traffic Light System in October last year, emphasising the need to ensure high vaccination coverage ahead of moving to the system.

The vaccination effort has been monumental: never before has Aotearoa rolled out so many vaccines in such a short period of time. Super Saturday in October 2021 saw over 130,000 doses administered in a single day. Ngā mihi nui to everyone involved, from the vaccinators and organisers to the New Zealanders who rolled up their sleeves to be vaccinated. It's been a remarkable effort. Globally, vaccination coverage remains patchy. With widespread transmission in under-vaccinated populations representing fertile ground for the emergence of new variants, it's important to remember that we're not safe until everybody's safe.

In addition to vaccines and variants changing the game over the last 12 months, rapid antigen



tests and antivirals have been added to Aotearoa's pandemic management toolbox, border measures have been carefully relaxed, and isolation and quarantine periods and conditions have been adjusted.

There's undoubtedly more change on the horizon, which means more mahi ensuring the government is up-to-date with the latest evidence. From analysing misinformation narratives, to tracking the efficacy of vaccines over time, to keeping an eye out for the emergence of new variants, to studying long COVID, Aotearoa's COVID-19 experts will have

plenty on their plates in the year ahead.
Explore our COVID-19 content:

pmcsa.ac.nz/topics/covid-19



Above left: Behind the scenes of VAX THE NATION, a rap video by Dr J. & Randa which starred Juliet along with, Associate Professor Siouxsie Wiles.

Above right: Behind the scenes shot of Professor Shaun Hendy giving a briefing alongside the Prime Minister and Dr Ashley Bloomfield at the Beehive theaterette.

Previous page: Professor Ian Town, Chief Science Advisor | Ministry of Health.

WHAT WE DO - CSA Forum

Building a science system fit for the future

In October 2021, the Ministry of Business, Innovation and Employment (MBIE) launched their long-heralded Te Ara Paerangi Green Paper to start discussions on redesigning Aotearoa New Zealand's research, science and innovation (RSI) system to make it fit for the future.

Our MBIE CSA, Professor Gary Evans, has had a busy year advising on this major project, supported by Dr Rob Murdoch, Professor David Hutchinson and the wider CSA Forum. The last major restructure of research institutions in Aotearoa was in the early 1990s, with the formation of the Crown Research Institutes from the Department of Scientific and Industrial Research and other government department research organisations. Since then, there have been significant changes in the types of research receiving government funding, how the funding is administered, and by whom. Changes have included providing government funding to private industry, initiation of the Marsden Fund for blue-skies research, and combining ownership, policy development and funding of government research organisations in a single Ministry. Some of the changes were driven by the need to solve apparent problems in the system or to take

advantage of opportunities, and some by political considerations. There is broad agreement across the sector that the system is due for a thorough overhaul.

As Minister Woods said in her press release for the launch of the MBIE Green Paper in October 2021:

“The world is a very different place now to when our Crown Research Institutes were created in the 1990s. If the last 18 months have shown us anything, it is that we need to have expert science to make expert, dynamic decisions. Our RSI system has served Aotearoa exceptionally well, but now it’s time to ask whether the system is set up as well as it can be to answer today’s pressing environmental, economic and social challenges, like climate change and child poverty.”



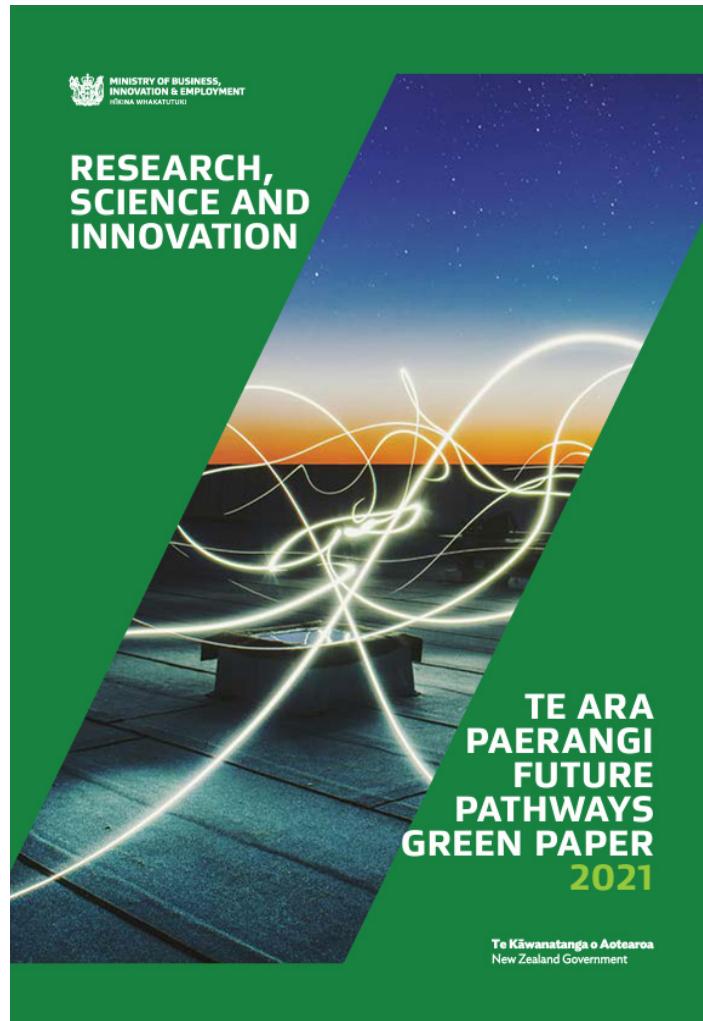
Previous page: Professor Gary Evans, Chief Science Advisor, MBIE.
Below: Te Ara Paerangi Future Pathways Green Paper front cover.

The Green Paper focussed on six areas of potential change to bring us closer to a connected, adaptable, resilient and future-focussed research system:

- **Research Priorities** – What is the role of clearly expressed whole-of-system research priorities?
- **Te Tiriti** – How can the research system understand and honour Te Tiriti obligations and opportunities?
- **Funding** – How should the funding system be reshaped for the future?
- **Institutions** – How should research institutes be shaped and designed?
- **Research Workforce** – How can we develop and retain the workforce we need?
- **Research Infrastructure** – How can we maximise our research infrastructure investments?

The Green Paper initiated a wide consultation on the issues including a call for submissions and a series of online workshops, some of which included Juliet and members of the Office.

The consultation period has now closed, and MBIE is analysing the more than 900 submissions received, supported by a reference group. The Green Paper, issued



to frame the consultation, will be followed by a White Paper laying out the policy options at the end of the year. MBIE has taken on staff, including secondments from other government agencies with an interest in research, to work through the options and have also established a reference group, with representation across the science sector, including Gary and Juliet and users of research from industry and government, to consult on proposed changes.

It is expected to take several years to work through the changes and put in place a new RSI system that everyone involved is hopeful will enhance the social, environmental and economic well-being of New Zealanders for the next 30 years.

WHAT WE DO

Kotahitanga: Uniting Aotearoa against infectious disease and antimicrobial resistance

Kotahi te aho ka whati, ki te kāpuia e kore e whati.

Worldwide, microbes are evolving to resist the effects of the antimicrobials designed to kill or control them, making infections harder to treat across human, animal and plant health. Aotearoa isn't exempt from this global threat, with drug-resistant infections already complicating disease management in our health facilities and homes, and on our farms.

With this in mind, and COVID-19 as a stark reminder that the age of infectious disease is far

from behind us, our major project for 2021 explored infectious diseases and antimicrobial resistance in Aotearoa.



The report provides the government with a comprehensive body of evidence and a clear set of actionable recommendations to tackle microbial threats.

Guided by a panel of 10 experts and a wider reference group of over 200 people from across the motu, we delved into the topic, visiting labs, hospitals, government offices, farms, laundry facilities, and many Zoom lobbies along the way. We found a wealth of expertise in the country, with examples of good research and practice across human, animal, plant, and environmental health. A huge thank you to everyone who generously shared their insights and time despite the challenges of working on this project during a global pandemic.

Many of the recommendations made by our panel weren't new, instead echoing and building on those in the 2017 New Zealand Antimicrobial Resistance

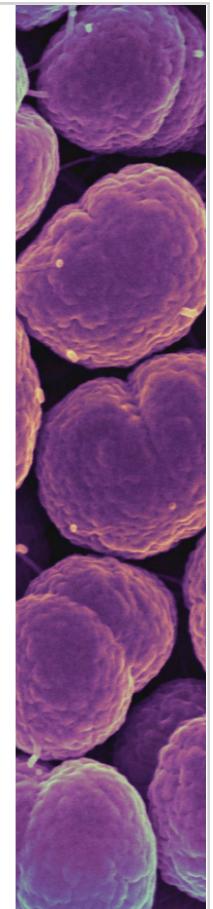
Kotahitanga
Uniting Aotearoa against
infectious disease and
antimicrobial resistance

A report from the Prime Minister's Chief Science Advisor,
Kaitohutohu Mātanga Pūtaiao Matua ki te Pirimia.

[Full report](#)



December 2021





Action Plan, which went largely unimplemented. With ample evidence, scientific agreement, and proven interventions, it became clear during the project that tackling infectious diseases and antimicrobial resistance in Aotearoa New Zealand is a matter of rolling up our collective sleeves and getting it done. We hope to see many dog-eared copies of the report sitting in government offices as work is undertaken to reform the country's health system; the establishment of the new public health agency offers the perfect opportunity to embed many of the report's recommendations.

While COVID-19 meant we had to launch the report virtually, we have been pleased with the government's reception so far. In our launch video, the report was welcomed by the Prime Minister. "This report is timely," she said. "It sets out a path... to ensure we use the right antimicrobial in the right place at the right time." Ministry of Health CSA

Professor Ian Town also welcomed the report and its actionable recommendations. And while the prevalence of infections caused by drug-resistant microbes in Aotearoa is low relative to other countries, Associate Minister of Health, Ayesha Verrall said that this is "no time to be complacent." "This mahi is urgent, with action taken today being crucial to safeguarding the health and wellbeing of future generations. We look forward to seeing the recommendations come to life.

Visit our website for full project details and the final report:

pmcsa.nz/topics/antimicrobial-resistance-and-infectious-disease/

Above left: A youth hui on antimicrobial resistance

Above centre: Ellen Rykers and Celia Cunningham visiting a chicken farm.

Above right: The Kotahitanga report panel and OPMCSA staff. From left to right: Dr Kristin Dyet, Ellen Rykers, Associate Professor Siouxsie Wiles, Dr Rachel Chianori-Clarke, Associate Professor Mark Thomas, Dr Dianne Sika-Paotonu, Distinguished Professor Nigel French, Professor Dame Juliet Gerrard, Professor Jack Heinemann, Dr Matire Harwood, Dr Sharon Gardiner, Dr George Slim, Dr Anneka Anderson and Professor David Murdoch.

Previous page: The Kotahitanga report cover.

Previous page inset: Dr Matire Harwood co-chair of the panel.

WHAT WE DO

Combatting food waste

Food that is produced for human consumption but not eaten has adverse environmental, social, and economic impacts. Our 2022 project will explore evidence-based solutions to combat food waste in Aotearoa.

An estimated 40% of all food produced for human consumption globally is wasted from farm to fork, amounting to 2.5 billion tonnes each year. While the full extent of food waste in Aotearoa is unknown, available evidence suggests that it is a significant problem, with hundreds of thousands of tonnes going to waste annually.

Our major project for 2022 will explore what's known about food waste in Aotearoa and what can be done to combat it, drawing on the expertise of New Zealand researchers, experiences and knowledge held by stakeholders throughout the food system, and international insights. Over the next year or so, we'll produce a series of interrelated reports that tackle different pieces of the food waste puzzle and provide evidence-based recommendations to government to inform action.

We're passionate about this project; because combatting food waste has scope to deliver

environmental, social and economic benefits to Aotearoa.

- Wasting food means accruing all the environmental harms and expending the limited resources associated with food production without realising the benefits of nourishing the growing global population. In particular, food waste contributes to greenhouse gas emissions, both during decomposition and from a whole-of-lifecycle perspective. So combatting food waste can help us achieve our climate change mitigation commitments.
- In addition, wasted food represents a missed opportunity to contribute to nourish people. Much of the food wasted across the motu is quality, surplus food, so capturing that food and ensuring it reaches bellies instead of bins can deliver social benefits in a country where food insecurity is a daily reality for all too many people.
- There are also economic benefits to be gained





from combatting food waste. In 2018, the average household wasted food to the value of \$644. Food waste can also mean unrealised profits for businesses, with opportunities throughout the food system such as upcycling processing by-products or embracing innovations that keep produce fresher for longer.

We are grateful for all the enthusiasm and support our project has been greeted with so far. We've had illuminating kōrero with experts, on-the-ground site visits with stakeholders, and have started wading into the academic and grey literature too. It was exciting to see the Ministry for the Environment reflect the climate change mitigation potential of combatting food waste in the country's first Emissions Reduction Plan, and we've heard about other

government workstreams that our project intersects with – including in relation to food security, sustainable agriculture, and waste minimisation and management.

A huge thank you to the experts, stakeholders, and officials who we are already connected with – well over 200 people are lending their expertise to the project! If you'd like to be involved and we aren't already in touch, please contact us.

Find our project framework and updates online:

<https://www.pmcsa.ac.nz/topics/food-rescue-food-waste/>

This page

Above left: The KiwiHarvest warehouse in Auckland.

Above centre: Juliet and George Slim visit Kaibosh in Wellington.

Above right images: Dumplings made using rescued food for the Waiheke Resources Trust Friday community meal.

Previous page

Top: Juliet surveying a bokashi bin at Waiheke Resources Trust

Bottom left: Rescued apples, mandarins and grapes - Waiheke Resources Trust.

Bottom right: Rescued pears and bananas.

A vertical strip on the left side of the page featuring a close-up photograph of ripe bananas.

WHAT WE DO

Nitrates in Drinking-water

Our Office looked at the evidence around nitrates in drinking-water, and summarised what we know, what we don't know, and what we need to know about nitrates in drinking-water.

Nitrates are substances that are commonly found in drinking-water and have generally been considered safe to consume at low levels (as is the case for many other substances found in our drinking-water). Nitrates are also found in much of the food we eat, and it is estimated that around 90% of the nitrate an average New Zealander consumes is through food rather than drinking-water.

In recent years, the level of nitrates in drinking-water has received increasing attention in Aotearoa. There is a growing body of research that has focused attention on investigating the potential association between nitrates in drinking-water and various health concerns, which we have summarised in our evidence synthesis. Potential health concerns are compounded by the trend of increasing levels of nitrates in drinking-water in some areas of Aotearoa attributable to human activities (primarily the increased use of synthetic nitrogen fertilisers in agriculture). Nitrates

are water soluble, which means that their presence on land can lead to the substance leaching into groundwater.

Currently Aotearoa has a Maximum Acceptable Value (MAV) for nitrates in drinking-water that is set at a level that is intended to prevent Methaemoglobinaemia (or Blue Baby Syndrome), in alignment with the World Health Organization's guidelines (50 mg/L nitrate). Blue Baby Syndrome is an acute condition associated with nitrate ingestion and infants that are bottle fed with formula made up with drinking-water containing more than 50 mg/L of nitrate are at risk of this illness. While most New Zealanders have access to drinking-water that meets this standard through reticulated town or district water supplies, those that get their drinking-water from private groundwater bore or well supplies should regularly test nitrate levels in their drinking-water and consider an alternative source if nitrate levels are high.

The evidence for a relationship between nitrates and

other health concerns has not been established with certainty. An association between nitrate consumption and bowel cancer risk in adults has been identified in some studies, but the evidence base is not conclusive. In those studies that find an association, the concentration of nitrates associated with bowel cancer was found to be significantly lower than Aotearoa's MAV. As with all complex factors involved in long term disease, it is difficult to design a sufficiently robust case-control or cohort study that would establish whether any correlation between bowel cancer and nitrates in drinking-water is causal or coincidental at nitrate levels observed in Aotearoa.

Another recent concern raised has been a potential correlation with adverse reproductive outcomes – particularly low birth weights and pre-term births. A meta-analysis exploring nitrate contamination and adverse reproductive outcomes concluded that there was 'no consistent evidence of a relationship between nitrate in drinking water and adverse reproductive



outcomes.’ The authors note that high quality, large epidemiology studies are needed to further assess any associations with nitrate exposure from drinking water and pregnancy, birth and infant outcomes.

After considering the currently available research, we conclude that evolving evidence on a possible relationship between nitrates and bowel cancer, reproductive outcomes, or any other adverse health events should continue to be monitored in Aotearoa. We hope that further research will be undertaken to give a more solid evidence base. Regular testing of nitrate levels in drinking-water is important for people who use private groundwater bore or well supplies, particularly for families with formula-fed babies or those who are

pregnant or are planning a pregnancy, and water with nitrate levels above the MAV should not be consumed. The Ministry of Health provides information on how people can test their drinking water.

This is an area of high interest and we have been very fortunate to have over twenty peer reviewers provide us with feedback throughout the process of producing our summary. We thank our reviewers again for contributing their time and effort.

Image credit: Katie (alaskahokie)

Read our review here:

<https://www.pmcsa.ac.nz/topics/nitrates>

WHAT WE DO

Tackling rheumatic fever

Rheumatic fever and rheumatic heart disease in Aotearoa almost exclusively impact Māori and Pacific peoples, with poverty, household crowding, barriers to accessing healthcare and racism all playing a role.

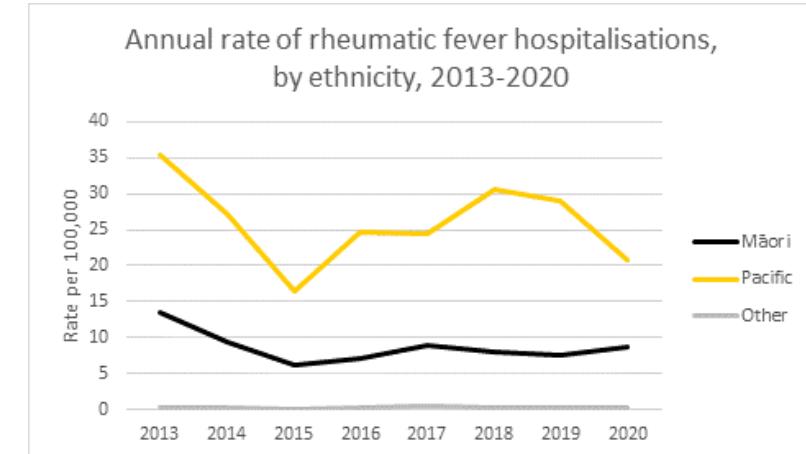
In addition to producing the *Kotahitanga Report*, which looked across the infectious diseases landscape, the panel conducted an evidence synthesis on one type of bacteria in particular – Group A Streptococci. While most infections with Group A Streptococci cause relatively minor conditions like skin infections and strep throat, if left untreated in at-risk people, a Group A streptococcal infection can lead to inflammation of the heart, known as rheumatic fever. Rheumatic fever can go on to cause irreversible heart damage, particularly where episodes recur. Known as rheumatic heart disease, this can lead to complications including heart failure, rhythm disturbances and valve infections, complications during pregnancy, and death.

Through the evidence synthesis, which was provided to the Ministry of Health to support their work, the panel found ample evidence to support the widely held view that improving socioeconomic

and living conditions would reduce rheumatic fever risk, as well as having broader positive impacts on health and wellbeing for individuals and whānau. Aotearoa could also benefit from improved data gathering to understand the extent of the problem, provide improved patient care, and monitor the effectiveness of interventions.

The panel also found areas that could benefit from more research. When our borders were closed in 2020 and 2021, rheumatic fever hospitalisations among Pacific peoples in Aotearoa dropped considerably, but held relatively steady for other ethnic groups, suggesting that rheumatic fever cases among Pacific peoples in the motu are partially driven by travel from the Pacific, where incidence is high. This link is worth exploring further. In addition, the panel found a need to do more research to understand the role played by skin infections in the onset of rheumatic fever.

Following the release of our report,



Minister Ayesha Verrall announced funding to support rheumatic fever prevention, surveillance and diagnosis, including funds to contribute to the development of a vaccine against Group A Streptococci.

Read our rheumatic fever evidence synthesis:

pmcsa.nz/topics/antimicrobial-resistance-and-infectious-disease/rheumatic-fever/



Mānawatia
a Matariki

We are excited that this year we were able to celebrate Matariki with its first public holiday. Congratulations to Professor Rangi Mātāmua and the expert panel for their mahi to calculate the dates.

WHAT WE DO

Internship and fellowship programme

Building links between science, research and policy.

To draw on as many science voices as possible, the Office runs an internship and fellowship programme that invites researchers to work with our Office on projects that sit at the interface between science and policy. Through this programme, this year we've had the privilege of working with 11 interns and seconded fellows and can't wait to welcome more in the year ahead.

We're grateful for the funding provided by Riddet Institute, Royal Society, Te Pūnaha Matatini and Uniservices. The programme wouldn't be possible without your support. We also had two Tairāwhiti interns start this year, whose placements are supported by the Prime Minister's Emerging Priorities Fund.

Read about our 2021–2022 cohort over the following pages.

If you're interested in joining us as an intern or fellow, get in touch: info@pmcsa.ac.nz

With thanks to:



Read more about our internships and fellowships:

pmcsa.ac.nz/what-we-do/internships/



Dr Pauls Davis was an intern funded by UniServices and Te Pūnaha Matatini. He joined the OPMCSA in 2021, having just completed his PhD in innovation management at the University of Auckland. Pauls is passionate about innovation ecosystems and his internship explored academic-business collaboration linkages and their potential in the Aotearoa New Zealand innovation ecosystem.



Jacques de Satgé is a Massey University PhD candidate studying mangrove ecology, with a particular focus on banded rails, an at-risk wetland bird species. During his 2021 internship, Jacques explored the impacts of mangrove removals in Aotearoa on native birds, concluding that councils need to improve their monitoring and consenting processes and should move towards holistic ecosystem management.

Read more about Jacques' internship on page 30



Professor Duncan McGillivray is the Director of Teaching and Learning and a Professor of Physical Chemistry at the University of Auckland. He is a materials scientist with a focus on biologically relevant interactions at the interface between different materials, with applications including improving antimicrobial surface layers and developing low-waste coating methods. As a visiting fellow in 2021, Duncan supported our Office by helping us to understand nanoplastics.



Dr Hannah McKerchar is a Riddet funded intern. Hannah has a PhD in biochemistry which mapped changes in food proteins and has a background as a commercial litigation lawyer. Hannah's project is exploring how to improve the use of research evidence and connections with policy in the area of food sustainability regulations in Aotearoa.



Ngahuia Mita (Te Aitanga ā Māhaki, Ngāti Porou, Ngāti Hako) is a PhD student with the University of Otago, and one of two Tairāwhiti interns with our Office. For her internship, Ngahuia is applying a Te Ao Māori perspective to examine the climate emergency, using tūpuna waka landing sites in Tairāwhiti to anchor her exploration of this crucial topic.

Read more about Ngahuia's internship on page 33



Dr Olivia Ogilvie has a PhD in Biochemistry from the University of Auckland, where she studied coeliac disease. Her work now focuses on cellular agriculture and future protein sources, with a particular interest in the regulatory, policy and ethical implications of emerging food technologies for Aotearoa. She is a part-time seconded fellow with our Office, where she has helped us stay on top of developments relating to the future of food.

Read Olivia's overview of cellular agriculture: pmcsa.ac.nz/topics/cellular-agriculture/



Dr David Pomeroy is a former high school maths teacher and current maths education lecturer at the University of Canterbury. His PhD from Cambridge University explored socioeconomic, ethnic and gender inequalities in maths learning among year 9 students. As a seconded fellow, David is working with Chief Education Science Advisor Prof Stuart McNaughton to produce an evidence synthesis about achieving equity and excellence in maths education.



Dr Cate Roy is a senior policy analyst in the Office of Research Strategy and Integrity at the University of Auckland, where she helps to strengthen Aotearoa's research ecosystem. During her 2021 fellowship, Cate worked with contacts in the research and policy communities to understand how to bring the two worlds together so that the country can tackle its toughest policy problems with the best research in hand.

Read more about Cate's internship on page 35



Dr Tom Saunders has a background in entomology, chemical ecology, and biological control, and he joined the OPMCSA after submitting his PhD. Tom is passionate about open research practices and is using his internship to explore the topic of public access to taxpayer-funded research in Aotearoa.

Read more about Tom's internship on page 36



Tanith Wirihana Te Waitohioterangi (Rongowhakaata, Ngāi Tāmanuhiri, Te Aitanga a Māhaki, Rongomaiwhine, Nāgti One-one) is a public policy and political science student with a passion for progressive policy and Māori culture, knowledge systems and customs. For his Tairāwhiti internship, Tanith is working with Te Papa to build a database of taonga from the Gisborne region that were taken by Captain Cook, including those of scientific interest.

Read more about Tanith's internship on page 34



Dr Simone Weyand is an independent scientist at the University of Cambridge, where she explores how the structure of proteins present in the outer layer of microbes impacts their characteristics. While on sabbatical, Simone is working with our Office as a seconded fellow. She helped with our infectious disease and antimicrobial resistance project by surveying international policy responses that Aotearoa could draw inspiration from.

WHAT WE DO - INTERNS

Holistic ecosystem management: A bird's eye view

Managing mangroves in Aotearoa requires improved monitoring and consenting processes and a holistic view of our ecosystems.

With mangroves expanding seaward and inland, we're seeing estuaries in the North Island change. That's led to council-approved mangrove removals, which intern Jacques de Satgé found are done with little regard for bird life.

While working with our Office, Jacques found that bird surveys before and after mangrove removals either aren't conducted or are generally of poor quality. "There's a range of monitoring improvements that are desperately needed," he says.

A variety of birds spend time in and around mangroves, but one in particular seems to be a huge fan. Using cameras and GPS devices and looking for footprints during his PhD research, Jacques has observed banded rails foraging extensively among mangroves and sometimes even roosting overnight.

In the few high quality monitoring studies that have been conducted before and after mangrove removals, notable reductions in banded rail



numbers have been reported, particularly in sites where mangroves have been removed entirely. In removal sites that retained some mangrove forest, impacts on other mangrove-using birds appeared to be minimal, but more research is needed. With mangrove clearing often being done to improve recreational access – think boat launching, dog walking and swimming – there's a need to understand the ecological impacts of prioritising these interests.

Humans play a big role in mangrove expansion. Activities like farming and deforestation cause sediment and nutrient runoff to enter waterways and flow into estuaries, promoting mangrove growth. "Mangroves are an ecological messenger," Jacques observes. "They are just telling us that we have...changed the ecology and fundamental workings of our estuaries."

Beyond better monitoring and more thoughtful consenting of mangrove removals, Jacques sees



a need to embrace holistic ecosystem management, informed by mātauranga Māori. Instead of shooting the ecological messenger by removing mangroves, we need to “look at the underlying drivers of expansion, and that means looking across your whole catchment.”

By understanding human activities, land, freshwater systems, and estuaries as intimately connected and managing catchments accordingly, we can sustainably improve Aotearoa’s environment for all.

Read Jacques’ internship report here:

tinyurl.com/abirdseyeviewdesatge

WHAT WE DO - INTERNS

Tairāwhiti internships

Two internships supporting the shared future kaupapa of the Tuia 250 commemorations.

At the Tuia 250 commemorations in Gisborne in 2019, discussions started with local iwi and the Department of Prime Minister and Cabinet about the possibility of an internship with the Office to focus on local issues. With funding from the Prime Minister's Emerging Priorities Fund and the support from the Te Aitanga a Māhaki Trust, Rongowhakaata Iwi Trust, Ngāi Tāmanuhiri, and Te Runanganui o Ngāti Porou, a call for proposals was put out.

The purpose of the internships was to complete a future-focused project centred on the Tairāwhiti, to support the 'shared future' kaupapa of the Tuia 250 commemorations. The topic of the internship projects could be:

- a project with particular relevance to Māori health and wellbeing, or pertinent social or environmental issues;
- a project with special significance to Māori communities that might otherwise not be

involved;

- a project combining wisdom from te ao Māori and Western science.

After a selection process involving submission of a written proposal and interview with people from the Office and Tairāwhiti iwi, two candidates were chosen, and the projects started in November 2021.

Ngahuia Mita based in Gisborne, is working to gather the rich voyaging whakapapa embedded in the landscape of the Te Tairāwhiti region and explore the impacts of changing climate and the climate emergency on significant waka hourua sites and their associated voyaging mātauranga. She has chosen a small group of significant landing sites in the region and will use archival material, interviews with key kaimahi, whānau, hapū and iwi members with an intimate association and knowledge of the whenua, awa and moana, and published literature to build a repository of mātauranga connected to key tūpuna waka landing sites in the Tairāwhiti



rohe and record changes to these sites over time. It is hoped this project will be the starting point for a more comprehensive study of waka landing and associated sites within Te Tairāwhiti.

Tanith Wirihana Te Waitohoterangi, based at Te Papa Tongarewa in Wellington and spending time in Gisborne, has been conducting research



to identify all taonga attributed to Rongowhakaata iwi and hapu that were collected and dispersed by Cook and his crew at the conclusion of their voyage of discovery, 1769 – 1771. In particular, Tanith has looked at the plants collected by the Endeavour crew from Oneroa, paddles (hoe) and other taonga traded by the Rongowhakaata delegation from Orakaipu at Whareongaonga in recognition of the safe return of



the children Hikirangi, Hourangi, and Marukawiti. It is hoped this work will lay down a foundation for the construction of a digital taonga archive and platform by which Rongowhakaata can digitally repatriate and reconnect with their indigenous cultural intellectual property and their unique tribal style.

These projects have shown both the value and the



challenges of bringing mātauranga Māori combined with the kind of science more familiar to the Office to bear on issues of significance to Aotearoa. Having Tanith in Wellington certainly gave Dr George Slim, the opportunity for many wide ranging and eye-opening conversations in the cafés around the town.

WHAT WE DO - FELLOWS

Knowledge sharing between academics and policymakers: The best of both worlds

Solving complex challenges in Aotearoa requires strong, trust-rich relationships between researchers and government.

While academia and policy can seem worlds apart, Dr Cate Roy found “overwhelming appetite on both sides” to bridge the divide, working together to tackle climate change, intergenerational poverty, COVID-19, and other complex problems facing the nation.

During her fellowship, Cate found that researchers are keen to inform policy and policymakers have a thirst for the high quality evidence and innovative ideas that New Zealand researchers produce. However, researchers and policymakers don’t collaborate as frequently or effectively as they could, a problem driven by the different timelines, incentives, priorities, and ways of working that dominate academic research and policy processes.

Helping researchers understand the policy context is key, Cate says, from how government works through to how to write policy briefs, connect with officials, and communicate effectively. Researchers also need professional incentives to do policy work, something

that isn’t captured in the traditional evaluation frameworks that measure research impact.

On the government side, policymakers could be supported to appreciate the thorough and incremental nature of academic research and encouraged to share policy priorities early. In addition, it’s important to bring a diversity of researchers into the policy fold, including early career researchers who are often doing exciting research that won’t necessarily be captured if policymakers only contact the most visible academics.

Secondments, internships, meet-and-greets and workshops are key to relationship building between researchers and policymakers, Cate says, and CSAs and other people with experience in both worlds are invaluable assets.

There are already examples of good practice to draw on, which Cate highlights with three illustrative case studies in her report. And with the enthusiasm she encountered during her interviews with researchers and policymakers, Cate is optimistic. “There’s huge

potential,” she says, “and huge benefits for New Zealand.”

Read Cate’s internship report: tinyurl.com/enhancingknowledge-roy



Image: Dr Cate Roy and Dr George Slim with the report.

WHAT WE DO - INTERNS

Increasing research impact: An open access revolution

Making academic research free to read is good for everyone, from researchers, innovators and policymakers to the New Zealand public – and it's the right thing to do.

To have maximum impact and deliver maximum benefit to Aotearoa New Zealand and the world, our research should be freely available to all. In addition, says intern Dr Tom Saunders, it's a moral issue – "if the public are funding research, then they should be able to access the results." At the heart of it, a quest to enhance research impact and transparency is what fuels Tom's passion for the open access kaupapa.

After finishing his PhD at the University of Auckland in 2021, Tom joined our Office to develop policy recommendations that aim to encourage open research in Aotearoa and start a conversation about the paywalls that sit between New Zealanders and the research they fund.

With journals increasingly charging hefty subscription fees or requiring researchers to fork out unrealistic sums to have their research published openly, Tom's internship report calls for journals to be reminded that their role is to "disseminate scholarly

research as far and wide as possible," not to act as gatekeepers to knowledge.

Looking at mechanisms such as rights transfers, green open access, offshore initiatives like Plan S, and more, Tom's case for open access is made powerful through his report's practical and concrete recommendations.

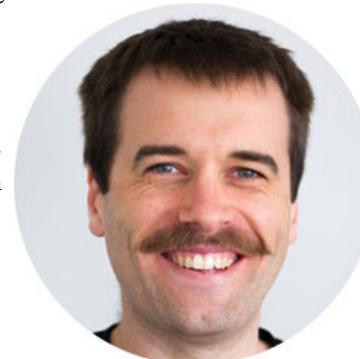
By bringing research out from behind paywalls, Tom is hopeful that public debate on science issues in Aotearoa will become richer, more inclusive and better informed. His report outlines how our research and innovation ecosystem will be strengthened as a diversity of ideas are shared, tested and commercialised, and he shows that

government will be better positioned to formulate evidence-based policy through enhanced access to a deep and wide pool of knowledge.

For researchers whose work is published open access, it's a huge win too. After all, having impact is why many people pursue careers in academia to begin with – "they want their research to be used."

Read Tom's report:

<https://tinyurl.com/Increasing-research-impact>



WHAT WE DO

Out and about

The team has been out and about engaging in interesting kōrero over the past year, as well as connecting virtually with colleagues from Aotearoa and abroad. Here's a selection of our activities.

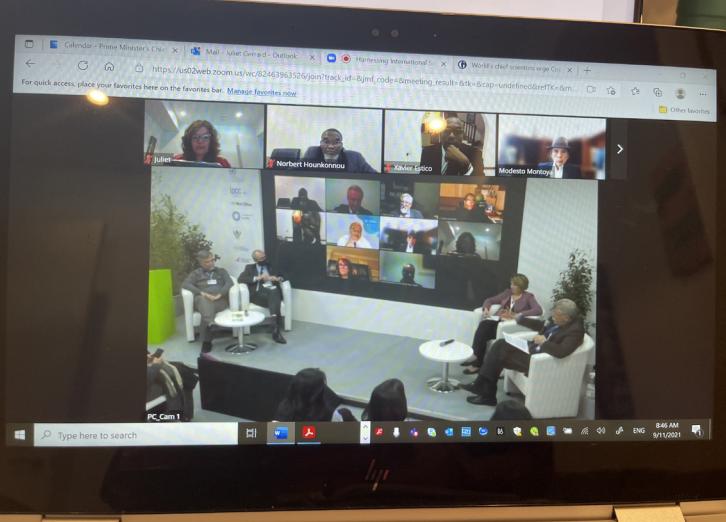


Top: Juliet and George Slim met with the forecasting team at MetService,

Middle left: Juliet with some of the team from the Waiheke Resources Trust.

Middle right: The CSAs Forum met with their Canadian counterparts, getting to know one another and finding common interests including in fisheries, environmental workstreams, indigenous knowledge, and equity, diversity and inclusion.

Left: Juliet and the Prime Minister visited researchers at the University of Auckland, learning about their mahi on rheumatic fever, vaccines, and flu tracking.



Left: Science in Dark Times, Shirley Horrocks' documentary about Juliet's first three years in her role, debuted at the New Zealand International Film Festival in November 2021.

Top centre: Following a joint statement from 39 international chief science advisors, Juliet took part in a session at last year's international climate conference, COP26, on the crucial role of science in understanding, mitigating and adapting to climate change.

Bottom centre: Juliet joined overseas colleagues in a discussion session on the experience of being a scientist in the COVID-19 crisis room, hosted by the American Association for the Advancement of Science as part of their annual conference.

Top right: Juliet was delighted to join other science and health leaders for breakfast at Homewood with British High Commissioner Laura Clarke, where she met with Prof Isabel Oliver, Interim Chief Scientific Officer at the UK Health Security Agency, to swap notes on lessons learned during the COVID-19 pandemic.

Bottom right. Juliet enjoyed meeting with the winners of the Columba College STEM Blues Awards to congratulate them and hear about their ambitious science career plans.



Dame Professor Juliet Gerrard

Prime Minister's Chief Science Advisor

World Majlis - ChangemakHER: Advancing Diversity in the Tech World

Friday 11 February, 12:30pm
Terra Auditorium - Expo 2020 Dubai



Top left: Juliet was chuffed to appear on the colourful cover of the Woman magazine early this year.

Middle: The CSA Forum heard from Assoc Prof Nancy Bertler about the instability of Antarctica's icesheets, a crucial topic to understand both to galvanise climate change mitigation action and to inform adaptation planning.

Top right: In between Auckland lockdowns, Juliet met with the Independent Research Association of New Zealand to hear their perspectives on the research landscape in Aotearoa.

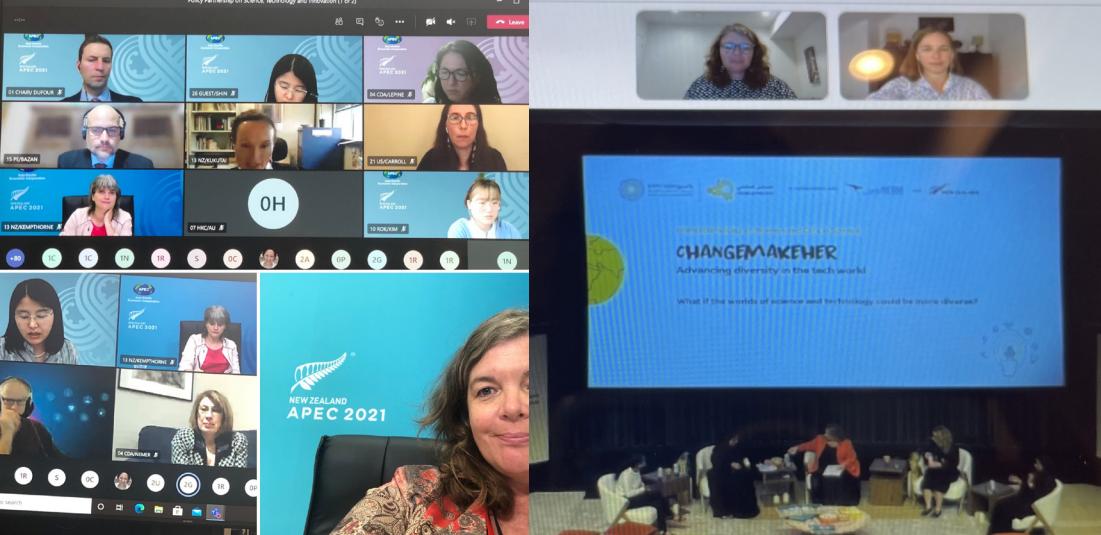
Bottom left: For international women and girls in science day, Juliet joined a panel of female scientists to discuss diversity in the tech sector at the Dubai Expo.



Above images: Every two years Ōtepoti Dunedin celebrates science by hosting the New Zealand International Science Festival. Juliet thoroughly enjoyed attending many events in 2021, including an opening panel discussion with Dr Rod Carr and Dr Helen Anderson, a panel on rethinking plastics, and a science party with a replica moon. She also managed to fit in a talk at the Association for Women in the Sciences conference that took place in the same week. Far right image credit: NZISF/Alex Lovell-Smith

Image to the right: Juliet was thrilled to host a panel of international science advisors, along with Professor Tahu Kukutai, at the 2021 Asia-Pacific Economic Cooperation forum.

Image to the far right: Juliet speaking online at the Dubai Expo.



FINANCES

2021-2022

Budget estimates plus in-kind contributions.

The activities of the Office of the PMCSA are funded under a Memorandum of Understanding between the University of Auckland and the DPMC and MBIE. The forecasted expenditure from this contract is included here. These are budget estimates, not financial statements.

The University of Auckland continues to support the activities of the Office by providing institutional support, meeting facilities, and access to financial and administrative services. We would like to particularly acknowledge the following key individuals within the University for their support: Nikki Andrews, who keeps an eye on our finances; and Ranmali Mada in the Office of the Vice Chancellor, who provides a vital link to administrative services.

We also thank the DPMC for providing hot desk facilities and general support, in particular Sacha O'Dea, John Scott, Hayden Glass, Ben McBride, Bryan Dunne and Chris O'Gorman.

	1 July 2021-30 June 2022
Funding received from DPMC for operations of the Office under the MOU*	870,000
Funding received from MBIE for operations of the Office under the MOU	500,000
External funding received to support intern projects	20,000
Breakdown of MoU Funding	
Salaries/people costs	1,135,000
Research costs	120,000
Operational costs	50,000
Domestic travel, Wellington	35,000
Other domestic travel	30,000
International travel	20,000
Total expenses	1,390,000
Honorarium to Juliet Gerard (this is a direct payment outside of the MoU)	50,000

Nāu te rourou, nāku te rourou,
ka ora ai te iwi

Ngā mihi nui ki a koutou katoa

Annual Report 1 July 2021 – 30 June 2022

The Office of the Prime Minister's Chief Science Advisor, Kaitohutohu Mātanga Pūtaiao Matua ki te Pirimia.

● 1-11 Short Street, Auckland 1010 | ☎ info@pmcsa.ac.nz | ➡ www.pmcsa.nz
✉ @nz_chief_science_advisor | 🐦 @ChiefSciAdvisor