

Te Pūnaha Matatini
Data ■ Knowledge ■ Insight

Annual Report 2019

A Centre of Research Excellence hosted by the University of Auckland



Cover: Little Brown Kiwi. Symbolic of our connection to the kaupapa and the complexity of its feathering – he mata tini – is representative of our mahi.

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About Us



Our Story

We live in a data-rich but knowledge-poor world

Te Pūnaha Matatini – ‘the meeting place of many faces’ – is a New Zealand Centre of Research Excellence developing methods and approaches for transforming complex data about the environment, economy, and society into knowledge, tools, and insights for making better decisions.

As ‘a meeting place for many faces’, we are committed to equity, diversity, and inclusion, focussed on transdisciplinary research, and connected to colleagues across research, government, industry, and communities.

We’re working together to enable New Zealanders to grow up and thrive in an increasingly complex and interconnected world

Te Pūnaha Matatini brings together the expertise of New Zealand’s leading researchers in social sciences, economics, biology, mathematics, computer science, operations management, statistics, engineering science, and physics.

Our transdisciplinary approach advances knowledge of complex systems and networks, and their applications, for the social, economic, and environmental benefit of New Zealand.



Director Shaun Hendy discusses Te Pūnaha Matatini’s work on RadioLIVE.

<http://bit.ly/1ohHOMk>

Our Partners

We’re bringing together leading researchers from across New Zealand’s research institutions





Board Chair's Report



It is appropriate that I say right at the outset that Te Pūnaha Matatini has had another very successful year and I encourage you to read the annual report in detail to judge for yourself.

We set out to investigate and better understand complex systems via three themes of activity:

- Complexity, risk, and uncertainty
- Complex economic and social systems
- Complexity and the biosphere.

Inevitably this leads to a very diverse range of activities within Te Pūnaha Matatini, and a need to have effective communication to achieve the outcomes and objectives we have set. This year there have been many examples of all forms of communication which shows we are in excellent health. As a result, Te Pūnaha Matatini is becoming more widely known and respected in the public sector which is a credit to all concerned and to the leadership skills of Professor Shaun Hendy, our Director.

Let me give you some examples to illustrate the diversity of thought and activity within Te Pūnaha Matatini:

1. The appointment of Professor Tom Roa (University of Waikato) as the Kaumatua of Te Pūnaha Matatini – a new leadership role. His experience and wisdom is, and will be, of great benefit to us going forward.
2. Dr Rebecca Priestley's book published this year *15 million years in Antarctica*. *The Listener* rated it one of the best 100 books of the year. I have read a number of books on Antarctica, and this is now definitely on my list to read.
3. Dr Cate Macinnis-Ng – her stand to protect Awhiawhi, a 350 year-old kauri tree. If you have ever tried developing/protecting a native forest you will understand her concern and call for action.
4. Data Ethics – a workshop organised by Associate Professor Siouxsie Wiles and Executive Manager Kate Hannah in September 2019. An important topic which is becoming an issue that is creating an increased focus and attention in many organisations.

At the start of this year our focus was naturally on the rebid process which is so important to our future. I acknowledge the excellent work done by incoming Co-directors, Dr Priscilla Wehi (Manaaki Whenua Landcare Research) and Professor

Murray Cox (Massey University), along with Kate Hannah in preparing and pulling together our submission. I am pleased to report that the rebid received excellent references from the international referee reports. Unfortunately, the site visit/interview stage of the rebid selection process is, at the time of writing this report, postponed because of Covid-19. It is unclear when the short listing will be completed or when the interviews take place, let alone who is on the short list! The Royal Society has advised the long list recommendations to the Advisory Committee and further that they are unable to complete the selection process by 30th June 2020. Consequently we, like many others, are somewhat in limbo. Hopefully the selection and interview process can be completed later this year so our planning for 2021 and beyond can be given effect to rather than having a significant delay. The delay does not make it easy for any CoRE's planning.

I would like to thank Shaun Hendy and his executive team for all their efforts over the last year. I note in particular the contributions made by our Incoming Co-directors, Priscilla Wehi and Murray Cox, Kate Hannah (Deputy Director Equity and Diversity), Alex James (Deputy Director Industry and Stakeholder Engagement), Siouxsie Wiles and Dan Hikuroa (Co-Deputy Directors Public Engagement), Julie Mugford (Whānau Chair), plus all our theme leaders and others that I have not mentioned. A special thanks also to the administration team led by Kathryn Morgan. As we neared the end of this year Covid-19 became a new reality and had a significant impact on our activities. It is appropriate I recognise our modellers, our science communicators and the whole team who, as a result, had to pick up extra duties to keep us running smoothly. Our very public communicators, Siouxsie Wiles, Michelle Dickinson, and Shaun Hendy have become trusted scientific communicators to the public at large. I also appreciate many other Te Pūnaha Matatini folk have also been involved in the communication activities and have done an excellent job. Congratulations and thank you to everyone for stepping up and doing what was necessary in a time of need.

We have an interesting year ahead and I believe we can all look forward to a positive future for Te Pūnaha Matatini going forward.

A handwritten signature in blue ink that reads "Richard Aitken".

Richard Aitken
Board Chair

Director's Report



The 2019 annual report is being written in the context of the Covid-19 pandemic. As I write this foreword in June, Te Pūnaha Matatini has played a key role in supporting New Zealand's response to Covid-19, from infectious disease modelling through to science communication.

Our next annual report will no doubt focus on this in detail, but what is apparent now, is that many of the things we put in place over the previous five years were essential for our ability to respond to this crisis. Our emphasis on working with end-users in government and partnering with iwi organisations, as well as the priority we have put on communicating our work to the public, were all critical in being able to meet the needs of New Zealanders at the early stages of the pandemic.

Nonetheless, much of 2019 was about preparing for the 2019–2020 CoRE funding round rather than a pandemic. As such, we welcomed kaumātua Tom Roa and two new Co-directors, Priscilla Wehi and Murray Cox, to the leadership team. It has been a pleasure watching this new team fashion a compelling new vision for Te Pūnaha Matatini that builds on our previous achievements while challenging us to move in new directions. These efforts culminated in a superb application that was submitted to the Royal Society Te Apārangi at the end of last year. The international referee reports for this application were some of the best I have ever seen. I feel confident that the future of Te Pūnaha Matatini is in very safe hands.

This does not diminish the achievements of our first five years. In preparing the ground for this next application, we benchmarked ourselves in a number of different ways. Our field-weighted citation impact (Dimensions) is the highest of the seven CoREs funded in 2015. The number of mentions of our work in New Zealand government policy documents is higher than all the six other CoREs combined (Policy Observatory), and our work has led to significant legislative change. Our investigator cohort is 50% women, 13% Māori, 3% Pasifika, and 9% Asian. Nearly 80% of our graduates stay in New Zealand at the end of their degrees, with 25% going on to academic roles and 75% finding work in government or the private sector. We have brought in nearly \$4 million in end-user research funding in five years and spun out three start-up companies.

Above all, the Covid-19 crisis has revealed the value of our transdisciplinary approach to research. This is something that has often been difficult to articulate to our funders and host organisation, but, as is often the case, it has been better to show rather than tell. There is still a long way to go to weather this pandemic, but I am proud that Te Pūnaha Matatini has demonstrated its worth in helping the country navigate its early stages.

Ngā mihi.

A handwritten signature in blue ink that reads "SCHendy".

Professor Shaun Hendy
Director



Our Vision and Values



Our Vision

- We work with our stakeholders from industry, government, and the public to help reshape New Zealand's economy, society, and environment
- We train a new type of scientist for the benefit of New Zealand
- We help build the kind of New Zealand of which we can all be proud
- We enhance Mātauranga Māori

Our vision is to undertake research and education to advance knowledge of complex systems and networks, and their applications for the social, economic, and environmental benefit of New Zealand.

Our Values

- Visibility and international excellence
- Outreach and engagement – ensuring demonstrated relevance or impact
- Collaboration for discover-orientated research
- Diversity through development and participation

Our values are drawn from the words of our foundational whakataukī, given to us in 2013 by Associate Professor Mānuka Henare (Ngāpuhi, Te Aupouri, Te Rarawa, Ngāti Kuri), Director of the Mira Száshy Research Centre for Māori and Pacific Economic Development;

E tipu, e rea, Mo ngā ra o tau ao –

Grow up and thrive for the days destined to you.

– Sir Apirana Ngata, 1874-1950



2019 Highlights



Realising Our Vision





Contributing to New Zealand's efforts to eradicate *M. bovis*

Network science and data modelling lie at the heart of what we do at Te Pūnaha Matatini and we have shown our expertise in these areas on a number of occasions when responding to issues of national importance, such as the *Mycoplasma bovis* (*M. bovis*) cattle disease discovered in New Zealand in 2017. This story was fast-moving and too sensitive to report in previous years; we are pleased to be able to report on it now.

In mid-2018, the Government, along with the dairy and beef industries, made the decision to eradicate *M. bovis*, with up to \$30 million set aside for science to help accelerate the eradication programme.

The *Mycoplasma bovis* Strategic Science Advisory Group (SSAG) was established soon after to help identify science priorities and develop a science plan to guide research funding decisions. Members of the SSAG include domestic and international expert scientists, vets and government representatives.

The SSAG, chaired by Dr John Roche, Chief Science Adviser for the Ministry for Primary Industries, invited Te Pūnaha Matatini's Director Shaun Hendy to be on its panel to contribute advice in terms of what kind of data modelling might be needed, as well as on effective science communication.

One early research project took the SSAG commission Te Pūnaha Matatini post-doc Dr Rebecca Turner from Scion some weeks to analyse data from New Zealand's National Animal Identification and Tracing (NAIT) system.

"Rebecca helped describe the pattern of animal movements across New Zealand, and to inform some of our priorities and strategies for disease control in this context," said Dr Mary van Andel, Principal Advisor to the Chief Science Adviser at MPI.

"She analysed animal movement data from the NAIT system using network models and network statistics to help us to understand how some farms have contact with multiple other farms.

"Rebecca's analysis was a great building block early in the piece. The *Mycoplasma bovis* eradication programme is ongoing and we've been able to continue using network analysis," said Dr van Andel.

The data analyses performed by Rebecca over a period of weeks in 2018 provided important information that the *Mycoplasma bovis* Programme (MPI, DairyNZ and Beef+ Lamb) has been able to leverage upon going forward.

"Even though the NAIT database was/is an incomplete record of all movements, there was evidence that NAIT recording was improving which would make future tracing easier, and we recommended several avenues for further investigation to understand the movement patterns in the New Zealand system and which movements might be missing from NAIT," said Rebecca.

"During my initial analysis work, in late 2018, MPI hosted a *M. bovis* science workshop in Wellington, bringing together researchers in epidemics, diagnostics, social science, as well as farmers and government, including some from the tracing team," Rebecca added.

"It was extremely well run and allowed us to work through where we saw the science needs and connected people with complementary skills. This was one of the highlights for me on the project – to see people with a diverse range of skills working actively together for a common goal."



Dan Hikuroa.

Te Pūnaha Matatini hosts Indigenising Science Workshop

Te Pūnaha Matatini hosted an Indigenising Science Workshop in 2019 designed for New Zealand university researchers keen to gain a better understanding of tikanga and to be equipped when working alongside Māori communities.

Co-organised and led by Dan Hikuroa, Co-Deputy Director of Public Engagement, and Kate Hannah, Deputy Director Equity and Diversity, the one-day wānanga was held at the University of Auckland on 23 October 2019.

Dan was particularly keen to focus the agenda around a quotation by University of Waikato Professor Linda Tuhiwai Smith, author of *Decolonizing Methodologies: Research and Indigenous Peoples* (Zed Books, 1999 and 2012):

“Research is probably one of the dirtiest words in the indigenous world’s vocabulary”

– Professor Linda Tuhiwai Smith

“We wanted to focus the day around this sentence from Linda’s book,” said Dan. “And trying to unpack and understand why that is, and from there, discuss ways we wish to operate as individual researchers, as groups of researchers and as an organisation.”

Over thirty Te Pūnaha Matatini investigators and whānau from around the country were invited to attend the workshop. Dan, along with Te Pūnaha Matatini Incoming Co-director Cilla Wehi and Deputy Director of Equity and Diversity Kate Hannah gave presentations that were supplemented by discussion time.

A key aim of the workshop was to help participants gain a greater understanding of tikanga and Te Tiriti o Waitangi, in a supportive, safe space where they could feel comfortable asking questions they might not otherwise, said Dan. “I wanted us to hone in on tika and pono. And for me, they are my guides on how and what and why I do the things I do, and importantly, why I don’t do some things.”

Another major objective was equipping the researchers with an enhanced knowledge with respect to working alongside indigenous communities when conducting their research. Cilla Wehi presented valuable insights into the nuances of relationship building with Māori in particular.

She followed this by leading a very memorable role play session in which participants, in their capacity as researchers wishing to gain the endorsement and build a relationship with key Māori groups, attempted to explain their work and interact with her as she played and gave typical responses that might be expected of a Māori community leader or elder.

At the end of the day, the overall feedback from those who attended was very positive.

“It was both a moving and memorable day for everyone involved, covering topics from pepeha to te Tiriti to partnership with indigenous communities”, said Te Pūnaha Matatini Director Shaun Hendy.



Te Pūnaha Matatini hosts Data Ethics Workshop

A diverse group of Te Pūnaha Matatini researchers and friends from around New Zealand gathered together for a Te Pūnaha Matatini-hosted Data Ethics Workshop in Auckland in 2019 to talk about data ownership and related issues.

The one-day wānanga was held at the University of Auckland on 16 September 2019, and co-organised and led by Siouxsie Wiles, Co-Deputy Director of Public Engagement at Te Pūnaha Matatini, and Kate Hannah, Deputy Director of Equity & Diversity.

More than thirty Te Pūnaha Matatini researchers, colleagues and friends from around the country attended, bringing together people from a broad diversity of research disciplines, and with different lived experiences and perspectives.

Following mihi and introductions, the agenda began in earnest with various interactive scenarios and group discussions taking place over the course of the day.

Among the data ethics topics discussed were research involving taonga species, the role of surveillance, and algorithms and artificial intelligence.

Siouxsie said she hoped the day would provide attendees with a better understanding of key issues and with resources to take away which would help guide their future thinking when developing new projects.

"The workshop was an opportunity for us to talk through some of the ethical issues that surround topics of interest to us within our centre and to deepen our understanding of the ethical questions that may arise from the research we are interested in," said Siouxsie.

At the end of the day, the overall feedback from those who attended was very positive.

"Such great kōrero with such great people at the @Punaha-Matatini data ethics workshop today," said Jo Bailey, Te Pūnaha Matatini Whānau member. "Got me thinking about open science, data sovereignty and the tensions in between."

"Great day at the @PunahaMatatini @AucklandUni data ethics workshop!" said Dr Reremoana Theodore, Co-director at the National Centre for Lifecourse Research. "Thanks @SiouxsieW for the invite. Great to spend time with this wahine toa @taramcallister4. And to meet so many researchers who I've admired @knhannah @LoraxCate @testeeves @Lanipai et al."



Dr Tom Roa.

Introducing Tom Roa, inaugural kaumatua for Te Pūnaha Matatini

A hui held at the University of Auckland on 2 July 2019 marked a special moment in the history of Te Pūnaha Matatini – the inauguration of our first ever kaumatua, Dr Tom Roa (Ngāti Maniapoto, Waikato).

Dr Tom Roa, a Tainui leader and Manukura/Associate Professor in the University of Waikato's Faculty of Māori and Indigenous Studies, is a familiar figure on marae throughout Tainui and the country. Over the years, Tom has also been a leading figure helping to bring the Māori language into the mainstream, and he is one of the founders of Te Wiki o Te Reo Māori movement in the 1970s.

Tom's appointment as Te Pūnaha Matatini kaumatua enables us to continue to grow a safe and inclusive CoRE for our multicultural team of investigators and students, and maintains our leadership in this particular area within the Aotearoa New Zealand science and research system.

The July hui at the University of Auckland comprised a large gathering of Te Pūnaha Matatini investigators, friends and Whānau from all over New Zealand.

Following a warm mihi whakatau, Te Pūnaha Matatini Incoming Co-director Cilla Wehi shared stories about her work with Tom over the years and provided some personal insights.

"Matua Tom has a very long research career in linguistics and translation," said Cilla. "More than that even, he is valued for his immense skills in the Māori world as somebody who has incredible expertise in whaikōrero, in the art of oratory, but who can also cut to the point in a very pithy way."

Cilla then welcomed Tom to the stage for his keynote speech – 'He Puna Pūnaha' – a springboard for ideas in the myriad of theories and systems to be explored.

Tom's talk was inspiring and it was a privilege to hear him speak. He talked about key concepts and traditions central to mātauranga in a way that his audience, many of whom are relative newcomers to Aotearoa, appreciated immensely. Tom also shared a karakia, a prayer invoking spiritual guidance.

"I have a fascination with how mātauranga Māori and science can be woven together. So Te Pūnaha Matatini fascinates me even more because of the interdisciplinary nature of so many of the projects that I've had a glance through," said Tom.

"When Potatau, the first Māori King was anointed, he said 'there is but one eye of the needle through which must pass the red, the black and the white threads'. Many people have taken that to mean that it's about bringing people together," said Tom. "But for Te Pūnaha Matatini, I suggest that you might have a mathematical thread, somebody else might have an ecological thread, somebody might have an economic thread.

"Somebody might have all of these different kinds of threads, along with my Māori thread," said Tom. "And if we thread those through the eye of the needle, they become something else. They become interweaved, and my suggestion is that if we thread that eye of the needle and if we bring all of that together properly, then we have a new creation – new data, new knowledges, new insights. Through that weaving."



New Zealand Journal of Ecology special issue on Mātauranga Māori

Te Pūnaha Matatini proudly sponsored the first ever *New Zealand Journal of Ecology* special issue on Mātauranga Māori, which was launched at the New Zealand Ecological Society 2019 Conference held in Lincoln in December 2019.

Entitled 'Mātauranga Māori and shaping ecological futures,' the special issue features two editorials and 13 research papers on topics ranging from the place of kaitiakitanga in urban restoration, to food sovereignty, to climate change adaptation. All articles are open access, and all have abstracts in te reo Māori.

"The *NZJE* special issue provides some amazing examples of how scientists in Aotearoa have co-developed research with Māori and how science can directly respond to aspirations of Māori," said guest editor Tara McAllister. "Our virtual issue looks back on research published in the *New Zealand Journal of Ecology* and explores how articles have engaged with Māori and mātauranga."

The guest editorial team included Te Pūnaha Matatini investigators Cilla Wehi (Manaaki Whenua) and Tara McAllister (University of Auckland), as well as Jacqueline Beggs (University of Auckland), Shaun Ogilvie (Eco Research Associates) and Amanda Black (Lincoln University), together with kaumatua Rauru Kirikiri (RK Associates), and additional assistance from Melanie Mark-Shadbolt (Director Māori, Biological Heritage National Science Challenge).

At a symposium held in conjunction with the New Zealand Ecological Society Conference at Lincoln on 2 December 2019, Cilla, Tara and Jacqueline introduced the special issue and presented an overview of the issue's first editorial which they co-authored. 'Ka mua ka muri' (Wehi et al. 2019) is an examination of the research previously published in the *New Zealand Journal of Ecology* and argues that substantive com-

mitment to community partnerships and bicultural research has not been realised in ecological research.

At the official launch following the symposium, guest speaker Craig Pauling (Ngāi Tahu, Environment Canterbury) laid down a traditional Māori challenge for ecology – a challenge explained in the issue's second editorial, 'Ka takoto te manuka' (McAllister et al. 2019):

"The whakataukī (proverb) "Kua takoto te mānuka" in our title refers to the laying down of mānuka leaves (*Leptospermum scoparium*) as part of a wero (traditional challenge). The wero that we lay here challenges ecologists to develop more widespread and effective partnerships with Māori, taking inspiration from the mātauranga and partnerships exemplified in this special issue. We demonstrate through this special issue that there is significant potential for mātauranga and research co-developed with Māori to inform and positively influence both our understanding of the ecology and management of the unique ecosystems in Aotearoa."

The special issue's launch was covered well in the media. Television pieces by Te Karere included interviews with PhD student Erana Walker, Cilla, and Cate Macinnis-Ng in her capacity as then President of the New Zealand Ecological Society.

Cilla tweeted afterwards that it was a privilege to lead the editorial team for this issue. "A lot of work, but amazing to see this mahi grow. Looking forward to the next generation of Māori scientists!"



Incoming Co-directors Dr Priscilla (Cilla) Wehi and Professor Murray Cox.

Incoming Co-directors take up the role of leading and setting the future vision for our CoRE

Dr Cilla Wehi from Manaaki Whenua Landcare Research, and Professor Murray Cox, from Massey University, will take up the role of leading our Centre into the rebid and beyond, as recommended by our Advisory Board and accepted by our host institution – the University of Auckland.

The announcement of Cilla's and Murray's appointment followed an intensive selection process involving written applications, presentations to investigators and an interview.

Cilla is a conservation biologist and Rutherford Discovery Fellow at Manaaki Whenua Landcare Research in Dunedin. Since completing a PhD in ecology and Māori at the University of Waikato, her research has focused on the links between culture and biodiversity, and ecological restoration. Cilla is passionate about inclusivity and diversity in science and was part of the 2018 Homeward Bound programme – the largest ever all-female Antarctic expedition that aimed to raise awareness of the low representation of women working in STEM.

Murray Cox is Professor of Computational Biology at Massey University. His research group integrates new genetic technologies with sophisticated computational analysis to address biological questions at the interface of genomics, computer science and statistics. In 2017, the Royal Society Te Apārangi awarded Murray the Te Rangi Hiroa medal for his work in advancing 'historical approaches to societal transformation and change'. Much of Murray's work is shaped by complexity science thinking, with rampant appropriation of complex systems approaches developed in physics and applied mathematics.

Cilla and Murray submitted an impressive and comprehensive application outlining their vision for the future direction of Te Pūnaha Matatini, as well as their rationale for a Co-directorship.

At a hui held in Tāmaki Makaurau in April 2019, we had the opportunity to hear Cilla and Murray speak further about their plans and vision, as well as to meet and hear from many of our twenty-six new Associate Investigators (listed opposite). With the overall number jumping by 50%, this occasion marked an important milestone for Te Pūnaha Matatini.



New Te Pūnaha Matatini Associate Investigators in 2019

- Associate Professor Ann Brower, University of Canterbury
- Dr Christina Painting, University of Auckland
- Professor David Hayman, Massey University
- Dr Élodie Blanc, Motu Research
- Dr Emma Sharp, University of Auckland
- Hamza Ajmal, Livestock Improvement Corporation
- Dr Inga Smith, University of Otago
- Dr Jonathan Tonkin, University of Canterbury
- Dr Kirsten Locke, University of Auckland
- Associate Professor Krushil Watene, Massey University
- Dr Leilani Walker, Auckland University of Technology
- Dr Lynn Riggs, Motu Research
- Dr Marama Muru-Lanning, University of Auckland
- Associate Professor Markus Luczak-Roesch, Victoria University of Wellington
- Dr Matthew Parry, University of Otago
- Associate Professor Maui Hudson, University of Waikato
- Mubashir Qasim, Livestock Improvement Corporation
- Dr Niven Winchester, Motu Research
- Dr Phil Wilson, University of Canterbury
- Dr Richard Arnold, Victoria University of Wellington
- Dr Sandra Velarde, Climate Change Commission
- Professor Tahu Kukutai, University of Waikato
- Associate Professor Tammy Steeves, University of Canterbury
- Dr Tara McAllister, University of Auckland
- Dr Tze Ming Mok, Population Association of New Zealand
- Dr William Godsoe, Lincoln University

Realising Our Values





Dr Eugenia Cheng.

Te Pūnaha Matatini supports New Zealand tour of world-renowned mathematician

Te Pūnaha Matatini proudly sponsored speaking appearances of acclaimed British mathematician and author Dr Eugenia Cheng at two major events held in New Zealand in May 2019 – the Auckland Writers Festival and Martinborough Maths Craft Day.

Dr Eugenia Cheng, Scientist-in-Residence at the School of the Arts Institute of Chicago, has sought to popularise the field of mathematics with her award-winning books such as *How to Bake Pi* and *The Art of Logic*, and is also an accomplished concert pianist.

Eugenia is an excellent communicator of science and, through her mission “to rid the world of maths phobia”, has made several high-profile television appearances on major US and British media network shows.

Te Pūnaha Matatini took the opportunity to support arrangements for Eugenia to bring her message to New Zealand audiences in 2019.

At her first appearance, during the 2019 Auckland Writers Festival on Sunday 19 May, Eugenia talked about her latest book *The Art of Logic*.

Held at Auckland's Aotea Centre and chaired by Dr Tanya Evans from the Department of Mathematics, University of Auckland, the session was a sell-out. And those lucky enough to attend were not disappointed – it was a highly informative and entertaining hour of getting to know Eugenia and her latest work.

Eugenia then headed south to Wellington and the beautiful Wairarapa in time for her second talk at Martinborough Maths Craft Day on Sunday 26 May. Sponsored by Te Pūnaha Matatini, Martinborough Maths Craft Day was Maths Craft's first time in a regional centre. Held in Martinborough's Waiinga Centre, over 450 visitors (in a town of 1,700 people) crammed in to explore maths through crafts, at the several craft creation stations, and listen to public lectures such as Eugenia's.

“We were thrilled and honoured to welcome our special guest speaker Dr Eugenia Cheng ... whose talk ‘Beyond Infinity’ was attended by over 100 people – a record for Maths Craft,” said the organisers Te Pūnaha Matatini investigators Jeanette McLeod and Phil Wilson.

During her time in New Zealand, Eugenia had a lasting impression on many who were fortunate to meet her and see her speak.

At Te Pūnaha Matatini, we were delighted that she came and that we had the chance to help her spread the word – that maths is not something to be afraid of. In Eugenia's words: “Maths is a place where you can imagine if different things are possible.”



Literary output highlights our thought leadership on global issues

Several Te Pūnaha Matatini investigators wrote books or book chapters in 2019, on hot global issue topics, reflecting the importance Te Pūnaha Matatini places on thinking and articulating our thoughts on matters concerning improving the world we live in. Here we highlight the 2019 literary contributions of Te Pūnaha Matatini investigators David Hall, Shaun Hendy, Rebecca Priestley, Murray Cox, Dan Hikuroa, and Tze Ming Mok.



#NoFly: Walking the talk on climate change – Shaun Hendy

Launched at events in Auckland, Wellington, Christchurch, Kaikoura, Blenheim, and Palmerston North in November 2019, Shaun's book *#NoFly* tells the story of his 2018 calendar year of not flying. As a frequent traveller, there were some clear challenges that Shaun needed to overcome during that year – so this book details a lot of those, including his experiences travelling on over-night buses and trains.

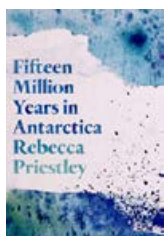
Shaun speaks to our desire to 'walk the talk' when it comes to climate change action. "By avoiding planes for a year, I found that I had cut my carbon dioxide emissions from travel to just over 1 tonne," said Shaun. "This was a reduction of 95 per cent from my 2017 carbon footprint from travel. It felt good."



A Careful Revolution: Towards a Low-Emissions Future – David Hall

With the current climate crisis upon us, New Zealand is now on its way to a low-emissions future. Launched in Auckland in July, David Hall's book *A Careful Revolution* looks at how such a transition (or revolution) can occur carefully. In other words, can it be attentive to the disruptions that it causes?

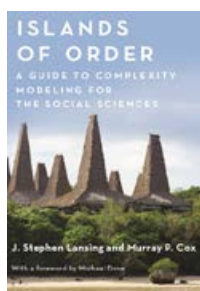
The book includes essays from 11 authors who explore the logistical practicalities and inevitable politics involved in getting our country to move towards a low carbon footprint future, and explores issues specific to Aotearoa New Zealand.



Fifteen Million Years in Antarctica – Rebecca Priestley

Rebecca Priestley's *Fifteen Million Years in Antarctica* offers a deeply personal tour of a place in which a person can feel like an outside in more ways than one. With generosity and candour, Priestley reflects on what Antarctica can tell us about Earth's future and asks: "do people even belong in this fragile otherworldly place?"

Launched at a special event held in Auckland, *Fifteen Million Years in Antarctica* was selected by *The Listener* to be in its '100 books of the year'.



Islands of Order – co-authored by Murray Cox

Te Pūnaha Matatini's Incoming Co-director Murray Cox, a geneticist, has co-authored *Islands of Order: A Guide to Complexity Modeling for the Social Sciences*, alongside anthropologist J. Stephen Lansing.

Murray and Stephen have explored dozens of villages on the islands of the Malay Archipelago over the past two decades, combining ethnographic research with genetic and linguistic marker research to unveil how these societies have transformed over time. The book draws on their pioneering fieldwork and shows how complexity science can help us better understand these changes.



We Are Here – Book chapters by Dan Hikuroa, Tze Ming Mok

Te Pūnaha Matatini investigators Dan Hikuroa and Tze Ming-Mok have contributed two of the chapters in this fantastic visual data book that helps us make sense of Aotearoa New Zealand. Authored by Chris McDowall and Tim Denee, *We Are Here* is full of incredible maps and infographics. "Clustered yet scattered, we New Zealanders live across the country's physical landscapes, experiencing its varied weather and environments. We co-create its political, economic and social systems on a daily basis. Each of us has a particular view of Aotearoa, yet nobody comprehends the whole." – Massey University Press.



Professor Suzi Kerr.

Suzi Kerr appointed Chief Economist at New York-based EDF

Professor Suzi Kerr, one of Te Pūnaha Matatini's founding investigators, relocated to New York, USA, in April 2019 to take up the position of Chief Economist with the Economic Defense Fund (EDF). Now Kairangi with Te Pūnaha Matatini, Suzi was a founding director at Motu Research in New Zealand from 1998 to 2009, and remained a senior fellow there until May 2019. Suzi graduated with a PhD in Economics from Harvard University in 1995 and won the NZIER Economics Award in 2010.

Public engagement highlights

- Cameron Walker successfully applied for a Distinguished Visitor Award from the University of Otago for Professor Margaret Brandeau's visit New Zealand from Stanford University. Cameron organised a range of speaking engagements for Professor Brandeau, including a day workshop on [Health Systems Modelling](#), which she delivered to clinicians and academics; a public Plenary at the ORSNZ conference and Analytics Forum; a talk at Waikato DHB; and a presentation to policy analysts at Ministry of Social Development in Wellington, sponsored by the [Healthier Lives](#) National Science Challenge.
- Tze Ming Mok spoke as part of the University of Auckland COMPASS seminar series: [Inside the box: A mixed methods analysis of ethnic choice and ethnic change for 'mixed' people in the UK](#)
- Audrey Lustig helped design and organise a postgraduate-focused R workshop and seminar series for the School of Biology at the University of Canterbury
- Markus Luczak-Roesch gave a Victoria University of Wellington Spotlight Series public lecture, [Re-building the web we want](#).
- Cilla Wehi participated in a Tuia 250 Panel at Te Papa, The Politics of Collecting Plants.
- Ilze Ziedins gave a public lecture funded by Edinburgh Mathematical Society, [When networks go bad: queues, delays, and bottlenecks](#), in Edinburgh Scotland.
- Tammy Steeves participated in U3A Okeover (University of the Third Age) public lecture series, [Enhancing resilience in threatened taonga species](#).

Educational outreach and workshops

- Leilani Walker developed and produced educational resources for the Science Learning hub, [Insects – physical characteristics](#).
 - Christina Painting and Leilani Walker both worked as science advisors on the [Buzz in the Garden – Participatory Science Platform](#) project led by Auckland Libraries and SouthSci. This project looks at community gardens at South Auckland libraries, documenting insect pollinator arrivals to the gardens. School children from the area conduct observations as part of after-school programmes based on activities developed Christina, Leilani, and the other science advisors.
 - Leilani Walker participated as an entomologist in Tauaki Mauri BioBlitz in Waitangi from 27th–29th November 2019.
- Working with local iwi, the aim of the BioBlitz is to record the current flora/fauna/fungi and where possible compare these specimens to what is known from the past.
- Audrey Lustig co-organised a two-day eradication workshop at Manaaki Whenua Landcare Research, [Knowing when to walk away: tools for proving eradication success](#). The workshop had a range of participants from different eradication projects across New Zealand with a strong emphasis on Predator Free 2050 projects. Audrey also ran a 10-week workshop series at Manaaki Whenua Landcare Research to train colleagues to use the eradication model which developed during her postdoctoral fellowship.

Film and television

- Priscilla Wehi was featured in the short film [Te Whakairo](#), which followed the creation of the whakairo which were part of the Vision Mātauranga programme led by Priscilla, examining how Māori perspectives align with the Ross Sea Marine Protected Area in Antarctica. *Te Whakairo* was selected for the Give Me Shorts Film Festival.
- Shaun Hendy, co-hosted series 2 of TVNZ's [What Next?](#) *What Next?*, asked Kiwis what they wanted New Zealand to be like in twenty years' time... for technology, the economy, the environment and the way we live. The four-part documentary series looked at those ideas in action, meeting Kiwis with radical ideas showing us the path to future-proof New Zealand.



2019–2020 student summer interns.

Young achievers: Our 2019–2020 student summer interns

Several New Zealand university students took up the opportunity to join Te Pūnaha Matatini's 2019–2020 summer internship programme, with paid 10-week placements working on research projects with a variety of our partner organisations.

Once again, our student interns had a range of backgrounds and came from all parts of the country, but they all shared a common desire to make the world a better place through the application and analysis of data, while gaining on-the-job experience.

"This programme is now its fifth year of operation and each year we have had an amazing group of students take up some fantastic opportunities with our partners," said Kathryn Morgan, Research Operations Coordinator at Te Pūnaha Matatini. "The core objectives remain the same as previous years – providing students with invaluable data analytics experience and insights into working for organisations in the real world."

The 2019–20 programme featured some very interesting projects involving a mix of both public and private sector work. Here we profile a few of the projects our interns worked on:

Developing complex systems models – Ministry for the Environment

A team of three interns in our programme were placed with the Ministry for the Environment (MfE) where they piloted a complex systems approach to modelling policy problems.

Shnece Duncan, a University of Canterbury Master of Commerce in Economics student, Ellena Black, a University of Auckland Honours degree graduate in Applied Mathematics, and Quyen Nguyen, a University of Otago Finance PhD student, looked at how various aspects of New Zealand's economy, financial system and environment could be more effectively modelled to improve MfE policy.

"Using a complex systems approach, the models we developed aimed to better understand the cumulative impacts of multiple policies and stressors on the environment and

people. As an example, we developed a simulation model that explored the on-farm adoption of new practices in New Zealand. Each farmer was modelled as a separate agent within neighbourhood and social networks. Each farm was modelled to be at a different life-cycle stage, producing either sheep, beef, dairy, or forestry products, with different decision-making strategies. We would like to extend a huge thank you to the MfE, especially senior analyst Jack Bisset, for their support and guidance throughout our internship."

Analysis of a complex organisation's carbon footprint – Te Pūnaha Matatini

Two of our interns analysed data on Te Pūnaha Matatini's carbon emissions over the past few years to better understand our past and current performance in this area.

Ebba Olsen, a University of Auckland Bachelor of Science student majoring in Mathematics and Logic and Computation, and Kahu Te Kani, a University of Canterbury Bachelor of Science graduate with a major in Mathematics and Economics, produced a detailed report that will be used to guide future Te Pūnaha Matatini decisions regarding the need for staff to fly in particular.

"As with any organisation we could lower our CO₂ emissions if we simply flew less," wrote Ebba and Kahu. "We could hold more meetings remotely, for example over Skype, or use other more environmentally-friendly modes of transportation – if travelling is absolutely necessary. However, an obvious hurdle in using these other modes of transportation is the lack of efficient inter-city transport options across New Zealand."

Ebba's and Kahu's internship supervisor, Te Pūnaha Matatini Director Shaun Hendy, is a well-known advocate for flying less to reduce our impact on the climate, and has written extensively on the subject.

"We would encourage other organisations to conduct a similar analysis of their CO₂ emissions and to reduce them where possible," said Shaun.

Creating an app to enrich the network visualisation experience – Nebula Data

Shih-Hao (Samuel) Chen, a University of Auckland Bachelor of Engineering study majoring in software engineering, worked with Te Pūnaha Matatini start-up Nebula Data during his summer internship.

The main objective of this project was to develop an application that would provide analysts with an enhanced way to see (visualise) networks.

"Networks arise in all shapes and forms in our everyday lives," said Samuel. "However, [their features] are challenging to interpret, and transforming the dataset into a useful visualisation relies on inflexible third-party applications. We wanted to build a supportive, customisable tool that would enable data analysts to uncover new observations."

Further details about individual and team projects

Following the completion of their placements, some of our interns wrote about their experiences and their detailed reports are available on Te Pūnaha Matatini's website:

[Te Pūnaha Matatini interns at Ministry for the Environment](#)

[Te Pūnaha Matatini interns report on centre's carbon emissions](#)

[Creating an app to enrich the network visualisation experience](#)

Te Pūnaha Matatini Summer Internships 2019

Quyen Nguyen, *Agent-based modelling to explore environmental and economic dynamics*, Ministry for the Environment, Wellington

Ellena Black, *Agent-based modelling to explore environmental and economic dynamics*, Ministry for the Environment, Wellington

Shnece Duncan, *Agent-based modelling to explore environmental and economic dynamics*, Ministry for the Environment, Wellington

Shih-Hao (Sam) Chen, *Machine Learning with Natural Language*, Nebula Networks Ltd, Auckland

Kahumoerangi Te Kani, *Te Pūnaha Matatini Analytics*, Te Pūnaha Matatini, Auckland

Ebba Olsen, *Te Pūnaha Matatini Analytics*, Te Pūnaha Matatini, Auckland

Isabelle Steinmann, *Natural language processing to improve decision-making processes*, Treasury, Auckland

Annie Wu, *Using design-based approaches to help translate complex concepts in science*, AgResearch, Hamilton

International collaborations

Visiting fellowships

Nirmal Nair	University of North Carolina (North Carolina, USA), <i>Electrical and Computer Engineering, energy block-chain and cyber-resilient energy systems</i> . This ongoing collaboration involved a long-term (three month) Visiting Fellowship, and Visiting Research Professorship.
David Hayman	Universidade Estadual Paulista (Sao Paulo, Brazil), Infectious Disease Epidemiology. This collaboration included the exchange of a PhD student, Renata de Lara Muiyaert, to study the Infectious Disease Epidemiology of Hantaviruses to determine how complex interactions between rodent species, and ecological changes like defaunation of forests or forest loss, lead to disease emergence.
William Godsoe	Eidgenössische Technische Hochschule (Zürich, Switzerland), <i>Competition and climate change's effects on range limits in the Swiss Alps</i> . With collaborator Jake Alexander, William received a short-term visitor's grant for a several-month stay, during which the team synthesized results from game theory and consumer resource ecology, to predict how climate change will affect alpine plants.
Pierre Roudier	GladSoilMap (Orleans, France), <i>Pedometrics/quantitative soil science</i> . Pierre had a visiting Fellowship with The GLOBE Digital SOIL MAP (GLADSOILMAP) consortium, which brings together world scientific leaders involved soil science. Soil science has critical relevance to global issues, such as food and water security, climate regulation, sustainable energy, desertification and biodiversity protection.
Marama Muru-Lanning	FMHS (Tokyo, Japan), LILACs <i>Longitudinal Study of Ageing</i> , Visiting Fellowship.
Steffen Lippert	Australian National University (Canberra, Australia), <i>Attack, Defense and the Market for Protection</i> , two-week visiting Fellowship.

Other international collaborations

Dion O'Neale	Leibniz Institut für Europäische Geschichte (Mainz, Germany), <i>Bipartite social networks</i>
Barry Milne	Duke University (North Carolina, USA), <i>Concentration of service use in the population</i>
Michael Plank	Queensland University of Technology (Brisbane, Australia), <i>Mathematical models and statistical inference for collective cell behaviour</i>
Simone Linz	University Maastricht (Maastricht, Netherlands), <i>Parameterized complexity in phylogenetics</i>
Michael O'Sullivan	LiHuili Hospital (Ningbo, China), <i>Data-informed Surgical Scheduling</i>
Melinda Allen	University of Tübingen DFG Center for Advanced Studies Words, Bones, Genes, Tools (Tübingen, Germany), <i>Probing the genetic diversity and demographic history of ancient seafarers in ISEA and Oceania, from archaic hominins to the dispersal of the Malayo-Polynesian language family</i>
Ilze Ziedins	International Centre for Mathematical Sciences, Edinburgh University (Edinburgh, Scotland), <i>Accumulating priority queues in heavy traffic (prioritization for healthcare delivery)</i> Karlsruhe Institute of Technology (Karlsruhe, Germany), <i>Sequencing and scheduling patients in EDs (emergency departments)</i>
Steffen Lippert	Paris School of Economics (Paris, France), <i>Learning and market entry</i>
Rebecca Turner	The National Socio-Environmental Synthesis Center (SESYNC), (Annapolis, USA), <i>Global insect invasions</i>
Les Oxley	Lund University (Lund, Sweden), <i>Sustainable development</i>
Marcus Frean	Max Planck Institute for Evolutionary Biology (Plön, Germany), <i>Beliefs: a catalyst for cooperation</i>
Thegn Ladefoged	Spatial Archaeometry Research Collaborations (Kona, Hawaii, USA), <i>Measuring the Influence of Royal Centers in the Early States of Ancient Hawaii</i>
Michael Plank	York Centre for Complex Systems Analysis (York, United Kingdom), <i>Dynamic size-spectrum models for marine ecosystems and harvesting</i>



Kate Hannah appointed Deputy Director, Equity and Diversity

As announced in June 2019, Kate Hannah has taken on the newly created role of Deputy Director, Equity and Diversity, for Te Pūnaha Matatini.

Prior to Kate's appointment, Te Pūnaha Matatini's Advisory Board had approved the creation of the role within the Te Pūnaha Matatini, the responsibilities of which would include developing, maintaining, and delivering on the diversity, equity, access, and inclusion strategy.

An exhaustive search process was not required as the best person for the job was already with us, said Shaun Hendy, Te Pūnaha Matatini Director. "We would normally run an open process calling for investigators to fill the role, but the circumstances here are unusual, in that Kate had effectively been filling this role on the executive team for the last four years," said Shaun. "In these circumstances, the Board agreed to appoint Kate to the position until the end of the 2020 contract as a way of recognising her mahi."

Kate's appointment was a well-deserved achievement and one celebrated by us all. Just a couple of weeks earlier, in May 2019, we were thrilled to see her recognised with the University of Auckland's Vice-Chancellor Excellence Award for "Exhibiting Personal Leadership Rangatiratanga" for substantive, extraordinary, consistent and inspiring leadership in promoting inclusiveness and diversity for women and other under-represented groups.

That award also acknowledged Kate's work over the years developing and implementing equity and diversity codes of conduct that are used not only within Te Pūnaha Matatini but across the wider New Zealand scientific research system.

It also recognised her key role designing, organising and delivering a highly successful event at the University of Auckland in 2018 – the Faculty of Science's 125th anniversary of women's suffrage in New Zealand celebration.

Kate, who holds a Master of Arts (2004) from Waikato University in 19th Century American Literary Culture, is a research fellow in the Department of Physics at the University of Auckland. She is also undertaking a Te Pūnaha Matatini-funded PhD in the Science and Society Group at Victoria University Wellington, researching novel hybrid methodologies for the historiography of science.

Awards, Media and Whānau



Recognising excellence within our CoRE

Several Te Pūnaha Matatini researchers received awards recognising their research efforts, leadership skills, and science communication activities in 2019.

Dr Jeanette McLeod and Dr Phil Wilson

Dr Jeanette McLeod and Dr Phil Wilson, mathematicians from the University of Canterbury, Te Pūnaha Matatini investigators and the co-founders of Maths Craft New Zealand, were awarded the New Zealand Association of Scientists (NZAS) Cranwell Medal for Science Communication in October 2019.

Jeanette and Phil have been on a mission to rid New Zealanders of their maths phobia since launching Maths Craft NZ, a non-profit initiative, in 2016. In 2019 Maths Craft welcomed just over 2,000 people to nationwide events, bringing the total number of Maths Craft attendees to over 11,000. In addition, 13 teachers attended Professional Development Workshops run by Maths Craft in 2019.

Maths Craft aims to celebrate the links between mathematics and craft, showing people of all ages how fun, creative and beautiful maths can be, and to demonstrate what it means to think like a mathematician. As Director and Deputy Director of Maths Craft, Jeanette and Phil have brought maths to the masses. More than 11,000 people from a diverse variety of backgrounds have now attended the regular free Maths Craft festivals and workshops, making it the largest maths outreach programme in New Zealand.

"With maths often seen as boring or scary, Jeanette and Phil have introduced thousands to a colourful alternative reality – of patterns, grand ideas and art," said Murray Cox, incoming Co-director at Te Pūnaha Matatini. "Telling the real story of maths in new and exciting ways that are characteristically their own, Jeanette and Phil have a special ability to engage everyone – from toddlers to teenagers to tipuna. The award



of the Cranwell Medal recognises their unique contribution to New Zealand's public science scene."

Cilla Wehi, incoming Co-director at Te Pūnaha Matatini, agreed. "Jeanette and Phil are two extremely talented mathematicians and ingenious communicators who have inspired many people around New Zealand, including me, to learn more about maths," said Cilla. "I'm thrilled to see their wonderful work recognised with this award." Jeanette and Phil have written dozens of freely available instructional handouts to be distributed at Maths Craft events. Furthermore, they have trained and mentored many volunteers and team members, trained teachers, given public talks, and collaborated with other researchers to determine the efficacy of their approach. Te Pūnaha Matatini has been a proud supporter of Maths Craft since its inception.

Further prizes awarded in 2019

- **Kate Hannah**, The Langham Prize, The Australasian Association for the History, Philosophy, and Social Studies of Science
 - **Kate Hannah**, Vice Chancellor's Excellence Prize, University of Auckland
 - **Kirsten Locke**, The Red Queen Effect: Women in Academia Award, University of Auckland
 - **Markus Luczak-Roesch**, Early Career Research Excellence Award, Victoria University of Wellington
 - **Maui Hudson**, Excellence in Research Award, University of Waikato
-

In the media

Te Pūnaha Matatini investigators were regularly sought for their expert opinion and comment by a range of local and international media in 2019.

Adrian McDonald

- [“These models are good. They have real predictive power.” Q&A with departing P&O lead, Adrian McDonald](#) (National Science Challenges)

Alex James

- [New data analysis proves: Science is sexist](#) (Scoop)
- [Science is sexist, new analysis finds](#) (Tech Explorist)
- [Science still dominated by ‘old boys’ club’, NZ study finds](#) (NZ Herald)

Andrea Byrom

- [You live on a planet facing a million-species extinction](#) (The Spinoff)
- [Andrea Byrom: Using technology to combat plant diseases](#) (Newstalk ZB)
- [Budget 2019: What people are saying](#) (Labour)
- [Global extinction rates accelerating – Expert Reaction](#) (Science Media Centre)
- [A million species threatened with extinction – UN report](#) (RNZ)
- [Extinction Horizon](#) (RNZ)
- [Budget gives DOC an extra \\$100m](#) (Wilderness Mag)
- [One million species at ‘imminent’ risk of extinction due to humans – UN Report](#) (Newshub)
- [Bleak diversity report: we must rethink our economics paradigms](#) (Newsroom)
- [NZ ‘flying blind’ on environment](#) (Taranaki Daily News)
- [Budget: Cash boost to keep DOC rangers safe from threats](#) (NZ Herald)

Ann Brower

- [Treasury warns scrapping tenure review could cost the Government more; Minister says there are alternatives to conserving pastoral land without the crown](#) (Interest)
- [Tenure review to be scrapped](#) (Newsroom)
- [Christchurch, New Zealand, shattered by a 2011 earthquake, offers an urgent lesson for California](#) (Los Angeles Times)
- [Why the Christchurch earthquake is often used as a case study for what could happen in Salt Lake City](#) (Deseret News)
- [Environmentalism welcomes end of tenure review](#) (Morning Report, Radio New Zealand News)
- [Call for change over lands role](#) (The Press, Christchurch)
- [Land and sale plan halted](#) (The Press, Christchurch)
- [Pastoral lease checks to increase](#) (The Press, Christchurch)
- [Tenure review’s “Gold-Rush” issue](#) (The Timaru Herald)

Anna Matheson

- [Anna Matheson: Reflections from a palace in Salzburg](#) (Hawkes Bay Today)
- [The Wellbeing Budget: What difference might it make?](#) (Croakey)
- [Budget 2019: Wellbeing – Expert Reaction](#) (Science Media Centre)
- [What exactly is a wellbeing budget?](#) (Newsroom)
- [Are we measuring success in our societies the wrong way?](#) (Stuff)

Audrey Lustig

- [Surge funding investment](#) (National Science Challenges)

Barry Milne

- [Poor neighbourhoods driving obesity for young Māori – study](#) (Newshub)
- [Drop in childhood obesity rates prompts more research](#) (Otago Daily Times)

- [Government data could be used to prevent youth suicide, academic says](#) (Stuff)
- [Poor neighbourhoods driving obesity for young Māori – study](#) (Newshub)
- [Drop in childhood obesity rates prompts more research](#) (Otago Daily Times)

Cate Macinnis-Ng

- [It’s ridiculous’: Top kauri scientist over lack of protection for Titirangi’s Awhiawhi](#) (NZ Herald)
- [1080 debate: time to face reality](#) (Ideasroom)
- [Mātauranga Māori ‘needed’ to help fight the world’s biodiversity crisis](#) (Stuff)
- [Mātauranga Māori special issue](#) (National Science Challenges)
- [A threat to our mighty atmospheric guardians](#) (Lincoln Ecology)
- [1080 debate: Time to face reality](#) (Stuff)
- [The unpopular tree sucking carbon from our air](#) (Newsroom)

Claire Postlethwaite

- [A growing number of female students are making waves in STEM and the world is taking notice](#) (Stuff)

Daniel Hikuroa

- [Give rivers more room to flood](#) (The Spinoff)
- [Raising the Bar: how to make our rivers healthy, according to Dan Hikuroa](#) (RNZ)
- [Veronika Meduna: Kaitiakitanga – Seeing Nature As Your Elder](#) (Scoop)
- [Mātauranga Māori could help with climate issues action seminar told](#) (Stuff)
- [How far should the indigenisation of university teaching and research go?](#) (The World University Rankings)

David Maré

- [Interactive: Do Kiwis choose to live in racially diverse neighbourhoods? Researchers find a surprising answer](#) (NZ Herald)
- [Coverage of housing and migration paper](#) (TVNZ; Herald; Stuff; Voxy; interest.co.nz; NZ Advisor)

David Hall

- [How the Christchurch Principles will fight the spread of hate](#) (The Spinoff)
- [David Hall: Climate emergency? Try revolution](#) (NZ Herald)
- [Why our response to climate change needs to be a just and careful revolution that limits pushback](#) (Noted)
- [Counterterrorism experts on why we must engage with online extremists](#) (Noted)
- [The Vision of Participatory Parity: a conversation between Cushla Donaldson and David Hall](#) (Circuit)
- [Climate change: The revolution](#) (RNZ)
- [Climate change revolution is now inevitable but we can still steer it – expert](#) (Newshub)

David Hayman

- [Science Media SAWY Express: David Hayman – Drinking Water Quality](#) (Science Media Centre)
- [Measles: What you need to know](#) (Newsroom)
- [Measles in Canterbury – Expert Q&A](#) (Scoop)
- [Measles warning for babies across the country](#) (Stuff)
- [Forty-seven measles cases in NZ this year: What you need to know](#) (NZ Herald)
- [Measles in Canterbury – Expert Q&A](#) (Science Media Centre)
- [One health – in Uganda](#) (NZVA)
- [Measles: who’s at risk?](#) (Health Central)

- Funding cuts hamper efforts to combat antibiotic resistant superbugs (NewstalkZB)
- Local Focus: Measles cases are a case for vaccines (NZ Herald)
- Joining the dots: What's really causing New Zealand's measles epidemics (RNZ)
- Mentor programme for disadvantaged kids (RNZ)
- More than three-quarters of people with measles not vaccinated (Newstalk ZB)

David Welch

- Is co-housing the answer to our housing crisis? (Newsroom)
- A life together: The rise of cohousing, papakāinga and the 'social mortgage' (The Spinoff)

Dion O'Neale

- Why women aren't continuing in physics (Scoop)
- A study suggests women are discontinuing physics study because of their high school teachers' attitudes (NZ City)
- Māori social networks revealed by obsidian (Stuff)
- Marathon: Daniel Jones is practising what he preaches in adding Hawke's Bay title to resume (NZ Herald)

Inga Smith

- Concerns raised over 'snow factory' bid (Otago Daily Times)
- From Greenland to Antarctica via Dunedin (Antarctica New Zealand)
- What is the carbon footprint of international tourism in NZ? (Stuff)

Isabel Castro

- Could native birds control pests in orchards? (This NZ Life)
- Kiwi Sponsorship (Hiking New Zealand)

Isabelle Sin

- Gender pay gap affects specialists – new study (ASMS)
- Gender pay gap affects specialists – new study (Scoop)
- Kiwi female doctors earn 12 percent less than male doctors (Newshub)
- Research uncovers stark gender pay gap among NZ medical specialists (NZ Herald)
- Gender pay gap: Female medical specialists paid less per hour than male co-workers (Stuff)
- Students' associations union calls Government 'dishonest' over allowance inaction (Te Waha Nui)

James Sneyd

- Multi-scale modelling of saliva secretion (NeSI)

Jeanette McLeod

- Maths can be fun (Martinborough Star)

Jonathan Tonkin

- In-depth approach to river management (Nature)
- River Management on a Changing Planet (Environmental Monitor)

Kate Hannah

- Enough is enough. NZ universities need to reckon with rife sexual misconduct (The Spinoff)
- Kate Hannah: Don't be fooled, far right groups have not been silenced (RNZ)
- Ready, Steady, Learn w/ Kate Hannah (95bfn)
- Open letter denounced white supremacy at Auckland University (Noted)
- Hundreds of university staff sign letter denouncing white supremacy at Auckland University (TVNZ)
- Become an adult university student for a week (Scoop)
- Kiwi Women in Science: How are we doing? (Stardome)

Kirsten Locke

- Why women aren't continuing in physics (Scoop)

Krushil Watene

- New degree on sustainable development to empower change-makers (Channel Mag)

- The meaning of philosophy in perplexing times – philosopher (Fuseworks Media)
- Drone film for reality check of NZ environment (Voxy)

Leilani Walker

- Leilani Walker's Spiders (RNZ)
- The Project: Spider expert gives Kiwis the biting truth on white tails (Newshub)
- Expert on New Zealand Spiders (RNZ)
- How to avoid the spring white tail invasion (MSN)

Lynn Riggs

- Research targets drought impact (Farmers Weekly)
- Over \$145m spent on health issues caused by poor housing (Otago Daily Times)
- World Health Organisation lays out blueprint to improve housing and potentially help NZ save millions (Stuff)
- Poor housing conditions costing taxpayers more than \$145m (RNZ)
- How will climate-driven drought impact rural communities? (Scoop)
- Census figures show one in five houses affected by dampness (Newstalk ZB)
- Poor housing costs NZ \$145m a year: new study (Health Central)
- Injuries, disease from bad housing costs New Zealand up to \$164m a year (NZ Herald)
- Making rentals warm & dry (Scoop)
- Improving New Zealand's rental homes will save the health systems millions every year (New Zealand Doctor)
- Health, the IDI and evidence-based policy (The NZ Initiative)
- Emissions across the economy – Expert Reaction (Science Media Centre)
- New guidelines may avert big health bills (Taranaki Daily News)

Marama Muru-Lanning

- The Voices of our Harbours: Kāwhia Manukau and Whangārei (Royal Society)
- Marsden researchers listen to voice of harbours (Waatea News)
- University of Auckland welcomes Te Pūtea Rangahau a Marsden (Scoop)
- Year in Review: In the time of public anthropologies (Journal of the American Anthropological Association)

Markus Luczak-Roesch

- The web is broken. We need to fix it (Stuff)
- What Google hides from its users (Newsroom)
- Online citizen science benefits primary education (Education Gazette)
- Former extremist backs Facebook ban on white nationalists (Newshub)

Matthew Parry

- NZ scientists in mission to reveal cosmic ripples (NZ Herald)
- Retirement after 54 years – on the third go (Otago Daily Times)

Maui Hudson

- Launch of the Māori STEAM Strategy and action plan (SunLive)
- Māori development (Bay of Plenty Times)

Michael Plank

- Spreading the load on fisheries through balanced harvesting (Royal Society)
- Spreading the load on fisheries through balanced harvesting (Phys.org)
- New data analysis proves: Science is sexist (Scoop)
- Science still dominated by 'old boys' club', NZ study finds (NZ Herald)
- When the engineer met the biologist (Malborough Express)
- Old boys' club still dominates NZ science (Stuff)
- We should stop catching big, old fish (Stuff)

Michelle Dickinson

- Nanogirl Michelle Dickinson: Could your makeup make you sick? (NZ Herald)
- Nanogirl Michelle Dickinson: Are mobile phones really bad for our health? (NZ Herald)
- Nanogirl Michelle Dickinson: Scientists may have figured out why we hiccup but there's still no cure (NZ Herald)
- Nanogirl Michelle Dickinson: Drink up, your beer could also heat your barbecue (NZ Herald)
- Nanogirl Michelle Dickinson: Pursuit of the perfect garden is blowing away our insect population (NZ Herald)
- Why NASA is sending mannequins into space (Newstalk ZB)
- Nanogirl Live science show set to show off to Manawātū crowd (Stuff)
- Nanogirl captivates Roslyn School with homemade inventions and wacky experiments (Stuff)
- Nanogirl Michelle Dickinson: Smartphone access technology: Keep your finger on the pulse (NZ Herald)
- Spray-on surface makes toilet stains a thing of the past (Newstalk ZB)
- Nanogirl producers promise fiery performance, despite crackle being stolen (Stuff)
- Nanogirl Michelle Dickinson: Don't count on houseplants to clean the air (NZ Herald)
- Nanogirl Michelle Dickinson: Students who play musical instrument perform better academically (NZ Herald)
- Nanogirl Michelle Dickinson: Modelling the flu to spread information (NZ Herald)
- Nanogirl Michelle Dickinson: Don't count on houseplants to clean the air (NZ Herald)
- Nanogirl Michelle Dickinson: Students who play musical instrument perform better academically (NZ Herald)
- Nanogirl Michelle Dickinson: Flashing lights and positive motivational thoughts help teens get more sleep (NZ Herald)
- Letters: Climate change, house flipping, history lessons and Michelle Dickinson (NZ Herald)
- I loved tech way before it was cool – Dr Michelle Dickinson (CIO)
- PM's chief science advisor weighs in on 5G concerns (Newstalk ZB)
- Michelle Dickinson on Eating Fried Chicken in the Shower: "I feel like an imposter" (RNZ)
- Nanogirl Michelle Dickinson: Driving your car drives up microplastic pollution (NZ Herald)
- Nanogirl Michelle Dickinson: Why plants panic when it rains (NZ Herald)
- Nanogirl Michelle Dickinson: Concrete solutions to cut carbon dioxide emissions (NZ Herald)
- Nanogirl Michelle Dickinson: Give dads the gift of freedom from criticism this Father's Day (NZ Herald)
- Nanogirl Michelle Dickinson: An apple and millions of bacteria a day keep the doctor away (NZ Herald)
- Nanogirl Michelle Dickinson: Being left-handed changes structure and function of your brain (NZ Herald)
- Nanogirl Michelle Dickinson: A coat of many strong and super-stretchy cobwebs (NZ Herald)
- Nanogirl Michelle Dickinson: Its never too late to start exercising (NZ Herald)
- Nanogirl Michelle Dickinson: How much you sleep is genetically determined (NZ Herald)
- Scientists discover bees use their wings to surf (Newstalk ZB)
- Nanogirl Michelle Dickinson: Animal health – Breeding for cuteness is hurting our pets (NZ Herald)
- Nanogirl Michelle Dickinson: We need to reduce waste, not grow more food (NZ Herald)
- Nanogirl Michelle Dickinson: Cigarette butts and their negative environmental impact (NZ Herald)
- Nanogirl Michelle Dickinson: Aeroplane noise is making birds go deaf (NZ Herald)
- Nanogirl Michelle Dickinson: Tongues can smell you say? I guess that makes scents (NZ Herald)
- Nanogirl astonished after thieves return stolen goods (NZ Herald)
- Nanogirl Michelle Dickinson: Scientists alter cows' genetics to reduce methane emissions (NZ Herald)
- Nanogirl Michelle Dickinson: Research shows impact of poverty on children's brain development (NZ Herald)
- Nanogirl Michelle Dickinson: Is your cobalt-rich car battery the new blood diamond? (NZ Herald)
- Research shows astronaut exercise programs may help cancer patients (Newstalk ZB)
- Nanogirl Michelle Dickinson: Are ridesharing companies clogging our cities? (NZ Herald)
- Nanogirl Michelle Dickinson: A year in space alters the human body (NZ Herald)
- Nanogirl Michelle Dickinson: Grumpy cat? You may be to blame (NZ Herald)
- Nanogirl Michelle Dickinson: Obesity rates highlight need for review of social media influencers (NZ Herald)
- Nanogirl Michelle Dickinson: How to avoid eating your clothes (NZ Herald)
- Nanogirl's social media plea sees return of stolen items (RNZ)
- Nanogirl Michelle Dickinson: Scientists let the cat out of the bag – Fluffy is deliberately ignoring you (NZ Herald)
- Nanogirl Michelle Dickinson: Should breast cancer screening start at 35? (NZ Herald)
- Nanogirl Michelle Dickinson: Lights blind-side pollinating moths (NZ Herald)
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- New study reveals why cats really eat grass (Newstalk ZB)
- Nanogirl Michelle Dickinson: Children who nap perform better at school (NZ Herald)
- Study: Owning a dog helps you live longer (Newstalk ZB)
- Rob Gaimster: Concrete solutions underway to carbon dioxide emissions (NZ Herald)
- Celebrity Kiwi scientist inspires girls in Fiji (RNZ)
- Mothers, daughters and overcoming bias in the science world (The Spinoff)
- Can you spot the hidden animal in this optical illusion? (NZ Herald)
- Study reveals breakthrough in male contraceptive pill (Newstalk ZB)
- Kitchen experiments with the kids – just the thing for half-term (The Guardian)
- Five technologies from the space race we take for granted (New Zealand Listener)
- The Unity children's bestseller chart for September (The Spinoff)
- Good Times: The highlights of this weekend's events in Christchurch (Stuff)
- 5G and why you need it (NZ Herald)
- Four ways to make Wellington a happier city (Stuff)
- Scientists teach rats to drive miniature cars (Newstalk ZB)
- There's an animal hiding in this optical illusion, but you have to shake your head to see it (Business Insider Malaysia)
- You need to shake your head to see the hidden animal in this optical illusion (My Modern Met)
- T-Tech summit aims to transform transport (NZ Herald)
- Wings over Wairarapa: site map, road directions, programme (NZ Herald)
- How did dogs become our best friends? (NZ Herald)
- UK scientists have trained artificial intelligence to evaluate when people will die (NZ Herald)
- 5G phone overheats – should you freak out about radiation? (NZ Herald)

- Nanogirl science tour for underprivileged Kiwi kids in jeopardy after burglary (NZ Herald)
- Brand new Nanogirl Live! science show touring this November (Scoop)
- Dr Michelle Dickinson: Scary consequences of modern medicine (Newstalk ZB)
- Michelle Dickinson, also known as Nanogirl, demonstrates how to make "unicorn noodles" (TVNZ)
- The weekend with Michelle Dickinson – Nano Girl (The Weekend)
- Boom in NZ podcasts – In the News (Science Media Centre)
- Eating fried chicken in the shower / Michelle Dickinson: The Awesome Voice (RNZ YouTube)
- Let me jog your memory (Weekend Herald)

Murray Cox

- Finish what's on your plate (Sciblogs)
- Denisovan jawbone discovery – Expert Reaction (Science Media Centre)
- Our mysterious cousins – the Denisovans – may have mated with modern humans as recently as 15,000 years ago (Science)
- Multiple Denisovan-related ancestries in Papuans (Max-Planck-Gesellschaft)
- New branches of the Denisovan family tree discovered in Indonesia (United Press International)
- A Genetic Ghost Hunt: What Ancient Humans Live on in Our DNA? (Discover)
- Study casts new light on our mysterious ancestors (NZ Herald)
- We may have bred with Denisovans much more recently than we thought (New Scientist)
- Ancient humans were more resourceful than we give them credit for (Stuff)
- Multiple lines of mysterious ancient humans interbred with us (National Geographic)
- Huge genomic changes an afterglow of archaic human pairings (Cosmos)
- Experts Skeptical of New Study Pinpointing the Birthplace of Humanity (Inside Science)

Nirmal Nair

- Auckland jet fuel crisis: Digger blow ruptured pipe, exposed infrastructure vulnerability (NZ Herald)
- Marsden Point pipeline rupture inquiry – Expert Reaction (Science Media Centre)
- Double Shot Interview with Dr. Nirmal Nair, The University of Auckland (Interest)
- Nirmal Nair on the depth of energy stocks in NZX, Norway's wealth fund and renewables, Saudi Arabia's Aramco IPO delay, Royal Dutch Shell's electric aspirations and the top global power companies (Interest)
- This floating solar farm is a damn clever climate change weapon (Wired)

Niven Winchester

- Rugby World Cup: Economist predicts All Blacks will beat South Africa in the final (Stuff)
- All Blacks have better chance of World Cup win than 2015 – economist (Reuters)
- Japan's Rugby World Cup success was improbable. Can it keep it up? (The Economist)
- Who will win the 2019 Rugby World Cup? (Significance)
- All Blacks winning World Cup makes 'economic sense' (RNZ)
- Analytics website Rugby Vision find All Blacks have 53 per cent chance of winning the Rugby World Cup (NZ Herald)
- Economist Niven Winchester predicts teams' chances of winning Rugby World Cup (Japan Times)
- Q+A: Is New Zealand ready to go carbon zero? (The Wire)
- Title favourites? How the All Blacks have a 53 percent chance of winning the World Cup (Rugby Pass)

- Economist predicts who will win the 2019 Rugby World Cup (Scimex)
- Helping India Meet Its Climate Targets While Maintaining Economic Growth (AZoCleantech)
- How India can meet climate targets without breaking the bank (World Economic Forum)
- Lowering emissions without breaking the bank (MIT News)
- How well did an algorithm perform at the 2019 Rugby World Cup? (Significance Magazine)
- Japan's Rugby World Cup success was improbable. Can it keep it up? (The Economist)
- My fearless prediction says the All Blacks will win the 2019 World Cup (The Roar)

Phillip Wilson

- How can origami shape your brain? (Curious Minds)
- Maths Can Be Fun (Martinborough Star)

Priscilla Wehi

- Climate change threatens use of traditional Māori plants – study shows (Stuff)
- Māori whakairo to be carved in Antarctica (Te Ao Māori News)
- Māori Carvers head to Antarctica copy (Antarctica New Zealand)
- Rising seas threaten hundreds of campgrounds, habitats (NZ Herald)
- New tech to archive old objects online (Southland Times)
- Ice carvings address climate change (Waatea News)
- Māori carvers head to Antarctica (Scoop)
- Climate change threatens Māori plant use and knowledge (British Ecological Society)
- We need mātauranga Māori to halt further biodiversity loss (Scimex)
- Māori carvings taken to Antarctica's Scott Base for NIWA research programme (Stuff)
- Climate change threatens Māori plant use and knowledge – study (Voxy)
- Mātauranga Māori 'needed' to help fight the world's biodiversity crisis (Stuff)
- Māori carvers head to Antarctica (NIWA)
- Carving out a key discussion (Otago Daily Times)
- He tui, he kōkō rānei?: Māori names for native birds matter - ecologist (Te Karere TVNZ)
- How climate change could throw Māori culture off-balance (Mongabay)
- Mātauranga Māori imperative to ecological research and outcomes (Te Karere on Youtube)

Rachael Ka'ai-Mahuta

- Keeping indigenous languages alive (RNZ)

Rachelle Binny

- Threats on all sides: effective ecosanctuaries require diverse methods (Royal Society)

Rebecca Priestley

- Unveiling Antarctic life (Weekend Herald)
- Book review – Fifteen Million Years in Antarctica (RNZ)
- A wealth of literary talent at Writers on Mondays (Booksellers)
- Contemporary Feminism: A panel discussion about art and science (RNZ)
- Rebecca Priestley (Curious Minds)
- Lucky to be here: Dr Rebecca Priestley on the harsh reality of Antarctica (New Zealand Listener)
- Rebecca Priestley – Fifteen Million Years in Antarctica (RNZ)
- Lunchtime Talk: Rebecca Priestley, 'Illustrating precarity' (Scoop)
- AFTERGLOW: Fifteen Million Years in Antarctica by Rebecca Priestley (Unity Books)
- Fifteen Million Years in Antarctica (Science in Society)
- Extract: Fifteen Million Years in Antarctica, a memoir beginning in Wellington (The Spinoff)

- Fifteen Million Years in Antarctica: A book extract (North & South)
- Why carbon emissions need to be part of our daily decision making (Stuff)
- New science journalism projects funded (Science Media Centre)
- Loose Reads w/ Jenna Todd: December 16, 2019 (95bfrn)
- CSIS JOINS #SCHOOLSTRIKE4CLIMATE (Science in Society)

Rebecca Turner

- App detects and predicts pests (Farmers Weekly)
- Keeping NZ pest free (Biological Heritage National Science Challenge News)
- Predicting pests before they arrive (Biological Heritage National Science Challenge newsletter)

Rhian Salmon

- CSIS JOINS #SCHOOLSTRIKE4CLIMATE (Science in Society)

Richard Arnold

- Census 'disastrous', but not useless (Newsroom)
- 2018 Census described as 'woefully inadequate' by stats expert (Newstalk ZB)
- Data Expert disappointed at botched Census (RNZ)
- Extreme weather linked to greater public trust in science (Stuff)
- Census 2018 independent review – Expert reaction (Science Media Centre)
- Political Roundup: Statistics NZ and a census failure of 'epic proportions' (NZ Herald)
- Why getting the census count right was so important (RNZ)
- Census 2018 independent review – Expert reaction (Scoop)

Sally Davenport

- Meet the researchers: SFTI Director, Professor Sally Davenport, MNZM (National Science Challenges)
- Where science benefits business and society (NZ Business)
- Productivity Commission appointments bolster (Scoop)

Shaun Hendy

- Physicist Shaun Hendy maps the lows, highs and sleepless buses of a no-fly year (Stuff)
- Shaun Hendy: Why you should rethink jetting away this summer (NZ Herald)
- Shaun Hendy: The case for not flying this year (NZ Herald)
- Shaun Hendy's year without flying (Yoogo Share)
- Alternative protein focus at ProteinTECH (Meat Export NZ)
- How much does flying contribute to climate change? (Sciblogs)
- Professor Shaun Hendy, Is Gravity a Social Construct (Sci21)
- Climate change contrarians' receive 49 per cent more media coverage than scientists, US study finds (TVNZ)
- Climate change – the kids know it's not OK (Newsroom)
- Trying to stay grounded (Otago Daily Times)
- Covering climate now series: What I learned in my no-fly year (NZ Herald)
- Eco-flying is far, far away (RNZ)
- No fly zone: I didn't catch a plane for a year and saved 19 tonnes of CO₂ (The Guardian)
- Shaun Hendy - How much does flying contribute to climate change? (Brave New Europe)
- Measuring the Science Media Centre's impact (Science Media Centre)
- Auckland professor says Kiwis should quit air travel to protect the environment (Newshub)
- Air Travel or Not? (Radio Adelaide)
- Physics professor on the merits of no fly campaign (The Panel, RNZ)
- How to cope when you've given up air travel but still need to see people (Stuff)
- Growing movement urges passengers to ditch air travel to tackle climate change' (Q + A, TVNZ)
- "Ways to boot out bias" (Nature 566 (7745), 567–569 (2019))
- Climate explained: how much does flying contribute to climate change? (The Conversation)

Siouxsie Wiles

- Profile: Siouxsie Wiles (Curious Minds)
- Where do I draw the line? Stuffing a jade 'egg' into my vagina (The Spinoff)
- Slip slop scrap: On the Cancer Society vs Consumer NZ sunscreen fight (The Spinoff)
- The Open Source Period project: my open leadership journey begins! (Sciblogs)
- Open Source Period (Sciblogs)
- Open by design, not default. (Sciblogs)
- Can breastmilk really contaminate pools? (95bfrn)
- How her bright pink hair helps Dr Siouxsie Wiles read people (NZ Herald)
- Contemporary Feminism: A panel discussion about art and science (RNZ)
- Calcium supplements: Don't waste your time and money (Stuff)
- The chemistry of pavlova (Stuff)
- From tripe, a Kiwi medical innovation (Stuff)
- Measles causes body to 'forget' immunity, new studies find (Stuff)
- Don't consume activated charcoal (Stuff)
- When it comes to NZ drugs, better safe than sorry (Stuff)
- Greta's mates: The responsible generation (Stuff)
- Tackling kauri dieback an ethical way (Stuff)
- Ebola drugs show promise, even as stigma persists (Stuff)
- Science: When it's time for the sex talk (Stuff)
- Parasite travelling from cats to dolphins (Stuff)
- Gut bacteria interfere with medicine (Stuff)
- Better strategy to control malaria: Get rid of the mosquitoes (Stuff)
- Octopus farming unsustainable, unethical, unnecessary (Stuff)
- Bad science: Caster Semenya, testosterone and the athletics federation (Stuff)
- Science: Are we performing at our best? (Stuff)
- Is a heartbeat always a heartbeat? (Stuff)
- The superhero squid, the Hawaiian bobtail (Stuff)
- Why we must explain vaccines to kids (Stuff)
- Periods: The painful side of sexism lacks research and funding (Stuff)
- Measles: The global crisis that shouldn't be (Stuff)
- Riding the crimson wave: Placebo periods (Stuff)
- Kids, screen time and potatoes: New study reveals important point to researchers (Stuff)
- Scientists must give credit where it's due (Stuff)
- Prominent Kiwi wahine explain what International Women's Day means to them (Stuff)
- Haere Ra, 2019 (Nine to Noon)
- 1080 or not? New antibiotics discovered and why we freeze (Nine to Noon)
- Ditch the supplements and sci-fi holograms (Nine to Noon)
- Measles long-term impact, tsunami fungus and bendy materials (Nine to Noon)
- Mutating monarchs, app eye scans and tsunami fungi (Nine to Noon)
- E-ciggies asthma risk, a nose for therapy and the IgNobels (Nine to Noon)
- Supercool organs, good sleep genes and smart parasites (Nine to Noon)
- Could kauri stop kauri dieback? (Nine to Noon)
- Glow-in-the-dark sharks and self-driving bikes (Nine to Noon)
- Safe sex talks, unhatched chick bonds and stickier plaster (Nine to Noon)
- Cicada viagra, an honesty test and antioxidant downsides (Nine to Noon)
- Plankton light shows and the jacuzzi bug (Nine to Noon)
- Fighting mossies with spider venom (Nine to Noon)

- [Octopus farm, bacteria-busting viruses and old bedbugs](#) (Nine to Noon)
- [HIV drug success and rethinking the panda's diet](#) (Nine to Noon)
- [Varroa mites and bee colony loss](#) (Nine to Noon)
- [How AI can test embryo viability and out with science 'manels'](#) (Nine to Noon)
- [Why forgetting is hard](#) (Nine to Noon)
- [Why zebras have stripes](#) (Nine to Noon)
- [Science's hidden figures and an end to insulin injections](#) (Nine to Noon)
- [Bricks made from treated human sewage](#) (Nine to Noon)

Stephen Marsland

- [Professor Stephen Marsland: bird counting computers](#) (RNZ)
- [Hi-tech bird encounter](#) (The Northern Advocate)

Suzi Kerr

- [Rethinking Global Emissions Trading](#) (Kleinman Center for Energy Policy)
- [Rethinking Global Emissions Trading](#) (Buzz Sprout)
- [Plans for primary sector action on climate change](#) (Meat Export NZ)
- [Our water economics research wins big!](#) (Water Sensitive Cities)

Tahu Kukutai

- [Census data unusable for Māori planners](#) (Waatea News)
- [Māori have no measure of success following botched census](#) (RNZ)
- [Māori electorate seat at risk due to Census 2018 debacle](#) (Stuff)
- [Statistics New Zealand release census data, but won't publish iwi data due to quality](#) (TVNZ)
- [Stats NZ won't release iwi data, and that's a problem](#) (The Spinoff)
- [Māori top of agenda for planners](#) (Waatea News)
- [AI is here to stay. Now we need to ensure everyone benefits](#) (Scoop)

Tammy Steeves

- [Data science and machine learning in research emerge as top themes at 2019 Science Coding Conference](#) (NeSI)
- [MIL-OSI New Zealand: UC conservation geneticist comments on new DOC biodiversity strategy](#) (Foreign Affairs)

Tara McAllister

- [Why aren't universities made for people like me?](#) (E-Tangata)
- [Māori and Pasifika lecturers vastly underrepresented in New Zealand universities – research](#) (TVNZ)
- [New research highlights underrepresentation of Māori and Pasifika in academia](#) (Tertiary Education Union)
- [Māori and Pasifika scholars remain severely under-represented in NZ universities](#) (Noted)
- [Why isn't my professor Pasifika or Māori?](#) (RNZ)
- [Māori and Pasifika staff numbers in academia unchanged for five years, research shows](#) (Stuff)
- [Māori 'underrepresented in the university academy'](#) (Te Ao Māori News)
- [Māori and Pasifika scholars remain severely under-represented in NZ universities](#) (Scoop)
- [Māori and Pasifika scholars remain severely under-represented in New Zealand universities](#) (The Conversation)
- [Why isn't my professor Māori or Pasifika?](#) (Scimex)

- [Māori and Pasifika scholars remain severely under-represented in New Zealand universities](#) (Sciblogs)
- [Why isn't my professor Māori or Pasifika?](#) (Fuseworks Media)

Tava Olsen

- [Port can't move without getting this right](#) (Ideasroom)
- [Marsden Point pipeline rupture inquiry – Expert Reaction](#) (Scoop)
- [Auckland jet fuel crisis: Digger blow ruptured pipe](#) (Newstalk ZB)

Thegn Ladefoged

- [Māori social networks revealed by obsidian](#) (Stuff)
- [Māori social networks revealed by obsidian](#) (Archaeology News Network)

Troy Baisden

- [Troy Baisden: Enviro report shows our poor grasp of causes](#) (NZ Herald)
- [Climate explained: Regenerative farming can help grow food with less impact](#) (Stuff)
- [New Zealand's urban freshwater is improving, but a major report reveals huge gaps in our knowledge](#) (The Conversation)
- [New Zealand's urban freshwater is improving, but a major report reveals huge gaps in our knowledge](#) (Sciblogs)
- [Water health hui called by Te Arawa Lakes Trust](#) (Rotorua Daily Post)
- [Experts headline Te Arawa lakes evening](#) (Rotorua Now)
- [Agricultural emissions agreement – Expert Reaction](#) (Science Media Centre)
- [New Zealand launches plan to revive the health of lakes and rivers](#) (VW Magazine)
- [New Zealand launches plan to revive the health of lakes and rivers](#) (Phys.org)
- [Troy Baisden appointed scientists' president](#) (NBR)
- [Holey data leaves us 'flying blind' on environment](#) (Newsroom)
- [How New Zealand's well-being budget delivers for the environment](#) (The Conversation)
- [How New Zealand's well-being budget delivers for the environment](#) (Scoop)
- [Nitrogen limit worry unnecessary](#) (Farmers Weekly)
- [New Zealand's lack of data risks 'irreversible damage' to the environment](#) (Stuff)
- [Does the "Well-Being Budget" include environmental wellbeing?](#) (RNZ)
- [Freshwater action plan – Expert Reaction](#) (Science Media Centre)
- [At 'tipping point': Can we still save NZ's rivers and lakes?](#) (New Zealand Herald)
- [Water Gas Work Needs More Work](#) (Farmers Weekly, 11 Nov p22)

Tze Ming Mok

- [They shit what you feed them': Tze Ming Mok on data limits](#) (The Spinoff)
- [After a long silence: A letter to a lost friend in Xinjiang](#) (The Spinoff)
- [Violent racist guilty of violent racist attack. The law says: nah, no hate crime](#) (The Spinoff)
- [The Women's March: The most conservative protest I've been on?](#) (The Pantograph Punch)
- [Extreme' pro-China candidate raises disquiet](#) (Newsroom)



View links to all of Te Pūnaha Matatini's 2019 media
<https://www.tepunahamatatini.ac.nz/2019-in-the-media/>



Te Pūnaha Matatini Whānau

Report by Julie Mugford, Chair of Te Pūnaha Matatini Whānau, an active transdisciplinary community with a shared interest in complex systems and networks, comprising postgraduate students, post-docs and early career researchers from all over New Zealand.

Te Pūnaha Matatini Whānau is a meeting place for us to share our skills and develop new skills, in particular leadership and entrepreneurship, and acquire the tools needed to become successful scientists and entrepreneurs in New Zealand.

While many of our members have supervisors or colleagues affiliated with Te Pūnaha Matatini, our Whānau is an inclusive group and we welcome anyone who feels their research aligns with one or more of Te Pūnaha Matatini's research themes and is keen to be involved.

Our members are undertaking transdisciplinary research which can make it difficult to fit in to any one department at their institute. By belonging to our Whānau network our members can feel part of a collective and meet other researchers who share their interest in complex systems and networks.

Te Pūnaha Matatini Whānau provides a space for collaboration and skill-sharing, and we encourage our members to take an active role in shaping our goals and activities. We organise a range of seminars and workshops with the aim to encourage networking, to develop leadership and entrepreneurial skills, and for outreach.

Activities are held all over New Zealand and we offer a limited amount of travel funding to support attendance at Whānau events. The first Te Pūnaha Matatini Whānau event of 2019 was our annual retreat at Waitetuna retreat centre, Raglan, Waikato, in July. The retreat was attended by 17 Whānau

members. We were fortunate to have fantastic guest talks from Waikato University Associate Professor Hēmi Whaanga (Ngāti Kahungunu, Ngāi Tahu, Ngāti Mamoe, Waitaha) on Māori astronomy and Matariki, Livestock Improvement Corporation's Pricing and Market Analysis Manager Mark Hannagan on critical thinking and thinking differently, and NIWA's Dr Paula Blackett on serious games – new ways to empower choice and learning in climate change adaptation. We had great opportunities to learn skills from fellow Whānau members who ran workshops on reproducible research and version control using Git and Github, an introduction to Python and Latex, and sentiment analysis with R.

We also had plenty of less structured group time for everyone to share different techniques and tools they use in their research and studies, for example, how to write a coherent presentation, time management tools, and useful R packages. As always, we had a lot of social time and free time built into the schedule for the important activities like a group walk on the nearby beach, movie night, and the annual quiz night.

In August, in collaboration with Young Scholars Initiative, Te Pūnaha Matatini Whānau ran a two-day workshop on knowledge and institutions complex systems at Victoria University in Wellington that was attended by Te Pūnaha Matatini Whānau members, early career researchers linked with Young Scholars Initiative and prominent scholars in the Asia-Pacific region.



This was a great opportunity to see, learn and share various interdisciplinary topics. Prof. Julia Lane (NYU), Prof. Brownyn Hall (Berkley), Prof. Jason Potts (RMIT), Prof. Uli Zülicke (VUW) and Prof. Shaun Hendy (UoA) gave insightful lectures and discussed some of the key research they are involved in and where the frontier research is going in terms of research collaborations, blockchain technologies, economics, networks and complexity.

The last event of the year for the Whānau was a research retreat in November at New Brighton, Christchurch. The research retreat is an opportunity for Whānau members to work in small teams on a research project to develop their [individual skillsets, abilities to work collaboratively, and as a bonus publish some original research. We had eight Whānau members attend the retreat.

Prior to the retreat, attendees ranked a list of four potential research projects based on their interests and skillsets they have or would like to develop. From these rankings two research projects were selected and a team of four worked on each project. One team worked on a Twitter sentiment analysis before and after the Christchurch mosques attacks and utilised skills learnt from the annual retreat sentiment analysis workshop. The other team used topic modelling to look at links between New Zealand government speech topics and government spending. Both teams had some challenges preparing and sourcing data but most importantly everyone learnt a lot of new skills and techniques. We also made sure to take plenty of time to enjoy beach walks and board games.

Te Pūnaha Matatini Whānau Board 2019

Julie Mugford, University of Canterbury – Chair

Ellen Hume, University of Auckland – Vice-chair (Aug–Dec)

Mubashir Qasim, University of Waikato – Vice-chair (Jan–July)

Reno Nims, University of Auckland – Immediate Past-Chair

Hamza Ajmal, University of Waikato – Treasurer

Giorgia Vattiato, University of Canterbury – Secretary

Attaullah, University of Waikato – Communications Officer

Ellen Hume, University of Auckland – Committee Member (Jan–July)

Stephen Merry, University of Canterbury – Committee Member



Our Research





Complexity, Risk, and Uncertainty



Today, both society and the economy generate a complex torrent of data. If this unprecedented flow of information is to be made useful, we require new tools and methods for its analysis.

Our work

The measurement, interpretation, and communication of complexity and risk is a key part of modern science. Te Pūnaha Matatini researchers working within the Complexity, Risk, and Uncertainty theme are developing tools for understanding and dealing with complex systems by developing the underlying theory. This includes work on optimising stochastic systems from supply chains to healthcare, inferring numbers of New Zealand birds from their calls (AviaNZ), and building a library of New Zealand soils from their spectral signatures. Public engagement with science is also a key part of Te Pūnaha Matatini's work, and the researchers in this theme are working on ways to better understand what makes for excellent public engagement, and improve scientists' engagement with diverse publics.

Our impact

Our work is both fundamental and applied. The theory that we develop is used, by ourselves and others, to support applications for the benefit of New Zealand, and international research. This theme is outward-looking, and combines with the other two themes to form integrated projects within Te Pūnaha Matatini, as well as externally.

Research highlight:

New Zealand universities not meeting diversity, equity goals

New research led by Te Pūnaha Matatini Associate Investigator Dr Tara McAllister (shown below fronting for the media) indicates our universities are not meeting their own diversity and equity values.

Published in the *MAI Journal*, the two studies have revealed that there has been very little improvement in Māori and Pasifika representation in academic workforces in our eight universities (Auckland, AUT, Waikato, Massey, Victoria, Canterbury, Lincoln and Otago), at senior levels in particular, from 2012 to 2017.

Why isn't my Professor Māori?

Lead author of the first paper, 'Why isn't my Professor Māori?' Dr Tara McAllister (Te Aitanga ā Māhaki, Ngāti Porou) says the institutions tend to portray themselves as supportive of and adherent to diversity and equity, as well as valuing te Tiriti o Waitangi.

"Universities always have these blanket statements that they value the Treaty, but I don't think they're sure what that looks like," says Tara. "A good start is having more Māori and Pasifika academics employed."

"As you move up the academic levels of seniority, the under-representation of Māori gets worse and worse. I think that's really disappointing given the outward promotion of diversity by each of these institutions."

According to the study's findings, there was no significant change in the overall percentage of Māori employed in New Zealand's eight universities between 2012 and 2017.

Furthermore, by 2017, only 3.4% of university staff at Professorial or Dean level were Māori – a major under-representation.

Tara's co-authors included Associate Professor Joanna Kidman (Ngāti Maniapoto, Ngāti Raukawa) at the School of Education, Victoria University of Wellington, Dr. O. Rowley (Ngāi Tahu) from the College of Public Health Medicine and Veterinary Science, James Cook University, Australia, and Dr. Reremoana Theodore (Ngāpuhi, Te Arawa), Co-director of the National Centre for Lifecourse Research at the University of Otago.

Why isn't my Professor Pasifika?

Lead author of the accompanying study, 'Why isn't my Professor Pasifika?' Dr. Sereana Naepi from Thompson Rivers University, says her paper shows that representation of Pasifika academic staff within New Zealand universities is even worse than for Māori.

According to the study, numbers of Pasifika academics at New Zealand universities remained stagnant from 2012 to 2017, with five or less at senior level staff (Professors or Deans) at the beginning and end of the period assessed.

Current New Zealand university policies on diversity and equity could be understood as little more than "window-dressing", but we are not unique in that sense, says Sereana.



"New Zealand aligns with international universities and their structural exclusion of diverse bodies and ideas. Although universities have made significant headway in increasing Māori and Pasifika students they now need to invest the same effort into recruiting, retaining and promoting Māori and Pasifika academics."

"It is important to have Māori and Pasifika leadership not only in Māori and Pasifika roles but throughout the university as our diverse viewpoints can provide creative solutions that are perhaps outside of the norm for universities."

Regular academic recruiting across a range of disciplines is key

The researchers suggest there are some promising initiatives being implemented. In particular, early career academic programmes that regularly recruit emerging Māori and Pasifika academics across a range of disciplines.

"An institution-wide approach like this can have significant impacts on these numbers, and cohort hiring for indigenous and diverse academics is one way of providing ongoing support and mentoring to ensure that Māori and Pasifika rise to leadership positions quicker," says Sereana.



Find out more about our Complexity, Risk and Uncertainty research.

<https://www.tepunahamatatini.ac.nz/about-us/our-research/risk-uncertainty-and-decision-making/>



Complex Economic and Social Systems



Te Pūnaha Matatini is using methods from complex systems analysis and organisational-level data sets to understand the role of innovation in productivity growth, and to assess the importance of knowledge, network, and supply-chain spillovers on firm behaviour.

Our work

The last decade has seen dramatic advances in our understanding of complex economic networks. Researchers at Te Pūnaha Matatini are applying new methods from complexity science to better understand New Zealand's economic and innovation performance. New Zealand's failure to close the gap in GDP with other advanced economies has been attributed to our small scale and distance from major markets, but the manner in which these factors influence the New Zealand economy's ability to capture and benefit from knowledge spillovers is largely unexplored. Understanding the potentiality of spillovers from diversity will inform government policy and decision-making, and will assist in the evaluation of the effectiveness and impact of government policies.

Our impact

Our research informs government policy and decision-making, and will assist in the evaluation of the effectiveness and impact of government policies. We work closely with the Ministry of Social Development, the Ministry for Business, Innovation, and Employment, and the Ministry for the Environment, which are sponsors of much of our work.

Research highlight:

Why high achieving women aren't continuing in Physics

Most high achieving women students studying physics at university choose to discontinue physics as a core subject, not because they aren't good at physics, but because they pursue further study in the life sciences.

This is one of the key findings of a paper published in *PLoS One* co-authored by Te Pūnaha Matatini researchers Steven Turnbull, Dr Dion O'Neale and Dr Kirsten Locke, and colleague Dr Frédérique Vanholsbeeck, all from the University of Auckland.

"We found that the majority of high achieving women physics students were actually studying physics for life sciences, which is needed for medicine and bioscience, and not actually for core physics," says lead author Steven Turnbull, Te Pūnaha Matatini PhD student in the University of Auckland's Faculty of Education and Social Work. "More importantly, of those students who do pursue further study in physics, we see higher attrition rates for women students after controlling for achievement level, with the exception of higher achievers."

"The implications of this are potentially career-limiting for women," says Dr Kirsten Locke, Te Pūnaha Matatini investigator at the University of Auckland's Faculty of Education and Social Work. "Higher achieving women are tending to opt for physics engagement strongly associated with specific career pathways, in ways that differ from their male counterparts."

Sociological methods uncover reasons behind gender difference

It is well known that women students are under-represented in university physics. However, the reasons for this are not so well understood.

"Importantly, our findings debunk any kind of idea that there's a lack of high achieving women physics students out there. It's not that they aren't doing well in physics or aren't interested in physics, because they are," says Dr Dion O'Neale, Te Pūnaha Matatini Principal Investigator in the University of Auckland's Department of Physics.

The novelty of Steven's work lies the combination of sociological methods (Pierre Bourdieu theory) and quantitative network analysis to understand the contexts in which students were making enrolment decisions. "Using these tools to frame the results gives one the chance to come up with hypotheses [explanations] as to why things are a particular way or mechanisms for taking the next step," says O'Neale. "[From a scientist's perspective], you've got something that you can start to test, as opposed to just saying yeah sure there aren't many women in physics."

In terms of their data set, the researchers analysed administrative data from 8,905 students enrolled in University of Auckland undergraduate physics courses from 2009 to 2014.



Implications for New Zealand's education system

Turnbull says the study's findings have implications for the New Zealand education system, particularly with respect to the way in which physics is presented to students at school.

"We would suggest that work to address gender disparities in physics also needs to be conducted before university level, even as far down as when students start forming their academic identity around 10 or 11 years old. Most importantly, we need to shift attitudes, both inside physics and in society as a whole, so that all students feel like physics is a field where they belong and can contribute."

The Head of Physics at the University of Auckland, Professor Richard Easter, said he was excited that his Department had hosted this work.

Easter said it had an immediate impact locally as, "It helps us to make evidence-based changes to our own practice, and the ways we present our subject to students."

Of note, the Physics Department at the University of Auckland was recently recognised by the Astronomical Society of Australia with a Silver Pleiades accreditation for its progress toward building a culture of equity, diversity, and inclusion.



Find out more about out Complex Economics and Social Systems research.

<https://www.tepunahamatatini.ac.nz/about-us/our-research/complex-economic-and-social-systems>



Complexity and the Biosphere



Te Pūnaha Matatini is applying network analysis, complexity theory, and dynamical systems methodologies to understand the biosphere; developing models that couple the interactions between biodiversity, the economy, and human decision-making.

Our work

The diversity of life on Earth is the planet's most striking feature; recent estimates are that fewer than a million of approximately eight million animal species have been described.

Biodiversity exists at a large range of physical scales: multicellular eukaryotes have linear dimensions that range in size from tens of microns to tens of metres, and metazoans encompass 17 orders of magnitude by volume.

The ability of next generation sequencing technologies to efficiently and simultaneously analyse massive numbers of DNA molecules has allowed the diversity and ecology of microbial communities to be examined in previously unfeasible depth and detail.

This vast new resource for understanding the hidden majority of species that contribute to New Zealand's terrestrial eco-

systems and ecosystem services will require new tools for its analysis and visualisation. The research in this theme informs government policy and decision-making, and assists the New Zealand public in better understanding their relationship with our unique flora and fauna.

Our impact

Our research in Complexity and the Biosphere provides quantitative tools that help inform national and local government policy and decision-making, for example in biosecurity, conservation management, and pest eradication programmes. Our research aims to provide data to help New Zealanders better understand the relationship between us and our diverse flora and fauna by analysing the iNaturalist citizen science platform.

Research highlight:

How differing animal personalities impact on conservation efforts

Te Pūnaha Matatini researcher Giorgia Vattiato (below) and colleagues, from the School of Mathematics and Statistics at the University of Canterbury, are modelling the effects of individual animal personalities in New Zealand on conservation efforts.

The project aims to answer questions such as why some invasive mammal pests always manage to avoid traps, and what kind of reintroduction measures for Kiwi might help them settle more efficiently.

Invasive mammal pests such as stoats, possums and rats represent a major threat to New Zealand's native birds such as Kiwi. Trapping pests as part of wider eradication efforts has worked well on small offshore islands and fenced-off areas of the mainland. However, a few individual animals always seem to be uncatchable – an issue that has led to a growing need for more robust eradication approaches.

Giorgia's research looks beyond what we already know about factors that influence the behaviour of animal populations. It is well known, for example, that differences in habitat, predation, food availability, social environment and physiology can all affect animal behaviours (and personalities). Common personality differences include boldness or shyness, activity level, resource selection, sociability, and home range size. These different personalities can affect a population as a whole, but very few population dynamic modelling studies have taken them into consideration.

The study of animal personalities can therefore be seen as an important step towards developing accurate, non-biased models that can better predict the efficiency of different programmes underway in New Zealand that aim to eradicate pests, reintroduce threatened species and protect biodiversity.

This has been the rationale of Giorgia's research – modelling the effects of individual animal personalities in New Zealand. Together with her Te Pūnaha Matatini supervisors, Dr Rachelle Binny at Manaaki Whenua Landcare Research, Associate Professor Alex James and Professor Michael Plank at the University of Canterbury, plus Associate Professor Isabel Castro at Massey University, she has conducted two different types of projects as part of her PhD study.

The first project involves modelling different scenarios of heterogeneity in a pest population, where individual animals are assigned a different probability of interacting with a newly-found trap (their 'trapability'). Running simulations of two different pest populations – homogenous (all individuals had the same trapability) and heterogenous (individuals have varying levels of trapability), revealed that it takes much longer to eradicate the latter population than the former.

"One of the outputs of our model is the time that you need to wait to be sure that your population has been completely eradicated," explained Giorgia. "Usually what a pest manager would do is wait until a number of consecutive nights when



there have been no captures. After a certain number of nights, they would say 'okay, we're 95% sure that we've eradicated the population.' So what we've done is simulated this number of nights to have 95% probability of eradication in different scenarios, and we've looked at how long we have to wait. So this is one way our model can be used."

"The model can be used to predict when to change eradication approaches. At one point the curves start to flatten and tail off as those last few very trap-shy individuals keep evading capture. So the flattening curve could inform a pest manager when to switch to a more intensive eradication mode – one that may be more expensive than the first part of the eradication."

Different Kiwi behave and react differently in response to being moved

The second project the team are working on aims to identify possible differences in the behaviour of Kiwi populations on Motuarohia Island in the Bay of Islands and Ponui Island in the Hauraki Gulf. One of Giorgia's supervisors on this project, Isabel Castro, had acquired data from previous years when capturing and recording information about the Kiwi population on Ponui Island.

"Isabel could see how different the birds were – some were very friendly, some were not," said Giorgia. "But nobody had actually ever looked at the numbers behind that. And so I went with her this year and we did a few experiments. We filmed the Kiwi right after capture, under different circumstances – holding them upside down, looking at them in the eye, whilst also recording their heart beat and respiratory rate, to look for differences between birds. They were so different. Some of them would just fall asleep in your arms, and others would never stop struggling. Some of them would even growl or snap their beak."

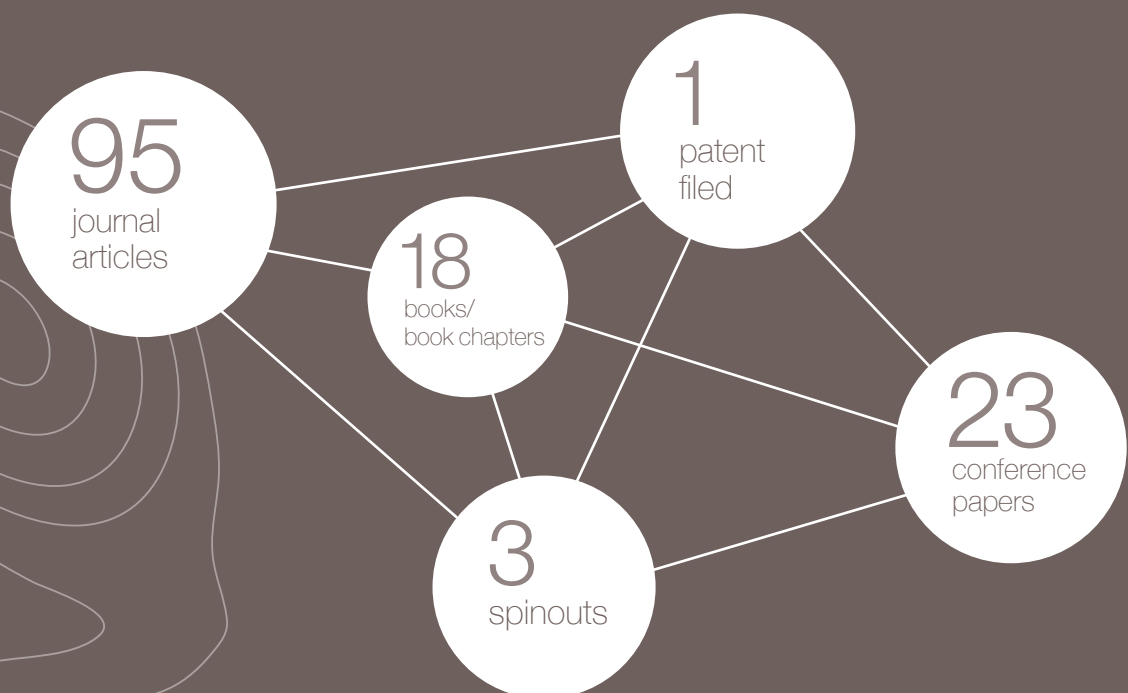


Find out more about our Complexity and the Biosphere research.

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Research Outputs



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O'Kane, Conor, Jing A. Zhang, Urs Daellenbach, and **Sally Davenport.** Building Entrepreneurial Behaviours in Academic Scientists: Past Perspective and New Initiatives. *Entrepreneurial Behaviour.* Palgrave Macmillan, Cham (2019)

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Coleman, A., **Maré, D.** & Zheng, G. *New jobs, old jobs: The evolution of work in New Zealand's cities and towns.* New Zealand Productivity Commission working paper

Davies, Benjamin, and **David C. Maré.**, *Relatedness, Complexity and Local Growth - Motu Working Paper 19-01.* Motu Economic and Public Policy Research

Fabing, Richard, and **David C. Maré.** *Improved productivity measurement in New Zealand's Longitudinal Business Database – Motu Working Paper 19-03.* Motu Economic and Public Policy Research

Fabrizi, Simona, **Steffen Lippert**, Addison Pan, and Matthew Ryan. *Unanimous Jury Voting with an Ambiguous Likelihood.* University of Auckland

Gahegan, Mark. *Reproducible Geocomputation: an open or shut case?* University of Auckland

Gepp S, Wright M, **Hall D.** *A review of the Resource Management (National Environmental Standards for Plantation Forestry) Regulations*

Grimes, Arthur, Kate Preston, **David C. Maré**, **Shaan Badenhorst** and Stuart Donovan. *The contrasting importance of quality of life and quality of business for domestic and international migrants – Motu Working Paper 19-06.* Motu Economic and Public Policy Research

Helton, J. William, Frank P. Kelly, Ruth J. Williams, and **Ilze Ziedins.** *A fluid model of a traffic network with information feedback and onramp controls.* University of California, San Diego

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Hyslop, Dean, Trinh Le, **David C. Maré**, and Steven Stillman. *Housing markets and migration: Evidence from New Zealand – Motu Working Paper 19-14.* Motu Economic and Public Policy Research

Kerr, Suzi, and Catherine Leining. *Paying for Mitigation: How New Zealand Can Contribute to Others' Efforts – Motu Working Paper 19-09.* Motu Economic and Public Policy Research

Kerr, Suzi, and Catherine Leining. *Uncertainty, Risk and Investment and the NZ ETS – Motu Working Paper 19-08.* Motu Economic and Public Policy Research

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Leining, Catherine, and **Suzi Kerr.** *Managing Scarcity and Ambition in the NZ ETS – Motu Working Paper 19-07.* Motu Economic and Public Policy Research

Leining, Catherine, and **Suzi Kerr.** *Outfitting the NZ ETS in post-Paris style: "Top Ten" List for 2019 – Motu Note #34.* Motu Economic and Public Policy Research

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Roudier, Pierre. *Package 'clhs'.* CRAN. Software Package

Sin, Isabelle, and Bronwyn Bruce-Brand. *Is the pay of medical specialists in New Zealand gender biased? - Motu Working Paper 19-21.* Motu Economic and Public Policy Research

Vergara, M., **Harvey, E.**, McDonald, N. & Brown, C. *Development of Reference Economic Futures (Revision 1.0).* Market Economics Ltd

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Donaldson, C. & **Hall, D.** The vision of participatory parity. *The Time of the Now – Collected Papers & Interviews from the 2018 Circuit Symposium and Artist Week.* (2019)

Fletcher, Sara Mikaloff, Kay Steinkamp, Gordon Brailsford, Dan Smale, Zoe Buxton, Peter Sperlich, **Troy Baisden** et al. National scale carbon dioxide inverse modelling: a New Zealand case study. *Proceedings from the 21st EGU General Assembly.* EGU2019. (2019)

Frochte, Jörg, and **Stephen Marsland.** A Learning Approach for Ill-Posed Optimisation Problems. *17th Australasian Conference on Data Mining.* (2019)

Hall, D. Mending the web of life: Producing value through reparation ecology. *2019 New Zealand Political Studies Association (NZPSA) Annual Conference.* (2019)

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Harvey, E., Smith, N., Vergara, M.J., Syed, Y., Buxton, R., and Brown, C. Supporting robust decision-making in Natural Hazard Risk Management through enhanced uncertainty analysis. *Decision Making Under Deep Uncertainty (DMDU) 2019 Annual Meeting.* (2019)

Harvey, Emily P. and **O'Neale, Dion R.J.** Using Network Science to Quantify Economic Disruptions in Regional Input-Output Networks. *Proceedings of NetSci-X 2020: Sixth International Winter School and Conference on Network Science.* (2019)

Kirsten Locke and Susan Wright. A Four Part Fugue: Power and Polyphony in the Academy. *Annual Conference for The European Conference Education Research (ECER).* (2019)

Lapsley, H. M., **Muru-Lanning, M.** & Dawes, T. D. Ngā Kaumātua, ō Mātou Taonga: Supporting Kaumātua health in a changing world. *Qualitative Health Research Conference.* (2019)

Li, H. A., & **Nair, N. K. C.** A Blockchain-based Distributed Non-cooperative Transactive Energy Market. *2019 IEEE Power & Energy Society General Meeting (PESGM).* (2019)

Li, Huan Aaron, and **Nirmal-Kumar C. Nair.** Cooperative Control In An Islanded Microgrid Under Blockchain-Based Market Operation. *2019 IEEE Innovative Smart Grid Technologies-Asia (ISGT Asia).* (2019)

Maina, D. K., **Sanjari, M. J.**, & **Nair, N. K. C.** Blackstart of DFIG-based Windfarm. *2019 IEEE Power & Energy Society General Meeting (PESGM).* (2019)

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Nkom, Balarabe, Craig Baguley, and **Nirmal-Kumar C. Nair.** Single Wire Earth Return Distribution Grids: A Panacea for Rapid Rural Power Penetration in Africa via Regulatory Policy Transfer. *2019 IEEE PES/IAS PowerAfrica.* (2019)

Odiathevar, Murugaraj, Winston KG Seah, and **Marcus Frean.** A Hybrid Online Offline System for Network Anomaly Detection. *2019 28th International Conference on Computer Communication and Networks (ICCCN).* (2019)

Priestley, Rebecca, Rhian Salmon, Zoë Heine & Taciano Milfont. It's the first metre that matters. *Australian Association of History, Philosophy and Social Study of Sciences.* (2019)

Rebecca W. B. Lund, Louise Morley, Julie Rowlands, Jill Blackmore, **Kirsten Locke,** Susan Wright, Ana Luisa Muñoz-García, and Rosemary Deem. Gender, Knowledge and Leadership in the Global Academy. *Annual Conference for The European Conference Education Research (ECER).* (2019)

Salmon, Rhian & Jo Bailey. Engagement by design, engagement through design. *Australian Association of History, Philosophy and Social Study of Sciences.* (2019)

Vanberkel, Peter T., and Benjamin Wedge and Alix J.E. Carter and **Ilze Ziedins.** Using a Slotted Queuing Model to compare the Efficacy of Emergency Departments Operating with and without a Physician in Rural Communities. *Proceedings of the International Conference on Health Care Systems Engineering.* (2019)

Conference chair engagements

Michael Plank. *Australia and New Zealand Industrial and Applied Mathematics Annual Conference,* Nelson, Conference Co-Chair

Sandra Velarde. *Oceania Ecosystem Services Forum 2019,* Christchurch, New Zealand, Forum Co-Chair

Troy Baisden. *Lakes Resilience Symposium,* University of Waikato, Chair

Conference session chair engagements

Anna Matheson. Systems approaches to local prevention, *23rd IUHPE World Health Promotion conference*, Rotorua

Arvind Tripathi. *The Eighteenth Workshop on e-Business (WeB 2019) Smart Business: Technology and Data Enabled Innovative Business Models and Practices*, Munich Business School, Munich, Germany

Isabelle Sin. *Wellbeing and Social Capital*, NZAE, Wellington

Krushil Watene. *Indigenous knowledge*, Human Development and Capability Association, UCL London, United Kingdom

Melinda Allen. *Late Quaternary environmental change in the South Pacific: climate, ecosystem dynamics and human colonisation*, INQUA, Dublin, Ireland

Pierre Roudier. *Applications of Pedometrics 1: Emerging needs and demands*, Pedometrics, University of Guelph, Canada

Troy Baisden. *Freshwater*, Environmental Research Institute Symposium, University of Waikato

Tze Ming Mok. *Diversity I*, New Zealand Population Conference, Te Papa, Wellington

Invited Speaker Engagements

Ann Brower. Braided rivers – the land the law forgot, NZ Ecological Society, Lincoln

Christina Painting. The evolution of diverse animal weapons, *International Congress of Arachnology*, Lincoln, Canterbury

Dion O’Neale. Being an ally: what we can all do to improve equity, *Dodd Walls Centre Research Symposium*, Dunedin

Dion O’Neale. Student Pathways in & through STEM Education, *Conference on Complex Systems 2019*, Singapore

Fraser Morgan. ADA: Antarctic Data Analysis, FOSS4G Oceania, Wellington

Isabel Castro. Genetics and Conservation Technology: Two Projects with Northland Kiwi, *Kiwi Hui*, Hawkes Bay

Isabelle Sin. Is the pay of medical specialists in New Zealand gender biased, *Association of Salaried Medical Specialists annual conference*, Wellington

Melinda Allen. Less is more: Element selection as sampling strategy, *International Council for Archaeozoology (Fish Working Group)*, Portland, Oregon, USA

Melinda Allen. Maritime Connections: Mobility, Colonisation and Post-settlement Interaction in East Polynesia, *Fifth Annual DFG Center for Advanced Studies Symposium: Maritime Connections*, Tubingen, Germany

Melinda Allen. Unearthing Lost Bioscapes, Nuku Hiva, Marquesas Islands, Polynesia, Society for American Archaeology, Albuquerque, New Mexico, USA

Michael Plank. Size-based models of harvesting and fisheries management, *10th Asia-Pacific Forum on “Math-for-Industry”*, Auckland

Shaun Hendy. Janus Particles in Flows, *Telluride 2019*, Leura, Australia

Shaun Hendy. The motion of droplets on complex surfaces, *Australia New Zealand Nano and Microfluidics*, Wollongong, Australia

Shaun Hendy. The motion of droplets on complex surfaces, *Modelling of Thin Liquid Films*, Banff International Research Station, Canada

Suzi Kerr. Climate Teams: A mechanism to ‘breathe life’ into Article 6.2 and support more ambitious global action, *Taller de implementación de mecanismos de Mercado del Acuerdo de París*. Centro de Cambio Global, Pontificia Universidad Católica, with Ministry for External Relations, Ministry for Environment and Ministry for Energy, Santiago, Chile

Suzi Kerr. Climate Teams: A mechanism to ‘breathe life’ into Article 6.2 and support more ambitious global action, *Asia Pacific Carbon Markets Roundtable*, Singapore (by video conference)

Suzi Kerr. Climate teams: generating high integrity supply of international units’, Carbon Forward, London

Troy Baisden. Ausseil A-G, Baisden W, van der Weerden T, Beare M, Teixeira E, Keller E, Lieffering M, Guo J, Law R. Climate change impacts on land use suitability, *Deep South Symposium*, Auckland

Troy Baisden. Lake Restoration in New Zealand, *11th Symposium of the Lakes Water Quality Society*, Rotorua

Troy Baisden. Overview of Lakes and Freshwater, *Environmental Research Institute Symposium*, University of Waikato

Tze Ming Mok. Yellow Perils, Honorary Whites, & Diversity Mascots: East Asians in the White Settler State, *Pathways 2019 Conference: Arahia He Ara*, Massey Albany, Auckland

Uli Zülicke. Mining the patent-citation network for clues about knowledge flows, *YSI Workshop on Knowledge & Institutions*, Wellington, New Zealand

Contributed talk engagements

Anna Matheson. Implementing a health promotion initiative to achieve systems change: Lessons from the evaluation of Healthy Families NZ, *23rd IUHPE World Health Promotion conference*, Rotorua

Arvind Tripathi. Effect of Internal and External Social Networks on Open Source Project Popularity, *Workshop on e-Business*, Munich

Dion O’Neale. Bipartite Networks for fun and profit, *ANZIAM 2019*, Nelson

Dion O’Neale. Historical Correspondence Networks, *NetSci-2019*, Burlington, Vermont

Emily Harvey. Supporting robust decision-making in Natural Hazard Risk Management through enhanced uncertainty analysis. *Decision Making Under Deep Uncertainty (DMDU) 2019 Annual Meeting*, Delft, Netherlands

Ilze Ziedins. Accumulating priority queues – a review of recent developments (given jointly with David Stanford), *Queues, Modelling, and Markov Chains: A Workshop Honouring Prof. Peter Taylor*, Mount Tamborine, Queensland

Ilze Ziedins. Phase transitions in a generalized hard core model (k-casting), *INFORMS Applied Probability Society Meeting*, Brisbane

Isabel Castro. Unobtrusive monitoring of kiwi, Birds New Zealand, Wellington

Isabelle Sin. The drivers and consequences of parental leave decisions, NZAE, Wellington

Isabelle Sin. The effect of student loan size on outcomes of NZ bachelor's graduates, NZAE, Wellington

Marcus Frean. Bayesian Record Linkage in Māori Land Data, Risk and Decision-Making, Wellington

Marcus Frean. Digital humanities and indigenous culture: reconstituting the past through historic data modelling and network analysis, *eResearch Australasia Conference*, Brisbane, Australia

Markus Luczak-Roesch. Random as well as non-random patterns of trait term recurrence and co-occurrence in English novels, and their potential implications on the lexical hypothesis in personality psychology, *Conference on Complex Systems*, Singapore

Michael Plank. Mitigating fisheries-induced evolution, *Australia and New Zealand Industrial and Applied Mathematics Annual Conference*, Nelson

Pierre Roudier. Mapping functional soil properties of the McMurdo Dry Valleys, Antarctica, Pedometrics, University of Guelph, Canada

Pierre Roudier. Mapping functional soil properties of the McMurdo Dry Valleys, Antarctica, *SouthCOP (Conference On Permafrost)*, Queenstown

Pierre Roudier. Towards a fine resolution, national grid of soil pH, Pedometrics, University of Guelph, Canada

Rebecca Turner. Evaluating the potential of international border interception data for biosecurity risk assessment, *Risk and Decision making conference*, Wellington

Rebecca Turner. Insights from global interception data for predicting establishment risk, *Australian Biosecurity Symposium*, Australia

Sandra Velarde. Policy design lessons for ecosystem services: Including cultural ecosystem services through adaptive governance, *Oceania Ecosystem Services Forum 2019*, Christchurch

Shaun Hendy. Instabilities in the melting of nanowires, *AMN9*, Wellington

Shaun Hendy. Instabilities in the melting of nanowires, *ANZIAM 2019*, Nelson

Tava Olsen. Dual serving problem: What is the right supply chain strategy?, *ANZAM OM Symposium*, Melbourne

Tava Olsen. How are firms adopting and implementing environmental sustainability practices in their supply chains?, *MSOM Conference*, Singapore

Thegn Ladefoged. A molecular model for water diffusion in obsidian, *International Obsidian Conference*, Sarospatak, Hungary

Thegn Ladefoged. Niche construction at Waitetoke garden complex, Ahuahu, New Zealand. *New Zealand Archaeological Association Conference*, Rakiura

Thegn Ladefoged. Setting the Agenda for the Next Phase in Obsidian Studies in Aotearoa (New Zealand), *Society for American Archaeology Meeting*, Albuquerque

Tze Ming Mok. What kind of Whitening? Predictors of ethnic group change for Mixed people in the United Kingdom, *New Zealand Population Conference*, Wellington

Keynote speaker engagements

Krushil Watene. Relationships and Responsibilities: Kaitiaki-tanga, *Australasian Association of Bioethics and Health Law / New Zealand Bioethics Conference*, Otago

Priscilla Wehi. Weaving patterns with interdisciplinary knowledge. How indigenous knowledge can affect current thinking in science, *Australasian Society for the Association of Animal Behaviour Conference*, Waiheke Island

Rachelle Binny. Biodiversity outcomes from New Zealand's sanctuaries: a national meta-analysis, *NETS 2019*, Tauranga

Rachelle Binny. Biodiversity outcomes of Aotearoa's most common predator control regimes: implications for restoration trajectories, *Crazy and Ambitious 2 Symposium: NZ's Biological Heritage NSC*, Te Papa, Wellington

Suzi Kerr. Economists and leadership toward low-emission societies, *AARES Conference*, Melbourne

Tava Olsen. Agriculture 4.0, *MSOM Supply Chain SIG*, Singapore

Tava Olsen. Agriculture 4.0, *Utah Winter Operations Conference*, Snowbird, Utah

Troy Baisden. Keynote: Enabling Positive Change in Our Lakes: Decisions and Adaptive Management, *Lakes Resilience Symposium*, University of Waikato

Plenary speaker engagements

Jeanette McLeod. Maths Craft: Bringing Maths to the Masses, *New Zealand Mathematical Society Colloquium*, Massey University, Palmerston North

Shaun Hendy. The motion of droplets on complex surfaces, *Fluids in New Zealand*, University of Otago

Suzi Kerr. Climate teams': minilateral cooperation for large-scale mitigation', *Environment for Development annual meeting*, Bogotá, Colombia

Tze Ming Mok. Plenary Panel and Discussion: 'Understanding New Zealand's Diverse Population in the 21st Century: Opportunities and Challenges', *New Zealand Population Conference*, Wellington

Patents filed

Murray Cox. An Enhanced Novel Endophyte for Grass Systems Improvement, NZ736857

Spinouts

Shaun Hendy. [Nebula](#) (founded in 2018, work ongoing)

Shaun Hendy. [Toha Foundry](#) (founded in 2018, work ongoing)

Michael O'Sullivan. ORUA Health



Governance and Management



Financial Report 2019

	2019
	Actuals
	\$000
Funding received	
Tertiary Education Commission grant	2,194
Surplus carried forward	585
Total funding received	2,778
Expenditure	
Salaries	
Director and Principal Investigators	612
Associate Investigators	0
Research/Technical assistants	58
Others	232
Total salaries & salary-related costs	902
Other costs	
Overheads	856
Project costs	369
Travel	75
Postgraduate students	312
Extra-ordinary expenditure	19
Total other costs	1,631
Total expenditure	2,533
Net surplus/(deficit)	244

Notes

This report covers the period from 1 January 2019 – 31 December 2019 and details funding received and funds distributed to collaborative partners of the CoRE.

All amounts are shown exclusive of Goods and Service tax (GST).

The net surplus will be carried forward into 2020 to fund future expenditure of the CoRE.

2019 Summary

Broad category	Detailed category	Yr5
Value of CoRE funding from TEC (\$M)		2,193,000
FTEs	Principal investigators	3.90
by category	Associate investigators	0
	Postdoctoral fellows	2.04
	Research technicians	1.30
	Administrative/support	2.90
	Total	10.14
Headcounts	Principal investigators	26
by category	Associate investigators	51
	Postdoctoral fellows	6
	Research technicians	2
	Administrative/support	4
	Total	89
Peer-reviewed research outputs by type	Books/book chapters	18
	Journal articles	95
	Conference papers	23
	Other	24
	Total	160
Value of non-Vote S&I external research contracts awarded by source	Government (non-Vote S&I)	2,193,000
	Domestic – private-sector funding	351,850
	Domestic – other non-Government	10,980
	Overseas	13,225,381
	Total	15,727,211
Commercial activities	Patents granted	1
	Total	1
Students studying at CoRE by level	Doctoral degree	45
	Other	24
	Total	69
Number of funded students completing	Doctoral degree	2
	Other	3
	Total	5
Immediate post-study graduate destinations (since 2015)	Employed overseas	32%
	Employed in NZ	68%



Meeting Our Strategic Outcomes



Research excellence

A strong collaborative network of investigators, students, and practitioners will be established in New Zealand, with a culture of research excellence that attracts and retains the very best national and international talent, and with expertise in the research, education, industry, and policy sectors that is required by stakeholders, end-users, and thought leaders.

1. Our graduates will be sought after for their knowledge of complex systems methods and their ability to apply this knowledge to significant problems of relevance to our end-users.
2. Our research will be used by stakeholders and end-users in New Zealand to provide direct savings, enhanced productivity, growth and diversification of the economy, environmental and social benefit, and develop new businesses.
3. In building close engagement with Māori communities and developing opportunities for Māori capability-building, the distinctive contribution of Māori to complex systems and networks will enhance social, economic, and environmental outcomes for New Zealand.
4. Through knowledge-sharing and best practice, our research will inform and improve decision-making in policy and public debate in New Zealand on issues related to complex systems and networks and their role in society, the economy, and the environment.

Sought-after graduates

Our graduates will be sought after for their knowledge of complex systems methods and their ability to apply this knowledge to significant problems of relevance to our end-users.

- More than seventy Te Pūnaha Matatini students (both graduate and undergraduate) have now been placed for 10 weeks at stakeholder and end-user organisations with joint internal and external supervisors. The internships were funded or co-funded by the external organisations (SIA, MBIE, Te Hiku Media, Ministry of Justice, MSD, Oranga Tamariki, Ministry for the Environment, Westpac, BRANZ, Ngāti Whātua Ōrākei). In some instances, students worked individually, but at several organisations we have used a team-based approach, where a PhD student leads a team of two undergraduate students. This team-based approach has worked very well, with both the students and hosting organisations being very pleased with the outcome.
- We have had several interns work with Te Hiku Media, a charitable joint-lwi venture between the Far North lwi of Ngāti Kuri, Te Aupouri, Ngai Takoto, Te Rārawa and Ngāti Kahu, over the last three years, on natural language processing tools for Te Reo Māori. Students employed in 2017–2018 returned to continue work on projects in 2018–2019. A similar continuity of student involvement is seen in the programme of work with Ngāti Whātua Ōrākei, with the 2018–2019 project an expansion of census data analysis and cleaning undertaken in 2017. Student interns in government departments in 2018–2019 have been offered jobs following graduation. These projects are developing ongoing relationships and skills for students and organisations, and are providing immense benefit to New Zealand.
- As we complete our fifth year, we can see that nearly 80% of our graduates have stayed in New Zealand at the end of their degrees, with 25% going on to academic roles and 75% finding work in government or in the private sector. Two of our graduates, Dr Rachelle Binny and Dr Audrey Lustig, have gone on to full-time research positions in Manaaki Whenua Landcare Research, while several continue to be employed by our spin-out company Nebula (see below).
- Student internships are leading to spinout companies: Nebula, headed by former Te Pūnaha Matatini intern Georgia Nixon, analyses the media using a range of network science techniques. This company now employs three graduates.

Research uptake

Our research will be used by stakeholders and end-users in New Zealand to provide direct savings, enhanced productivity, growth and diversification of the economy, environmental and social benefit, and develop new businesses.

- There are now many examples of ways in which Te Pūnaha Matatini research has been used in New Zealand. For instance, work with the New Zealand Rugby Union and the data science company Qrious helped them develop new products and services. For the New Zealand Rugby Union a visualisation method was developed that allowed team coaches to visualise complex performance data sourced from games. Te Pūnaha Matatini researchers have worked with Qrious as they develop their mobile phone location-based human movement product Voyager. A Te Pūnaha Matatini PhD student worked with the Social Investment Agency to develop one of their main software tools.
- Work being done by Te Pūnaha Matatini researchers Ilze Zeidins, Mike O'Sullivan, Cameron Walker and Tava Olsen provides practical solutions to real world problems within New Zealand's healthcare system. Their patient pathways project

work for example involves the analysis of a complex series of steps between the time a patient presents for healthcare and the time of discharge, amidst a background of limited resourcing (e.g. staffing, surgical teams, and equipment). Prioritising one patient's access to a resource may have adverse effects for other pathways that also need that resource. To determine effective prioritisation strategies for patients therefore requires modelling of the complexity of patient pathways, their use of resources, and the effect of different prioritisation strategies. This is undertaken in partnership with District Health Boards so findings can be swiftly implemented to deliver benefit. This has led to the spin-out company ORUA Health.

- Te Pūnaha Matatini work on evaluating the impact of the Marsden Fund and the effectiveness of decision-making by its evaluation panels has been acknowledged as extremely valuable by the Marsden Fund Council: "This work was invaluable in allowing us to obtain an objective measure of proposal quality. We had asserted for many years that our near miss proposals were of equivalent quality to those that were funded, but this work allowed us to confirm this in an independent and quantitative manner." (Juliet Gerrard, Chair of the Marsden Fund Council). The study was also very important for getting Statistics New Zealand's Science and Innovation domain plan agreed upon by the sector, as it was a clear demonstration of what was possible with good data collection practices. Further analyses of the Marsden Fund are underway, with a new study commissioned by the Council in 2019.

- Te Pūnaha Matatini is regularly commissioned to investigate and measure research impact. In the last three years we have carried out impact evaluation for the Concrete and Cement Association of New Zealand, the NZ Food Safety Science and Research Centre, the Bioheritage and Science for Technological Innovation National Science Challenges, the Science Media Centre, and the University of Auckland's Centre for Innovation and Entrepreneurship. In MBIE's discussion paper on measuring research impact, the two New Zealand studies cited were both undertaken by Te Pūnaha Matatini researchers. A project with the Science Media Centre has led to the spin-out company Nebula.
- Te Pūnaha Matatini has worked with the Ministry of Social Development (MSD) to provide network analysis tools for identifying at-risk children. Researchers characterised the networks that exist in their relational client database and provided workshops to MSD staff in using network tools. MSD funded a post-doctoral fellow, who has worked along MSD analytics staff to facilitate diffusion of network analysis methods into the Ministry. MSD and Oranga Tamariki are supporting further work in this project, which led to a high-profile publication in PLoS One in 2019.
- Te Pūnaha Matatini has worked with the Ministry of Primary Industries to assist with the *M. bovis* eradication programme, a billion-dollar crisis for our primary sector. Our Director sits on the *M. bovis* Strategic Science Advisory Group and has given advice on science communication. Rebecca Turner, our post-doc at Scion, has undertaken a project to help understand animal movement data, which has been crucial in the response.

Partnership models

In building close engagement with Māori communities and developing opportunities for Māori capability-building, the distinctive contribution of Māori to complex systems and networks will enhance social, economic, and environmental outcomes for New Zealand.

Capability building

- We have a significant partnership with iwi digital media venture Te Hiku Media. We have funded or co-funded interns working with Te Hiku since 2015, and are partners on the Kōrero Māori project (now Papa Reo, funded by as a MBIE data science platform) with Te Hiku and Dragonfly Data Science to develop natural language processing tools for Te Reo Māori.
- Te Pūnaha Matatini is partnering with Ngāti Whātua Ōrākei on a Te Pūnaha Hihiko: Vision Mātauranga Capability Fund project which extends our existing collaboration, supported via repeated internship placements of Māori students working within Kaupapa Māori paradigms. 'He waka eke noa' combines qualitative and quantitative methods to develop tools for evaluation of tribal data and aspirations in within a Ngāti Whātua Ōrākei framework.
- There are now several Te Pūnaha Matatini research projects that enable the distinctive contribution of Māori, focusing on the interaction of mātauranga with complex systems and networks methods and approaches. Our flagship project Mai i ngā maunga ki te tai started in 2018. A key outcome will be developing processes of best practice for engagement by

environmental scientists with tangata whenua. Furthermore, this project is being scoped and designed in partnership with Māori, with direction of the locus of research being entirely a response to community need and priority.

- Te Pūnaha Matatini has partnered with Te Mana Rauanga, the Māori Data Sovereignty Network, to encourage the uptake of indigenous data sovereignty principles by New Zealand organisations and researchers.
- Te Pūnaha Matatini has appointed a kaumātua, Dr Tom Roa from the University of Waikato. The role of kaumātua in Te Pūnaha Matatini is to be a repository of knowledge about New Zealand society, including aspects of history and social systems, especially pertaining to Māori; be knowledgeable in appropriate processes/tikanga, especially within Māori and bicultural contexts; interpret and protect Māori cultural practices and protocols, include helping to create and hold space for people who are culturally different in some way (in the broadest sense), and include providing advice on implementing research; provide guidance to help find ways to solve thorny problems, and resolve disputes if necessary; and to have ceremonial roles e.g. during a powhiri.

Improved decision-making

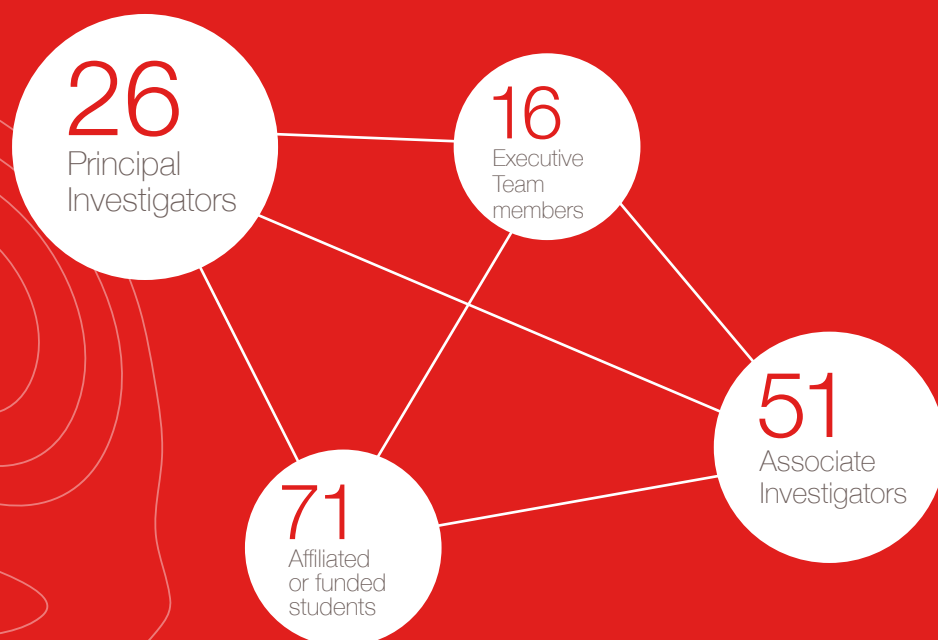
Through knowledge sharing and best practice, our research will inform and improve decision making in policy and public debate in New Zealand on issues related to complex systems and networks and their role in society, the economy, and the environment.

- Te Pūnaha Matatini has led the national discourse on the public responsibilities of scientists to communicate their work and participate in public debate. Four Te Pūnaha Matatini investigators have won the Prime Minister's Science Communication Prize (Priestley (2016), Dickinson (2014), Wiles (2013), Hendy (2012)), three have won the Callaghan Medal for science and/or technology communication (Dickinson (2015), Wiles (2013), Hendy (2012)), and Siouxsie Wiles has been awarded a Blake Leadership medal. Books such as *Silencing Science* (Hendy 2016), *Fukushima Effect: A New Geopolitical Terrain* (Priestley 2016), and *Antibiotic Resistance: the end of modern medicine?* (2018) have also contributed to international discourse on science communication.
- Our researchers are consistent contributors to public debate as commentators themselves, but also by making their research accessible and promoting its use in public discourse. For instance, in 2018, Director Professor Shaun Hendy, with his #NoFly2018 campaign to reduce his carbon footprint, contributed to regular media discussions regarding climate change and climate justice. Te Pūnaha Matatini investigators are regularly in the media (as shown by the media mapping done by student spinout company, Nebula), and comment on diverse topics – from Kauri dieback to sexism in science and academia.
- Te Pūnaha Matatini has run three national media campaigns "Reframing Innovation" (August 2016), "InfectedNZ" (November 2016), and "WaiNZ" (September 2017) to promote the using of data and evidence in public discourse. The third campaign, WaiNZ, sought to highlight the issue of polluted waterways in New Zealand. Held over the week of 11–15 September 2017, it was based around blog articles shared by leading environmental, social and health researchers. Overall, it generated more than 1,900 web-site views and 32,600 Twitter impressions. In 2018, Director Shaun Hendy ran a #nofly2018 campaign, which has led to more than a dozen media articles, and the establishment of a Facebook group dedicated to reducing flying.
- Te Pūnaha Matatini has become well-known for leadership in collaborative management, advising other CoREs and research centres on structure and operational matters, governance, and policies for growing diversity. In particular, Te Pūnaha Matatini has taken a leadership role in promoting diversity within the New Zealand science system, beginning with evaluating the publicly available data for each Centre of Research Excellence. The Association of CoREs agreed in 2015 to adopt Te Pūnaha Matatini's Sponsorship Policy as its own. Critical to these initiatives was the decision to formalise Te Pūnaha Matatini's diversity, equity, access and inclusion statement as a policy, and to develop a sponsorship policy for public dissemination via the website. Alongside the sponsorship policy, a code of conduct was developed for Te Pūnaha Matatini investigators and students, and for Te Pūnaha Matatini events or events that we sponsor.
- Te Pūnaha Matatini research has played an instrumental role in establishing the National Research Information System (NRIS). Our research was presented to the then Minister of Finance, Bill English, in 2015, and this proved crucial in the adoption of Statistics New Zealand's Science and Innovation Domain Plan, and the creation of NRIS (now NZRIS), which will allow the value of New Zealand's investments in science and innovation to be rigorously quantified.





Our People



Executive team



Professor Shaun Hendy
University of Auckland
Director, Te Pūnaha Matatini

Shaun Hendy is Director of Te Pūnaha Matatini and Professor of Physics at the University of Auckland. His interest in the science of complexity stems from a conversation at a lunchtime journal club at Industrial Research Ltd about Geoffrey West's work on the increase in the number of patents per capita with city size in the US. Hendy then downloaded an international patent database and found that the difference in patents per capita between Australia and New Zealand could be explained by the difference in population distributions.

Shaun served as Deputy Director of the MacDiarmid Institute for Advanced Materials and Nanotechnology from 2008–2012 and as President of the New Zealand Association of Scientists from 2011–2013. He has won a number of awards, including the Prime Minister's Science Media Communication Prize and ANZIAM's E. O. Tuck Medal. In 2012 Shaun was elected a Fellow of the Royal Society of New Zealand. In 2018 Shaun appointed as a Director on the Callaghan Innovation board.



Dr Priscilla Wehi
Incoming Co-director
Manaaki Whenua/Landcare Research

Priscilla (Cilla) is a conservation biologist and Rutherford Discovery Fellow at Manaaki Whenua Landcare Research in Dunedin. Since completing a PhD in ecology and Māori at the University of Waikato, her research has focused on the links between culture and biodiversity, and ecological restoration. Cilla is passionate about inclusivity and diversity in science and is part of the [2018 Homeward Bound programme](#) – the largest ever all-female Antarctic expedition that aims to raise awareness of the low representation of women working in STEM. Cilla is also a member of the [Predator-Free 2050 Bioethics Panel](#) and the Kindness in Science Committee sponsored by Te Pūnaha Matatini.



Professor Murray Cox
Incoming Co-director
Massey University

Murray Cox is Professor of Computational Biology at Massey University. Murray's research group integrates new genetic technologies with sophisticated computational analysis to address biological questions at the interface of genomics, computer science and statistics. Currently an Alexander von Humboldt Fellow at the Max Planck Society in Germany, Murray was awarded the 2017 Te Rangi Hiroa medal by the Royal Society of New Zealand for his work advancing "historical approaches to societal transformation and change."



Associate Professor Alex James
University of Canterbury
Deputy Director, Industry and Stakeholder Engagement

With a PhD in combustion engineering, Associate Professor Alex James made the transition from catalytic converters to the rest of the world, where she uses mathematical modelling to solve problems. At heart she's a mathematical modeller and works on problems from social science to climate change, but her main hobby is ecology. Although Alex says she is no ecologist – "friends had to teach me the difference between beetles and bugs" – she is excited by the contribution mathematics can make to the analysis and study of interactions among organisms and their environment.



Dr Dan Hikuroa
University of Auckland
Co-deputy Director, Public Engagement

Daniel (Dan) Hikuroa is an earth systems scientist at the University of Auckland who integrates mātauranga Māori (Māori knowledge) and science to enhance the value of his research to the communities he works with. For his PhD, Dan led a British Antarctic Survey deep field geology mapping expedition, and completed a postdoctoral fellowship looking into how naturally occurring climate change affected the world's oceans and biosphere in the distant past. Among his many projects in recent years, Dan was a co-author on the *2014 State of the Hauraki Gulf Environment Report*.



Associate Professor Siouxsie Wiles
University of Auckland
Co-deputy Director, Public Engagement

Siouxsie is an award-winning scientist who has made a career of manipulating microbes. She and her team make bacteria glow in the dark to understand how infectious microbes make us sick and to find new medicines. Siouxsie is also an enthusiastic tweeter, blogger, artist, curator and media science commentator and has won numerous prizes for her efforts, including the Prime Minister's Science Media Communication Prize. In 2017, she published her first book, *Antibiotic resistance: the end of modern medicine?* as part of the BWB Texts series.



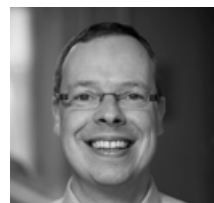
Kate Hannah
Deputy Director, Equity and Diversity
Executive Manager, Te Pūnaha Matatini

Kate Hannah has a Master of Arts (2004) from Waikato University in 19th Century American Literary Culture. Her principal research area is the historiography of the history of science, with a focus on the cultures and subcultures of science, gender in science history, and narrative and complexity. She holds dual roles at Te Pūnaha Matatini, Executive Manager and Associate Investigator; she is a research fellow in the Department of Physics at the University of Auckland, course convener of Science Scholars 101, and a Te Pūnaha Matatini-funded PhD candidate in the Science and Society Group at Victoria University Wellington, investigating novel hybrid methodologies for the historiography of science. Basically, she's a historian in a Physics department.



Professor Stephen Marsland
Victoria University of Wellington
Theme Leader, Complexity, Risk, and Uncertainty

Stephen is Professor of Mathematics at Victoria University of Wellington. He was previously Professor of Scientific Computing at Massey University and has PhD from Manchester University and a degree from Oxford University. His research interests are in the applications of mathematics, especially differential geometry, to a wide variety of problems such as birdsong recognition, shape and medical image analysis, machine learning, and smart homes for the elderly. He also works in complexity science, including complex networks and agent-based models.



Professor Uli Zuelicke
Victoria University of Wellington
Theme Co-leader, Complex Economic and Social Systems

Uli is a Professor of Physics at Victoria University of Wellington and a Fellow of the New Zealand Institute of Physics. With a background in theoretical condensed-matter physics, Uli's research interests include mesoscopic and low-dimensional systems, spins in semiconductors, and complex materials such as graphene. He enjoys solving theoretical problems and collaborating with colleagues on experiments of mutual interest.



Professor Michele Governale
Victoria University of Wellington
Theme Co-leader, Complex Economic and Social Systems

Michele Governale is an Associate Professor of Physics at Victoria University of Wellington. Prior to his arrival at Vic in 2009, Michele is a condensed matter theorist, with a particular interest in the theory of quantum transport in nanostructures. Studying the basic electronic properties of nanostructured systems has potential applications in the design of electronic devices of exceptionally minute dimensions (in the nanometres!).



Dr Cate Mcinnis-Ng
University of Auckland
Theme Co-leader, Complexity and the Biosphere

Cate is a Senior Lecturer in Ecology at the University of Auckland's School of Biological Sciences and the President of the New Zealand Ecological Society. As an enthusiastic 'tree ecophysiologicalist', Cate's current research focuses on plant responses to climatic conditions – in particular, the impact of drought on New Zealand's native forests. Before moving to Auckland in 2010, Cate was based in Sydney, Australia, where she completed her undergraduate degree and PhD, and undertook postdoctoral research. Since then, she has received a host of awards – a Marsden Fast-Start grant in 2012 and a Rutherford Discovery Fellowship in 2015.



Associate Professor Michael Plank

University of Canterbury

Theme Co-leader, Complexity and the Biosphere

Mike's research is in mathematical modelling, particularly in ecology and physiology. The motivation for this research comes from real-world problems and the emphasis is on qualitative mathematical models that capture the essential behaviour of a particular phenomenon. Mike has research interests in a variety of applications – ecology and exploitation of fish communities, collective cell behaviour, complex ecological networks, invasive species, epidemiology, animal movement, and neurovascular coupling.



Kathryn Morgan

Research Operations Coordinator, Te Pūnaha Matatini

Kathryn coordinates Te Pūnaha Matatini's day-to-day research operations and communications requirements, and provides critical support to the executive management team. After graduating with a Masters of Sciences in Physical Geography from the University of Auckland, Kathryn worked initially as a researcher at several organisations, and also spent 12 years in a variety of roles at the Auckland Museum. Later, she trained in secondary education and for a number of years was a high school teacher – highly translatable experience for when dealing with academics!



Greg Town

Communications and Marketing Advisor, Te Pūnaha Matatini

Greg is supporting Te Pūnaha Matatini's communications requirements as part of his role with the University of Auckland's Science Faculty marketing team. Since graduating with a Science degree in Physiology from the University of Auckland, Greg has worked as a magazine and news editor, medical writer, health journalist, and technology blogger for a variety of publishing firms and marketing agencies based in New Zealand, Singapore and the UK.



Anna Vasilyeva

Research Operations Administrator, Te Pūnaha Matatini

Anna is PhD candidate in the Faculty of Education and Social Work at the University of Auckland, and her thesis is exploring the power of images in the media and the way these images affect our self-perceptions. Anna has a BA in Linguistics and MCA in Communication Arts in Global Communication. She is the creator and owner of The Breakfast Workshop, a photography and videography company, and is particularly interested in motion design, AR, photography, video games and 3D modelling.



Julie Mugford

Chair, Te Pūnaha Matatini Whānau

Julie, a PhD student at the University of Canterbury, is researching and developing statistical tools to make better use of citizen science data. The main aims of her research are to measure the accuracy of users and to develop efficient ways to improve the overall accuracy of such data. Julie has a BSc (Hons) in Mathematics from the University of Canterbury. She is particularly interested in working with Te Pūnaha Matatini researchers with widely varying backgrounds and expertise to collectively solve problems in new and ground-breaking ways.

Advisory Board



Richard Aitken

Advisory Board Chair

Executive Chairman, Beca (New Zealand)

Through his 45-year career at Beca, Richard has played an active part in growing this professional services consultancy to a team around 3000-strong throughout New Zealand, Australia and Asia. He has served in several executive positions and held a range of directorships both internal and external. Before taking up the Chairmanship of the Beca Group in 2009 he held the lead role of Group Chief Executive for a decade.

Richard has in-depth experience in engineering project management and with partnering and alliance contracting. Current external directorships are with Trustpower Ltd and Panuku Development Auckland Ltd (Deputy Chair) and since February 2015 the Te Pūnaha Matatini Advisory Board (Chair). Richard has represented Beca on the Project Alliance Board for the Waterview Project (Auckland) for the last five years and was appointed to the Chair in late-2015. He remains a member of the Construction Strategy Group (a high-level industry body) having chaired it from inception for nearly five years.

Richard is a Distinguished Fellow of the Institution of Professional Engineers NZ (IPENZ) and a Fellow of the Institution of Structural Engineers UK (IStructE).



Professor John Hosking

Dean of Science, University of Auckland

John is Dean of Science at the University of Auckland assuming the role in June 2014.

Immediately prior to that he was Dean of Engineering and Computer Science at the Australian National University and before that was Professor of Applied Computer Science in the Department of Computer Science at the University of Auckland including a six-year term as Head of Department between 1999 and 2005.

John's research career has been in software engineering, with over 200 publications to his name, and a long history of university-industry research engagement. He has been awarded both an FRSNZ in recognition of his research activities and a National Tertiary Teaching Excellence award reflecting his passion for teaching.



James Mansell

Business owner at Noos Ltd – Business consultant service

James, an independent consultant who provides mentoring courses and presentations on leadership, big data and government, champions the safe use of data science to deliver civic and environmental value. This includes developing an outcomes focused operating model to reform the state sector. Since 2014, James has been leading the development of a new model for data sharing known as the "Data Commons". In 2011, he was awarded the public sector's Leadership Development Centre (LDC) fellowship prize. This was used to study leadership at Harvard the Wharton School and Centre for Creative Leadership. James holds a first class honours degree in Philosophy from Victoria University of Wellington.



Professor Jim Metson

Deputy Vice-Chancellor (Research), University of Auckland

Professor Jim Metson is the Deputy Vice-Chancellor (Research) at the University of Auckland. For the past two years he has been Chief Science Adviser for the Ministry of Business, Innovation and Employment. With experience in academic research, working with industry and also with government, his past positions include: Deputy Dean of the University of Auckland's Faculty of Science, Associate Director of Light Metals Research Centre (LMRC), a Councillor for the Australian Institute of Nuclear Science and Engineering, the Chair of the Australian Synchrotron Science Advisory Committee, the former Head of the School of Chemical Sciences, chair of the Research Infrastructure Advisory Group (RIAG) for MBIE's predecessor MoRST and a Principal Investigator of the MacDiarmid Institute.



Peter-Lucas Jones

General Manager, Te Hiku Media

Peter-Lucas is an experienced broadcaster and digital content leader with tribal affiliations to Ngāti Kahu, Te Rārawa, Ngāi Takoto and Te Aupōuri. He is the General Manager of Te Hiku Media which is the tribal media hub of Te Hiku o Te Ika and the five iwi of Te Hiku, he is also Deputy Chair of Māori TV, and the Deputy Chair of Te Whakaruruhau o Ngā Reo Iirangi Māori o Aotearoa, the national Māori radio network. Peter-Lucas has led Te Hiku Media in creating Māori language content, documenting, curating and archiving Māori language oral histories of Te Hiku o Te Ika, and piloting digital access, and most recently played a leading role in the Māori language corpus gathering for the voice recognition project 'Kōrero Māori'. A former member of the Arts Council of New Zealand Toi Aotearoa and a treaty negotiator for Te Aupōuri, he has post-settlement governance experience.



Pieta Brown

Manager, Data & Analytics, PwC New Zealand

In Pieta's role as Data & Analytics Manager at PwC's Experience Centre, she brings a real passion for data and analytics, technical expertise, practical common sense and the ability to see the big picture to PwC's clients. Pieta believes broad thinking from multiple disciplines is critical to analytics success and her data science 'dream team' comprises technical expertise alongside psychology, anthropology and design. Her previous roles have been as a statistician, Insights Manager and Chief Analytics Officer.



Professor Wendy Lawson

Pro Vice-Chancellor Science, University of Canterbury

Professor Wendy Lawson, Pro-Vice-Chancellor for Science at the University of Canterbury, is a glaciologist with a passion for fieldwork. She has more than 30 years of experience of remote fieldwork in polar and alpine environments, including in Greenland, Svalbard, Alaska and Arctic Norway – as well as Antarctica. Wendy's previous roles include Dean of Science and Head of Department of Geography at the University of Canterbury, and as an academic at the University of Auckland. She has a range of academic and Crown sector strategic sector governance experience, including Ministerial appointments as a Board Director of NIWA and of Antarctica New Zealand. Wendy's PhD is from the University of Cambridge and her most recent qualification awarded in 2008 is a Postgraduate Certificate in Public Administration from the University of Warwick Business School. One of her career highlights of which she is most proud is the naming of a stream in Antarctica – Lawson Creek – in her honour in 1995.

International Advisory Board

Professor Alan Hastings

University of California, Davis

Professor Alan Hastings is interested in a range of topics in theoretical ecology and population biology, and more generally in mathematical biology.

He is a Professor in the Department of Environmental Science and Policy and also a member of the Centre for Population Biology. Alan completed his PhD in Applied Mathematics at Cornell University in 1977 under the supervision of Simon A. Levin and have been at UC Davis (located in beautiful Davis, California) since 1979. He is the founding Editor in Chief of the journal *Theoretical Ecology*, published by Springer.

Professor Bronwyn H. Hall

University of California, Berkeley

Bronwyn H. Hall is Emerita Professor at the University of California at Berkeley, a Research Associate of the National Bureau of Economic Research and the Institute for Fiscal Studies, London, and a Visiting Fellow at NIESR, London. She currently serves as an associate editor of the Economics of Innovation and New Technology, and of Industrial and Corporate Change. She is also a member of several advisory boards (Solvay Brussels School of Economics and Management, European Patent Office, DIW – German Institute for Economic Research). She received a BA in physics from Wellesley College in 1966 and a PhD in economics from Stanford University in 1988.

Professor Frank Kelly

Fellow of Royal Society (UK)

Professor of the Mathematics of Systems

University of Cambridge

Frank Kelly is Professor of the Mathematics of Systems in the University of Cambridge. He was elected a Fellow of the Royal Society in 1989, and a Foreign Member of the National Academy of Engineering in 2012. In 2013 he was awarded a CBE for services to mathematical sciences. His main research interests are in random processes, networks and optimization. He is especially interested in applications to the design and control of networks and to the understanding of self-regulation in large-scale systems. From 2003 to 2006 he served as Chief Scientific Adviser to the United Kingdom's Department for Transport. He was chair of the Council for the Mathematical Sciences, and a member of the RAND Europe Council of Advisors.

Professor Ian Foster

Director, Computation Institute

University of Chicago

Ian Foster, Senior Fellow, is Director of the Computation Institute, a joint institute of the University of Chicago and Argonne National Laboratory. He is also an Argonne Senior Scientist and Distinguished Fellow and the Arthur Holly Compton Distinguished Service Professor of Computer Science. Ian received a BSc (Hons I) degree from the University of Canterbury, New Zealand, and a PhD from Imperial College, United Kingdom, both in computer science. His research deals with distributed, parallel, and data-intensive computing technologies, and innovative applications of those technologies to scientific problems in such domains as climate change and biomedicine. Methods and software developed under his leadership underpin many large national and international cyber-infrastructure. Dr Foster is a fellow of the American Association for the Advancement of Science, the Association for Computing Machinery, and the British Computer Society.

Professor Julia Lane

Wagner School of Public Policy at New York

Julia Lane is a Professor in the Wagner School of Public Policy at New York University. She is also a Provostial Fellow in Innovation Analytics and a Professor in the Centre for Urban Science and Policy. Julia has published over 70 articles in leading economics journals, and authored or edited ten books. She has been the recipient of over \$50 million in grants and has organized over 40 national and international conferences, received several national awards, given keynote speeches all over the world, and serves on a number of national and international advisory boards.

Professor Manuel Trajtenberg

Tel Aviv

Manuel Trajtenberg is an economist and chair of the Planning and Budgeting Committee of the Council for Higher Education in Israel. Manuel graduated from the Hebrew University of Jerusalem with a major in economics in 1973 and completed a master's degree in economics and sociology in 1976, also at the Hebrew University. In 1984 he received his PhD from Harvard University for work entitled 'Economic Analysis of Product Innovation: The Case of CT Scanners.' Upon completing his PhD, he returned to Israel, and has since been serving as a professor in the Tel-Aviv University School of Economics. Trajtenberg has served in several public roles. He was a consultant to the Ministry of Industry, Trade and Labour and to the Prime Minister's Office. In 2006 he was appointed the first chair of the Israeli National Economic Council.

Professor Philip McCann

Groningen

Philip McCann trained as an economic geographer. He studied at and gained his PhD (1993) from the University of Cambridge (UK) and then worked at the University of Pennsylvania in the US (1993-1995), the University of Reading (UK) (1995-2005) and the University of Waikato in New Zealand. At Reading he was a professor of Urban and Regional Economics, in Waikato a professor of Economics. He has also been a guest professor in the US, Japan, Thailand and Italy. He has long had an intensive relationship with the Faculty of Spatial Sciences in Groningen, which he regularly visits for guest lectures, seminars and PhD ceremonies. Philip McCann's research covers a wide range of topics. Much of his research has been financed by extra-university clients such as the British Ministry of Trade and Industry, the EU and the OECD.

Research Committee



Professor Shaun Hendy (Chair)
Director
University of Auckland



Professor Murray Cox
Incoming Co-director
Massey University



Dr Priscilla Wehi
Incoming Co-director
Manaaki Whenua/Landcare
Research



Assoc Prof Cate Macinnis-Ng
University of Auckland
Theme Co-Leader – Complexity
and the Biosphere



Dr Dan Hikuroa
University of Auckland
Co-Deputy Director, Public
Engagement



Dr Dion O'Neale
University of Auckland



Dr Isabelle Sin
Motu Research



Kate Hannah
University of Auckland
Deputy Director, Equity and
Diversity; Executive Manager



Professor Michele Governale
Victoria University of Wellington
Theme Co-Leader – Complex
Economic and Social Systems



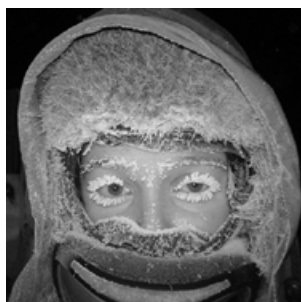
Assoc Prof Mike Plank
University of Canterbury
Theme Co-Leader – Complexity
and the Biosphere



Julie Mugford
Te Pūnaha Matatini Whānau
Chair



Assoc Prof Siouxsie Wiles
University of Auckland
Co-Deputy Director, Public
Engagement



Dr Rhian Salmon
Victoria University of Wellington



Professor Stephen Marsland
Massey University
Theme Leader – Complexity,
Risk, and Uncertainty



Professor Uli Zuelicke
Victoria University of Wellington
Theme Co-Leader – Complex
Economic and Social Systems

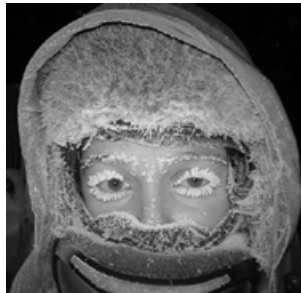
Public Engagement Committee 2019



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Kairangi

Te Pūnaha Matatini has introduced a new category of investigator – Kairangi, a Māori term meaning ‘the finest pounamu’ (greenstone or jade) which can be used to describe a person held in high esteem. This new category reflects our development as an organisation and acknowledges the important contributions of our senior colleagues.

Professor Adam Jaffe (Motu Research)

Professor Andy Philpott (University of Auckland)

Professor Richard Easther (University of Auckland)

Professor Suzi Kerr (Motu Research)

Te Pūnaha Matatini Whānau

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Angelia Hura	Isabel Castro	Massey University
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Jane Li		Victoria University of Wellington
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Michal Salter-Duke	Stephen Marsland	Victoria University of Wellington
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Quyen Nguyen		University of Otago
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Sina Safaei		University of Auckland
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Kahu Te Kani, University of Canterbury
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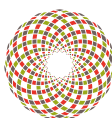
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