

HIGHLIGHTS 2017

Royal Society  
Te Apārangi

EXPLORE  
DISCOVER  
SHARE

ROYAL  
SOCIETY  
TE APĀRANGI



HIGHLIGHTS

2017

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HIGHLIGHTS 2017

PAST AND PRESENT STAFF MEMBERS OF THE SOCIETY AT A SPECIAL 150TH ANNIVERSARY EVENT IN OCTOBER.



E X P L O R E  
D I S C O V E R  
S H A R E

THIS PUBLICATION SHARES  
WHAT WE WERE UP TO IN  
2017, A VERY SPECIAL YEAR  
FOR US AS WE CELEBRATED  
OUR 150TH ANNIVERSARY.

## OUR YEAR IN REVIEW

E X P L O R E

OUR ROLE IS TO SUPPORT NEW ZEALANDERS  
TO EXPLORE, DISCOVER AND SHARE  
KNOWLEDGE.

We support New Zealanders to follow their curiosity and **explore** the world through the many research funds and development opportunities we offer. Best known is the Marsden Fund but we also administer a number of other opportunities, including for talented young people.

D I S C O V E R

We recognise the **discoveries** that New Zealanders make through their research, from school children through to researchers at the top of their field who we elect as Fellows of our academy. We celebrate excellence in research by presenting medals and awards and synthesise expert knowledge on topics of importance to New Zealand.

S H A R E

Knowledge is for **sharing**. We need it to make decisions on important issues and to enjoy life to its fullest. We share information on key topics and facilitate the sharing of the latest research discoveries through our public events and expert advice programme, journals and the Science Media Centre.

READ ON TO DISCOVER MORE ABOUT OUR  
ACTIVITIES DURING THE MONTHS OF 2017...



01/17



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JANUARY | KOTITĂTEA

EXPLORE  
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NEW ZEALAND AND JAPANESE RESEARCHERS HAVE BEEN WORKING TOGETHER TO DEVELOP TECHNOLOGY TO ALLOW SWARMS OF DRONES TO LOCATE AND RETRIEVE INFORMATION ABOUT CASUALTIES IN WIDE-SCALE EMERGENCIES SUCH AS TSUNAMIS AND EARTHQUAKES.

## DRONES TO SUPPORT SEARCH AND RESCUE

During January 2017, four members of the Japanese research team visited the University of Canterbury for joint field trials, utilising the University of Canterbury's fleet of drones and flight test areas, both within the university campus and at the dedicated flight test area 50km south of Christchurch.

The research received funding as a New Zealand–Japan Joint Research Project, currently funded under Catalyst: Seeding, which is managed by the Society on behalf of government. The project's two objectives are to use multiple drones to locate people under rubble and collect information that is contained in the Body Area Networks (BANs) devices those people are wearing that monitor and send information on variables such as heart rate or motion.

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"Many BANs are capable of measuring something relevant to the well-being of the wearer, and if we can tap into that as we fly over an area, there is also potential for triaging the casualties to ensure those most in need are attended to first by the rescue teams."

DR GRAEME WOODWARD, RESEARCH LEAD,  
WIRELESS RESEARCH CENTRE, UNIVERSITY OF CANTERBURY



LEARN MORE ABOUT THE PROJECT



FEBRUARY | HUITĀNGURU



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DISCOVER  
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## VALUING NATURE IN A HUMAN- DOMINATED WORLD

IN FEBRUARY, BRITISH ECOLOGIST AND CONSERVATION SCIENTIST DAME GEORGINA MACE FRS GAVE THE 2017 RUTHERFORD MEMORIAL LECTURE IN MANY CENTRES, HELD IN PARTNERSHIP WITH LONDON'S THE ROYAL SOCIETY, ON HOW THE FOCUS OF CONSERVATION HAS SHIFTED FROM PRESERVATION AND PROTECTION TO ADAPTABILITY AND RESILIENCE.

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"I actually don't think natural capital is about money. There are things nature provides us for free – clean water, clean air, energy, the soil – and we use the interest on that natural capital in order to sustain our way of life. I think the idea of natural capital is that we should be investing in nature in order to sustain that flow of benefits."

DAME GEORGINA MACE



HOW SHOULD WE VALUE NATURE IN  
A HUMAN-DOMINATED WORLD



EXPLORE  
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MAKING THE SCIENCE  
TEACHING LEADERSHIP  
PROGRAMME  
MORE  
CULTURALLY  
RESPONSIVE

THE SCIENCE TEACHING LEADERSHIP PROGRAMME, MANAGED BY THE SOCIETY ON BEHALF OF GOVERNMENT, AIMS TO DEVELOP SCIENCE LEADERSHIP IN SCHOOLS.

As part of enhancements to make the Science Teaching Leadership Programme more culturally responsive, the first professional development workshop was held on Tapu Te Ranga Marae in Wellington in February. It began with a formal pōwhiri and provided an immersive experience for the participant teachers.

Overall, the enhancements seek to enable participant teachers and schools to become more culturally aware and responsive by giving them the knowledge and skills to foster an environment that is able to show science through different cultural lenses, helping all students feel more included and engaged in science. The initiatives that celebrate and value diversity have been well received by the increasing number of schools with a high number of Māori and Pasifika students participating in the programme.

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“I enjoyed being fully immersed in the wānanga at the marae. I felt it strengthened some aspects of my cultural identity and also exposed some areas that I need to develop further. The connection to language, culture and tikanga was great – it put some practices into perspective and gave me an opportunity to reflect on how these will be beneficial in the classroom.”

FEEDBACK FROM PARTICIPANT TEACHER, SCIENCE TEACHING LEADERSHIP PROGRAMME



DISCOVER MORE ABOUT THE SCIENCE TEACHING LEADERSHIP PROGRAMME

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# BETTER ENGAGEMENT WITH MĀORI RESEARCHERS

The leaders of Ngā Pae o te Māramatanga and the Society formally gathered on 13 and 14 February 2017 at Waipapa Marae for a strategic planning meeting with the shared aim of strengthening the intent of the Society to connect more with Māori researchers and Māori communities. Among other topics, this meeting marked the starting point of a shared project to highlight the depth and breadth of Māori scholarship and began a project to develop a suite of awards to be presented at the Society's annual New Zealand Research Honours event to recognise Māori research excellence.

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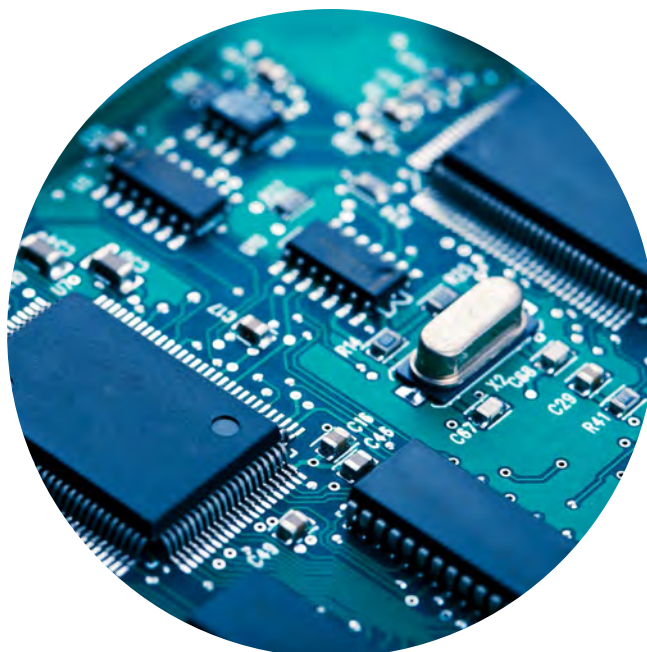
"We are extremely grateful to Ngā Pae o te Māramatanga for their willingness to partner with us as we pursue our journey to better engage with Māori researchers."

EMERITUS PROFESSOR RICHARD BEDFORD QSO FRSNZ, PRESIDENT,  
ROYAL SOCIETY TE APĀRANGI

Q&A

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MARCH | POUTŪTERANGI



## TEACHERS IN INDUSTRY

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Royal Society Te Apārangī was contracted to the Ministry of Education to deliver the Teachers in Industry programme during 2017 in Franklin, Papakura and Manurewa. The programme connected schools kura with science or technology-intensive businesses in their community. Teachers spent time with the businesses and gained industry experience, enabling them to develop business-relevant curriculum content for the classroom. The programme has lifted the awareness of teachers to factor in local opportunities and employability skills into their teaching and learning programmes, and businesses have valued the opportunity to engage with teachers and to showcase their sector.

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“Students have received more knowledge from me and local industry. There are planned visits, and more students have found career options.”

SECONDARY CLASSROOM TEACHER INVOLVED IN TEACHERS IN INDUSTRY



YEARS OF DISCOVERY  
1867 - 2017

04/17

APRIL | PAENGA-WHĀWHĀ



IN APRIL WE BEGAN A SIX-MONTH PROGRAMME OF EVENTS AND ACTIVITIES TO CELEBRATE OUR 150TH ANNIVERSARY OF SUPPORTING THE DISCOVERY AND SHARING OF KNOWLEDGE IN NEW ZEALAND.

## CELEBRATING 150 YEARS OF DISCOVERY



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SHARE

In 1867 we were established as the New Zealand Institute “to promote the general study and cultivation of art, science, literature and philosophy”. We are committed to continuing to play this role in New Zealand for hopefully another 150 years and beyond, supporting researchers, fostering curiosity in school children and empowering New Zealanders to make decisions on future challenges by providing the latest findings on these issues.

“We look forward to working with you as we deliver on the key objective specified for the Royal Society Te Apārangi in its current Act, namely to “foster in the New Zealand community a culture that supports science, technology and the humanities”. In fostering this culture the academy, the government and the public all have vitally important roles to play.

There is a famous Māori whakataukī or proverb that captures well for me the inclusive nature of this mandate:

*Mā wai e tō te waka o te mātauranga?  
Māku e tō, māu e tō, mā te whakarongo e tō.*

Who will bear the canoe of knowledge?  
I will, you will, all who listen will.”

PROFESSOR RICHARD BEDFORD FRSNZ, PRESIDENT,  
ROYAL SOCIETY TE APĀRANGI

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DISCOVER  
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## SYMPOSIUM FOR INTERNATIONAL ACADEMIES

THE FIRST EVENT OF OUR 150TH ANNIVERSARY PROGRAMME WAS A SYMPOSIUM FOR LEADERS OF ACADEMIES FROM AROUND THE WORLD TO DISCUSS KEY CONCERNS INCLUDING ISSUES OF PUBLIC ENGAGEMENT AND PUBLIC TRUST, HOW TO IMPROVE GLOBAL RESEARCH PRACTICE, AND HOW TO IMPROVE DIVERSITY OF FELLOWSHIP AND MEMBERSHIP GENERALLY.

We welcomed representatives of 17 academies from Europe, UK, China, Finland, Canada, Australia and the Pacific and the Assistant Director General of UNESCO along with valued researchers from CRIs, universities, independent research organisations and government agencies. The two-day symposium started with a formal pōwhiri with the visitors led into Te Whare Apārangi by Sir Venki Ramakrishnan FRS, President of The Royal Society, London.

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“One of the most important challenges facing us today is reaching people with evidence-based information that will be of value to them, while showing understanding and respect for their beliefs and values. We need to do much more to reach people who are turning away from true experts to listen only to their favoured perspectives.”

PROFESSOR RICHARD BEDFORD FRSNZ, PRESIDENT, ROYAL SOCIETY TE APĀRANGI

 [VIEW VIDEO OF PŌWHIRI](#)

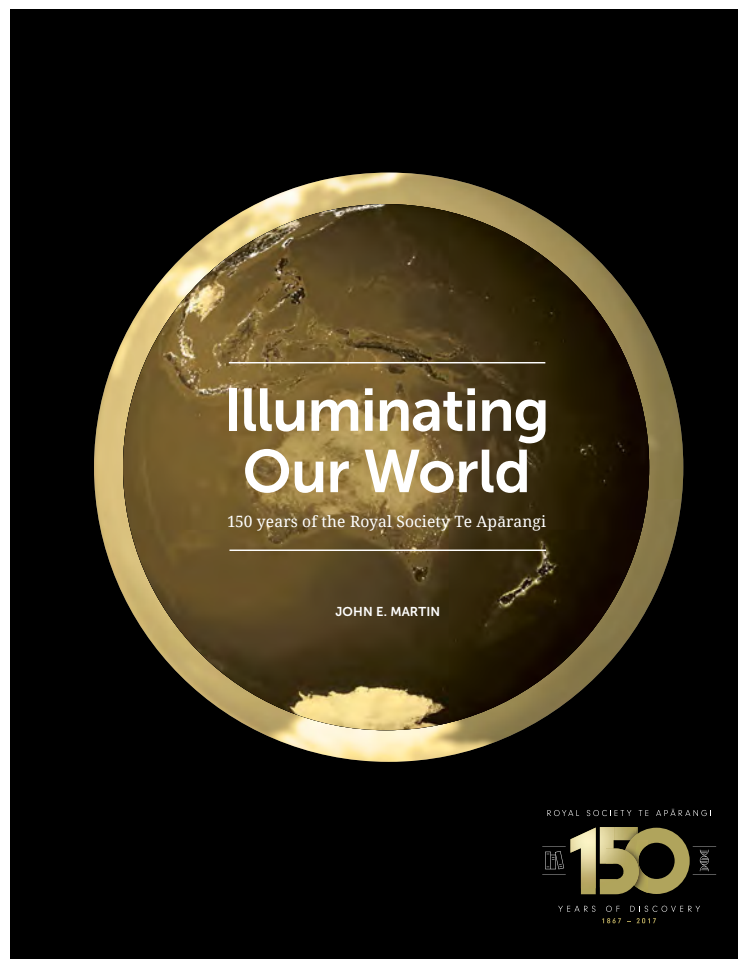


## 'ILLUMINATING OUR WORLD'

On 5 April we held a formal dinner at Parliament at which a book on the history of the Society by historian John E Martin *Illuminating our World: 150 Years of the Royal Society Te Apārangi* was launched by the Prime Minister.

An exhibition of portraits telling the story of the Society also opened at Parliament as well as an online interactive timeline outlining key points from our history.

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"What I'm hoping comes through in the book is the very interesting evolution of an organisation that, in order to survive and prosper, has had to reinvent itself multiple times."

JOHN E MARTIN



READ INTERVIEW WITH AUTHOR

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## OUR NEW BRAND AND WEBSITE LAUNCHED



As part of our 150 year anniversary, we refreshed our organisational identity. Our legal name remains Royal Society of New Zealand but we began using our new identity, Royal Society Te Apārangi and adopted an iconic kiwi symbol, the koru, as our logo. This reflects new growth while keeping a strong connection to our roots in Aotearoa. The changes involved a significant amount of research and symbolise the journey we have begun to be more diverse, open, and relevant. We also launched a new website in line with the new direction for the Society.

 EXPLORE ROYALSOCIETY.ORG.NZ



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HIGHLIGHTS 2017

05/17

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MAY | HARATUA

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ANTIMICROBIAL RESISTANCE:

## A MAJOR HEALTH ISSUE FOR NEW ZEALAND

MANY MICROBES THAT COMMONLY CAUSE INFECTIOUS DISEASE IN HUMANS AND ANIMALS ARE BECOMING RESISTANT TO THE ANTIMICROBIAL MEDICINES USED TO TREAT THESE DISEASES.

From May 2017, the Society began releasing resources to summarise the latest known about antimicrobial resistance in New Zealand, highlighting that New Zealand is in no way insulated from this global issue. Resources included an evidence update to outline the likely implications of antimicrobial resistance in New Zealand, a series of videos to explain the main concepts behind antimicrobial resistance and factsheets in Māori and English designed for people visiting health clinics.

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“In New Zealand we are as vulnerable as the rest of the world. We have higher rates of many infectious diseases than countries like the USA, the UK and Australia and a growing number of those organisms are becoming resistant to our medicines.”

ASSOCIATE PROFESSOR SIOUXSIE WILES, MICROBIOLOGIST AT THE UNIVERSITY OF AUCKLAND AND AN EXPERT ADVISER ON THE REPORT



SEE MORE AT [ROYALSOCIETY.ORG.NZ/ANTIMICROBIAL](https://royalsociety.org.nz/antimicrobial)

# HOW TO BRING NATURE BACK TO OUR CITIES

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Professor Bruce Clarkson, who was awarded the 2016 Charles Fleming Award for his work in ecology, gave the 2017 Charles Fleming Academy Lecture on urban ecological restoration around the country. He talked about how cities can use riverside planting to develop corridors to reconnect and encourage nature but also emphasised the role of pest control and individual gardens.

“If you want to do things like bringing Tūi back into your garden, having a grey willow there is not going to cut the mustard but, if you can get the ingredients right, anybody anywhere in the country who has a reasonable sized garden can do things which ensure that they bring back more native plants and animals into the system.”

PROFESSOR BRUCE CLARKSON



BRINGING INDIGENOUS NATURE BACK INTO  
NEW ZEALAND CITIES



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DISCOVER  
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# REVIEW FINDS DEFICIENCY IN THE PRACTICAL SKILLS

OF THOSE ENTERING THE  
SCIENCE TECHNICIAN  
WORKFORCE

An expert panel convened by the Society produced a report in May that outlined issues in the science technician workforce and suggested a two-fold path for the future. The panel concluded that science technicians need an understanding of scientific principles and methodologies, plus technical aptitude and transferable practical skills. The panel suggested that the Level 6 Diploma in Applied Science delivered in polytechnics be more widely promoted and that certain science degrees lift the core requirements in laboratory practice.

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“Science technicians bring a wealth of practical skills to the business and science sectors, yet there is now significant mismatch between the knowledge and skills acquired through tertiary education to those needed in employment.”

PROFESSOR JIM JOHNSON FRSNZ, CHAIR OF THE REPORT'S EXPERT PANEL.



VIEW SCIENCE TECHNICIAN WORKFORCE REPORT

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HIGHLIGHTS 2017

06/17

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JUNE | PIPIRI

MATARIKI AND THE PLEIADES

OUR WORLD  
FROM  
DIFFERENT  
LIGHTS

EXPLORE  
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TO CELEBRATE MATARIKI, WE JOINED WITH TE PAPA TO HOST A DISCUSSION WITH DR DANIEL HIKUROA, DR OCEAN MERCIER AND DR WAYNE NGATA, WHO SHARED HOW MĀTAURANGA MĀORI INFORMS THEIR RESEARCH.

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“As we look to celebrate Matariki, I am in awe of the generations of empirical observations that underpin such celestial knowledge, including the maramataka (Māori lunar calendar), observations that tuned our tūpana into natural rhythms and cycles, a tuning that I continually strive to incorporate and implement into my practise as an earth-systems scientist.”

DR DANIEL HIKUROA



MATARIKI AND THE PLEIADES PANEL DISCUSSION



ORCID IS A GLOBAL ORGANISATION THAT PROVIDES RESEARCHERS WITH A UNIQUE DIGITAL IDENTIFIER, WHICH THEY LINK WITH THEIR CHOSEN PROFESSIONAL ACTIVITIES.

## LAUNCH OF NEW ZEALAND ORCID HUB

They can also permit other organisations such as their employer, funders or publishers to write information to their record, saving them time. The Society is the lead agency of the New Zealand ORCID Consortium, which has the role of supporting the adoption of ORCID by research organisations and funders in New Zealand. In June there was a soft launch of the New Zealand ORCID Hub, which allows all Consortium members to productively engage with ORCID regardless of technical resources. The Hub is a web application with a simple user interface being developed by technology partners at the University of Auckland using an agile project management approach, with a public demonstration of progress on a fortnightly basis.



LEARN MORE ABOUT THE NEW ZEALAND ORCID HUB

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STUDENTS ATTEND  
OVERSEAS  
SCIENCE AND  
TECHNOLOGY  
OPPORTUNITIES

From June, students began representing New Zealand at international science and technology events, supported by the Talented School Students Travel Award, administered by the Society on behalf of government. One of the students selected was Aayushi Verma, from Christchurch Girls' High School, who attended the USA Space Camp in Huntsville, Alabama.

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"I had so many fascinating intellectual conversations with other like-minded students and by attending Space Camp, I am even more motivated to pursue a career in astrophysics, which is my passion. I hope that one day I can work at NASA and help advance humankind in some way. To me, space exploration is a necessity to advance the growth of humanity, and to find new horizons".

AAYUSHI VERMA

## ALUMNI SERIES LAUNCHED

To inspire young New Zealanders interested in pursuing careers in research, we launched a new online series on our website in June to profile the careers of those who have been supported by the Talented School Students Travel Award in the past and allow them to share advice to those keen to follow in their footsteps.



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“My life so far has followed a very special path. Native Americans describe this path as the Good Red Road... those that know me realise, my passion for aerospace, astronomy and aviation has been a constant theme in my life, shaping my choices and defining my pathway. I was extremely lucky to be selected and supported a second time by the Royal Society of New Zealand to attend the US International Space Camp in Huntsville, Alabama together with another student in 2007... while I can't go into the specifics of what I am doing at Boeing I can say that I am loving every minute of my time here.”

CAROLINE DELONG, A MECHANICAL ENGINEER CURRENTLY WORKING AT BOEING DEFENSE SPACE & SECURITY IN OKLAHOMA CITY, USA.



[VIEW CAROLINE DELONG'S STORY](#)

In June, Associate Professor Stephen On, Lincoln University, was awarded a Catalyst: Seeding grant to test a new type of scanner in New Zealand that can identify harmful strains of bacteria in food. Catalyst: Seeding grants are awarded by the Society on behalf of government to facilitate new small and medium pre-research strategic partnerships.

The technology, called a BEAM (Bacteria Rapid Detection using Optical Scattering Technology) scanner, was developed in the US and Associate Professor On is working with two senior US food safety researchers to see if the technology may be useful in New Zealand.

The scanner is designed to identify disease outbreaks better, by providing a 'specific fingerprint' of bacteria cultured on a standard agar media plate. This allows researchers to pinpoint the strains of interest much quicker, with a particular focus on pathogens.

## INNOVATIVE TECHNOLOGY TO DETECT DISEASE- CAUSING BACTERIA



EXPLORE  
DISCOVER  
SHARE

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"If there's an outbreak of E. coli or salmonella, for example, you may have dozens of samples to examine. The technology provides the major advantage of identifying the pathogen of concern by rapidly screening it from microorganisms naturally present in food or clinical samples. Because it's non-invasive, you can take your isolate of interest and further characterise it with sub-typing methodologies to better identify an outbreak. No comparable technology is available elsewhere – it's a game-changer."

ASSOCIATE PROFESSOR STEPHEN ON



VIEW NEWS STORY ON TESTING BEAM IN NEW ZEALAND

# PROGRESS FOR BIOSYSTEMATICS AND TAXONOMY

EXPLORE  
DISCOVER  
SHARE

IN JUNE WE ACCEPTED AN INVITATION TO PARTNER WITH THE AUSTRALIAN ACADEMY OF SCIENCE TO DEVELOP A SHARED VISION AND ROADMAP FOR THE FOUNDATIONAL DISCIPLINES OF BIOSYSTEMATICS AND TAXONOMY IN OUR REGION FOR THE NEXT DECADE.

This work follows on from a comprehensive review of taxonomic collections in New Zealand that we published at the end of 2015. It called for more resources and a coordinated approach to safeguard and grow New Zealand's biological collections, which it said are intrinsic to supporting sectors of New Zealand life from economic growth to human health.

The Chair of the 2015 review Professor Wendy Nelson FRSNZ, from NIWA and the University of Auckland, and contributor Dr Tom Trnski, Auckland War Memorial Museum, were invited to serve on the advisory committee of the Australasian plan.

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"Following New Zealand's 2015 report, we are making progress in New Zealand for maintaining and building capacity in taxonomy. Since the release of the review, it has been pleasing to see a greater acknowledgement of the importance of taxonomy in our national science strategies and government work programmes. Furthermore, last year saw the establishment of a national working group hosted by Te Papa that brings together 13 institutions that hold over 90% of New Zealand's taxonomic collections. This is a very important step in safeguarding our biological collections, which underpin the work needed to describe new species."

PROFESSOR WENDY NELSON



VIEW MORE ON TAXONOMY PROGRESS

07/17

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JULY | HÔNGONGOI

EXPLORE  
DISCOVER  
SHARE

## CUTTING-EDGE INFORMATION FOR MPS

In collaboration with the Speaker of the New Zealand Parliament, Science New Zealand, Universities New Zealand and the Independent Research Association of New Zealand, we ran our annual Speaker's Science Forum so that Members of Parliament have the opportunity to hear presentations on topical research areas.

**In 2017, the topics presented were:**

- Understanding New Zealand's freshwater
- Transport in growing cities
- Big data: big value
- Has New Zealand's exposure to earthquake risks and hazards changed?
- Production, protection and adding value
- New Zealand's space science



LEARN MORE ABOUT SPEAKER'S SCIENCE FORUM





HE WAKA EKE NOA:  
MENTORING IN  
THE AOTEAROA  
RESEARCH  
COMMUNITY



Effective mentoring is valuable at all stages of a researcher's career. In July we published mentoring guidelines that draw on Māori, Pasifika and Pākehā perspectives to offer a unique framework for mentoring in the context of an increasingly diverse Aotearoa. They were developed by a working group led from within our Early Career Researcher community, and are for use by anyone or for any group that finds them helpful.

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"Mentoring is important for sharing knowledge and building the skills of Aotearoa New Zealand researchers. It is most effective when done in a culturally appropriate way, and we have integrated Māori and Pasifika as well as European approaches into the guidelines. Enhanced mentoring practice promises to make an important contribution to improving equity in the achievement and professional mana of researchers from groups that may have been disadvantaged."

DR JANE ALLISON, WORKING GROUP CONVENOR AND ROYAL SOCIETY TE APĀRANGI EARLY CAREER RESEARCHER FORUM COMMITTEE CHAIR



[VIEW MENTORING GUIDELINES](#)



# BILINGUAL APPROACH FOR PRIMARY SCIENCE CONFERENCE



The Society partnered with the Teachers' Refresher Course Committee to run the Primary Science Conference in July for teachers kaiako. One major accomplishment for the 2017 conference in Auckland was successfully incorporating workshops in te reo Māori or with an emphasis on Pūtaiao.

"The workshops were very valuable and the keynote speakers inspiring! I especially enjoyed hearing from facilitators who are doing practical activities towards promoting science in their schools. I personally found great value in attending the workshops relating to rongoā Māori and Te Ara ka Takahia."

CONFERENCE ATTENDEE

AUGUST | HERETURIKŌKĀ

THE CARVING OF WHAKAOTIRANGI IN THE ŌTĀWHAO MARAE.

## 150 WOMEN IN 150 WORDS

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**DISCOVER**  
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Also for our 150th Anniversary, we began an online series to celebrate women's contributions to expanding knowledge in New Zealand, starting with Whakaotirangi, a pre-1400 experimental gardener. When Māori first came to New Zealand they brought seeds of important plants with them to test for food and medicinal use in the new, colder land. Both Tainui and Te Arawa traditions speak of one woman who carried out this important task: Whakaotirangi. Tainui tradition holds that Whakaotirangi landed in the Waikato at Kawhia, but in experimenting with her plants moved over the hill to Aotea. There she built a garden she called Hawaiki Nui, where native medicines still grow today.



READ MORE ABOUT WHAKAOTIRANGI AND VIEW THE  
150 WOMEN IN 150 WORDS PROJECT

TALK IT UP –  
SHOULD NEW  
ZEALAND  
DEVELOP A  
NATIONAL  
LANGUAGES  
POLICY?

E X P L O R E  
D I S C O V E R  
S H A R E

In August, we joined with partners to run workshops on considering a national language policy for New Zealand. This followed on from a report we produced in 2013 that outlined the major issues facing language practices in New Zealand. Leading the 2017 workshops was Professor Joseph Lo Bianco from the University of Melbourne, who developed Australia's languages policy in 1987. He said that speaking more than one language brings cognitive, inter-cultural, and career benefits.

“Communication is what keeps our social body politic together, it's what energises the economy, it's what makes education operate. We need to treat language like a resource for the community.”

PROFESSOR JOSEPH LO BIANCO



LISTEN TO INTERVIEW WITH JOSEPH LO BIANCO

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## MARSDEN FUND INVESTMENT PLAN RELEASED AND DISCUSSED

THE MARSDEN FUND COUNCIL RELEASED A THREE-YEAR INVESTMENT PLAN IN AUGUST TO HELP GUIDE THE STRATEGIC DIRECTION OF THE FUND AND CONTRIBUTE TO THE NATIONAL STATEMENT OF SCIENCE INVESTMENT.

The Marsden Fund Council developed the plan following an assessment earlier in 2017 undertaken by the Ministry of Business, Innovation and Employment.

The assessment found that the Fund is highly-regarded, well-run and effective at selecting high-quality research within its current settings, but recommended an investment plan to provide strategic direction, and ensure the Fund continues to be effective and fit-for-purpose.

Society staff who support the Fund operations and Marsden Fund Councillors gave presentations around the country on the investment plan and received feedback, particularly on the trial of an alternative evaluation methodology to be undertaken in 2018.



VIEW MARSDEN FUND INVESTMENT PLAN



# 150TH ANNIVERSARY REGIONAL LECTURES

As part of our 150th anniversary programme, our 10 independent branches each invited a researcher to share their latest discoveries with the local community. Topics presented were our changing oceans; marine climate refugees; pest-free pipfruit; future foods; radio astronomy; responding to earthquakes; heat stress from climate change; improving dairy cattle genetics; preparing society for advances in artificial intelligence; solving biology's riddles with computers; and social license and life science technologies.



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“The post-expert and post-truth world will make many important decisions that much harder and could threaten the nature of democracy itself. Science has an important role in being a bastion against that threat. To get there we will have to look again how we better engage between science and the rest of society. It is not as in 1942 when Robert Merton, the sociologist of science, described scientists as priests standing on an altar revealing truths to an ignorant society; rather today science is deeply embedded within society – a society that still is generally supportive of the scientific effort and which is increasingly empowered in its decision making.”

SIR PETER GLUCKMAN FRS FRSNZ, PRIME MINISTER'S CHIEF SCIENCE ADVISOR, IN HIS ADDRESS TO THE WELLINGTON BRANCH.



READ PRESENTATION: NEW LIFE SCIENCES,  
SOCIAL LICENSE AND SOCIAL CONSENSUS



EXPLORE  
DISCOVER  
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LAUNCH OF AOTEAROA  
NEW ZEALAND  
SCIENCE  
JOURNALISM  
FUND

In August, our Science Media Centre partnered with Victoria University of Wellington's Science in Society programme leader and 2016 Prime Minister's Science Communicator's Prize winner, Dr Rebecca Priestley, to launch the Aotearoa New Zealand Science Journalism Fund. This fund is aimed at helping journalists and freelance writers work on science-related projects that would be otherwise hard to get off the ground. For the first round it distributed \$15,000 among six selected projects, all of which have been published. Among the stories were two in-depth 45-minute documentaries, a 5,000 word feature, online videos and a multi-part newspaper series, on issues ranging from sea level rise and aged-care robots to gene editing and synthetic food.

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"The Robots are coming, and they are coming to watch over our elderly. Around the world, lifespans are lengthening, the proportion of elderly in the population is increasing, people are developing more complex healthcare needs, and more are living alone. Meanwhile, the price of looking after our elderly is rising...Robotics holds the answer."

NAOMI ARNOLD IN ARTICLE 'THE ROBOTS WILL SEE YOU NOW',  
PUBLISHED IN *NEW ZEALAND GEOGRAPHIC*.



READ THE ROBOTS WILL SEE YOU NOW AND VIEW  
AOTEAROA NZ SCIENCE JOURNALISM FUND

HIGHLIGHTS 2017

2017

SEPTEMBER | MAHURU



EXPLORE  
DISCOVER  
SHARE

## EDITING OUR GENES: PROMISES AND PITFALLS

With support from the Becroft Foundation, the Society arranged for broadcaster Kim Hill CRSNZ to be joined by US-based bioethicist Josephine Johnston and panels of experts in four main centres in September to explore the implications of gene editing technologies for New Zealand. Each discussion focussed on a different potential application for gene editing, such as the risks and benefits of using gene editing for human reproduction and fertility, in medicine, for pest control and in agriculture. The discussions were recorded and broadcast by RNZ (Radio New Zealand).

They were part of our larger expert advice project for exploring the implications of gene editing for New Zealand.

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“I don’t think it’s defensible to say all gene editing would be good or all gene editing would be bad. I don’t see it as an up-down technology where we would give it a thumbs up or a thumbs down. I think it’s much more complex than that as this tool can have so many different uses, so the muddy work of figuring that out is what we have to do.”

JOSEPHINE JOHNSTON



[LISTEN TO EDITING OUR GENES PANEL DISCUSSIONS](#)

# FALLING WALLS LAB COMPETITION FOR INNOVATIVE IDEAS



FALLING WALLS LAB COMPETITORS. FROM LEFT: CHRISTOPHER PETRIE, MEHDI SAEIDI, GERMAN AMBASSADOR TO NEW ZEALAND, HE MR GERHARD THIEDEMANN, ROYAL SOCIETY TE APĀRANGI PRESIDENT, PROFESSOR RICHARD BEDFORD, SUNIL GOPAUL, PENI HAUSIA HAVEA AND FEDERICO TOMASETTO.

EXPLORE  
DISCOVER  
SHARE

Novel solutions to tackling invasive plants, climate change, impacts of artificial intelligence on education, better knee treatments and making sustainable agriculture truly sustainable won five early career researchers from New Zealand and the South Pacific the chance to compete at the Australian Falling Walls Lab in Canberra in September.

The global event is run by The Falling Walls Foundation, a non-profit organisation in Berlin, dedicated to the support of science and the humanities. Each year winners of the regional competitions get to compete at the finals in Berlin. For 2017, the New Zealand Falling Walls Lab was a collaboration between Royal Society Te Apārangi, the German Embassy in Wellington and Canberra, and the Australian Academy of Science.

Mehdi Saeidi from Auckland University of Technology was placed third in the Australian competition for his idea for 'Breaking the Wall of Knee Replacements in Younger Patients' by developing an implant that will remove excessive load and slow progression of osteoarthritis, which affects millions of people worldwide. The implant aims to reduce the likelihood of requiring a total knee replacement.



READ MORE ON FALLING WALLS 2017

# ENCOURAGING SCIENTISTS TO TELL STORIES

EXPLORE  
DISCOVER  
SHARE



In September, the Science Media Centre collaborated with US-based The Story Collider, a podcast sharing true, personal stories about science. They ran workshops on story telling for scientists in Wellington and Christchurch and hosted a packed public event in Wellington.

One of the story tellers, Professor Cather Simpson, Director of The Photon Factory at the University of Auckland, describes how a disagreement with her cell biology MD/PhD supervisor leads her to take a 3-month hiatus in the physical chemistry department and ultimately take a new career path.

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“So I grit my teeth, I look forward and I go... and I fall in love, scientific love. I find myself getting up at four in the morning to do calculus out of text books. I am captivated by the idea that you can use mathematics to describe light and how light interacts with materials.”

PROFESSOR CATHER SIMPSON



HEAR CATHER'S STORY

## WINNING VIDEO EXPLORES POI AND HEALTH



In September the Society joined with others to sponsor the Early Career Researchers "150 Seconds of Science" video competition. This year the competition was opened up to students as well as early career researchers and the winning entry was led by doctoral student Kate Riegle van West. It was based on a clinical trial conducted between the Centre for Brain Research and the Dance Studies Programme at the University of Auckland, establishing the benefits of poi on physical and cognitive function in healthy older adults. Participants improved their balance, grip strength, memory and attention.



"These are super exciting results, especially when thinking about quality of life, as they cover some of the hallmarks of frailty. I hope this study will pave the way for future poi and health research and shed more light on one of New Zealand's taonga. "

KATE RIEGLE VAN WEST



WATCH VIDEO POI: A SPIN ON HEALTH



## JOURNAL SPECIAL ISSUE REFLECTS ON 150-YEAR HISTORY



In September 2017, the *Journal of the Royal Society of New Zealand* published a special issue entitled 'The 150-year voyage of the *Journal of the Royal Society of New Zealand*: from colonial beginnings to an electronic world'. This issue featured five invited review articles revisiting the central themes that were explored in the first issue of the *Transactions and Proceedings of the New Zealand Institute*. Atholl Anderson FRSNZ considered the changing perspectives of Māori colonisation voyaging. Phil Garnock-Jones assessed the contribution of Leonard Cockayne to theoretical issues in botany. Colin Miskelly reviewed colonial ornithology. Nick Mortimer FRNSZ reviewed Crawford's 1869 essay on the geology of the North Island and Cor Vink reviewed 180 years of research on spiders in New Zealand.

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"Research on spiders (araneology) in New Zealand has a 180-year history that began just before the Treaty of Waitangi was signed. Initially, specimens were collected and taken back to Europe to be described, but from 1857 studies began to be conducted in New Zealand."

COR VINK, CANTERBURY MUSEUM.

 [VIEW JOURNAL SPECIAL ISSUE](#)

HIGHLIGHTS 2017

10/17

OCTOBER | WHIRINGA-Ā-NUKU

EXPLORE  
DISCOVER  
SHARE

# ACCELERATING RESEARCH CAREERS WITH RUTHERFORD DISCOVERY FELLOWSHIPS

EACH YEAR ON BEHALF OF  
THE GOVERNMENT WE AWARD  
RUTHERFORD DISCOVERY  
FELLOWSHIPS TO 10 LEADING  
EARLY- TO MID-CAREER  
RESEARCHERS, SUPPORTING THEM  
TO ACCELERATE THEIR RESEARCH  
CAREERS IN NEW ZEALAND.

2017 Fellowship recipients will seek answers to questions such as: How can we better track the population of threatened species? What makes cancer spread around the body? How do we constitutionally recognise and accommodate the rights of indigenous people globally?

## 2017 RUTHERFORD DISCOVERY FELLOWS

**Dr Emma Carroll**, University of Auckland, for research entitled: Family matters: developing close kin mark recapture methods to estimate key demographic parameters in natural populations.

**Associate Professor Claire Charters**, University of Auckland, for research entitled: Constitutional transformation to accommodate Māori in Aotearoa New Zealand: Lessons from around the globe.

**Dr Aniruddha Chatterjee**, University of Otago, for research entitled: Investigating the origin and consequences of epigenetic alterations in cancer metastasis.

**Dr Christopher Cornwall**, Victoria University of Wellington, for research entitled: Physiological and environmental controls of coralline algal calcification under climate change.

**Dr Alex Gavryushkin**, University of Otago, for research entitled: Online algorithms in evolutionary biology.

**Dr David Hayman**, Massey University, for research entitled: From individuals to populations: multi-scale approaches to pathogen emergence.

**Dr Marwan Katurji**, University of Canterbury, for research entitled: The invisible realm of atmospheric coherent turbulent structures: Resolving their dynamics and interaction with Earth's surface.

**Dr Yvette Perrott**, Victoria University of Wellington, for research entitled: Realising the potential of galaxy clusters as cosmological probes.

**Dr Max Petrov**, University of Auckland, for research entitled: Deciphering the metabolic pathways underlying post-pancreatitis diabetes.

**Associate Professor Melinda Webber**, University of Auckland, for research entitled: Kia tū rangatira ai ngā iwi Māori: living, succeeding, and thriving as iwi Māori.



VIEW MORE ABOUT THE 2017 RUTHERFORD  
DISCOVERY FELLOWS

# 2017 NEW ZEALAND RESEARCH HONOURS

EXPLORE  
DISCOVER  
SHARE

THE PREEMINENT CELEBRATION OF THE 150TH ANNIVERSARY WAS OUR RESEARCH AWARDS CEREMONIAL DINNER, HELD 150 YEARS TO THE DAY THAT ROYAL SOCIETY TE APĀRANGI WAS ESTABLISHED ON 10 OCTOBER 1867.

Over 420 guests from the research and business community attended the event held at the Auckland Viaduct. Society Councillor Professor Tahu Kukutai was MC for the evening and honourable guests included the Governor-General, Her Excellency Dame Patsy Reddy, His Excellency Sir David Gascoigne, the Minister for Science and Innovation, Hon. Paul Goldsmith, Tā Tipene O'Regan and Tā Pita Sharples of Ngā Pae o te Māramatanga, Sir Peter Gluckman, and representatives of Ngāti Mutunga, the iwi of Te Rangi Hiroa, the first Māori fellow of the Society. A mihi whakatau by representatives of Ngāti Whātua Ōrākei welcomed the Governor-General and guests, with Paora Sharples of Ngā Pae o te Māramatanga, son of Tā Pita, responding on behalf of the Society. The Governor-General gave a speech emphasising the contribution of the Society to New Zealand over its 150-year history, and musicians were an added dimension to the ceremony, particularly Moana Maniapoto with a mesmerising performance of her song Treaty.



**VIEW VIDEO OF MOANA MANIAPOTO PERFORMING TREATY AT THE EVENT**

A new Māori award, Te Puāwaitanga, was announced. The name was gifted by Ngā Pae o te Māramatanga, which has been assisting the Society to develop a suite of Māori research awards, with two more signalled on the evening.

Professor Wendy Larner FRSNZ, Provost at Victoria University of Wellington, was announced as the next President of the Society, beginning her term in July 2018.



**VIEW SPEECH FROM ROYAL SOCIETY TE APĀRANGI PRESIDENT**



Nineteen researchers from a range of academic and research organisations were presented with our awards.



The top honour, the **Rutherford Medal**, presented for an exceptional contribution to New Zealand research, was awarded to volcanologist Professor **Colin Wilson** FRS FRSNZ of Victoria University of Wellington. His research has shown how large volcanoes behave before and during explosive eruptions, including those that created Lake Taupō, expanding our understanding of volcanoes and the hazards they pose.

## LEADERSHIP



The **Thomson Medal** was awarded to Professor **Charles Eason** CRSNZ. He received this medal for his inspirational leadership in his research career, particularly in the areas of drug development and pest control, and also as the Chief Executive of the Cawthron Institute

in Nelson, which has expanded its expertise in aquaculture breeding, seafood safety, nutraceuticals and coastal and freshwater ecology.

## COMMUNICATION



The **Callaghan Medal** for science communication was awarded to Professor **Peter Shepherd** FRSNZ, University of Auckland, for developing activities to increase the understanding of science by the New Zealand public. These include a programme to keep

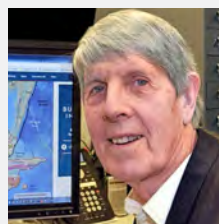
biology teachers, and their students, up to date with the latest developments in the life sciences and expanding the Queenstown Research Week.



## SCIENCE

Professor **Sally Brooker** FRSNZ, University of Otago, was awarded the **Hector Medal** for designing and making molecules with exceptional properties such as the ability to act like a switch or magnet or to accelerate chemical reactions.

Some of these molecules may contribute to a 'greener' future, allowing creation of compostable plastics or even the production of hydrogen from light energy, which would be the ultimate 'green' fuel.



Dr **Roger Cooper** FRSNZ, GNS Science, received the **Hutton Medal** for his contributions to understanding the geological foundations and the earliest organisms of Zealandia and beyond and for his role in maintaining and developing paleobiology expertise in

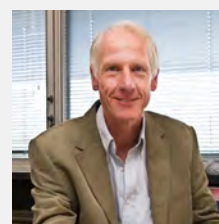
New Zealand, which uses rocks to study ancient biology.

## HUMANITIES AND SOCIAL SCIENCES



Emeritus Professor **Laurie Bauer** FRSNZ, Victoria University of Wellington, was awarded the **Humanities Aronui Medal** for his influential research in descriptive linguistics. His world-renowned research has focussed on word-formation, the description of

New Zealand English, and the sound structure of language.



Professor **Cris Shore** FRSNZ, University of Auckland, was awarded the **Mason Durie Medal** for his contributions to political anthropology and the study of organisations, governance and power. He has pioneered the use of anthropological methods to study

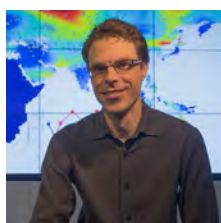
policy and institutions.



Professor **Ngahuia te Awekotuku** received the **Pou Aronui Award** for her outstanding service to humanities-aronui over 40 years, showing an enduring commitment to indigenous culture and heritage. She is an acclaimed author of award-winning research and works of fiction and poetry, recognised arts curator and critic, and stalwart of Writer's Festivals locally and overseas.



Professor **Tracey McIntosh**, University of Auckland, was presented the **Te Rangi Hiroa Medal** by Ngāti Mutunga iwi representatives, the award being for advancing our understanding of enduring social injustices that undermine Māori wellbeing and inhibit social cohesion and meaningful cultural diversity in Aotearoa. Her research focuses on how to correct the intergenerational transmission of social inequalities, how they pertain to Māori, and influence new indigenous knowledge and policies that work for Māori and the nation.



Professor **Murray Cox**, Massey University, was similarly presented the **Te Rangi Hiroa Medal** for his anthropological work to reconstruct processes of transformation and change in past societies using genetic data. His research has revealed a number of social features from the past such as marriage rules and farming expansion in South East Asia.

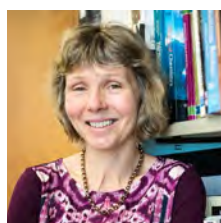
## TECHNOLOGY, APPLIED SCIENCE AND ENGINEERING



Professor **Peter Tyler** FRSNZ, Victoria University of Wellington, was awarded the **MacDiarmid Medal** for designing and synthesising a new raft of potential drugs that target the enzymes of many diseases. This has led to the development of newly approved lymphoma drug, Mundesine, that is giving patients new hope.



Professor **Stephen Henry**, Auckland University of Technology, was awarded the **Pickering Medal** for his development and commercialisation of a surface-modification technology, called Kode™ Technology, which shows huge promise for therapeutic use including fighting cancer, reducing surgical infections and healing wounds.

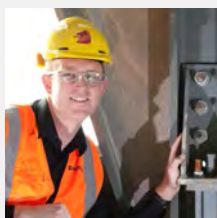


Professor **Kim Pickering**, University of Waikato, was awarded the **Scott Medal** for her development of composite materials that are more sustainable. Many composite materials are not biodegradable or recyclable, but she has used more sustainable materials as fibres for reinforcing, for example hemp, wood and harakeke or New Zealand flax.



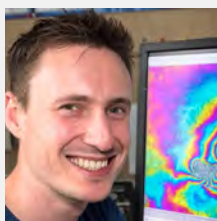
Professor **Ian Woodhead**, Lincoln Agritech, was also awarded the **Scott Medal** for advancing electronic engineering, particularly in developing sensors for the agricultural and environmental sectors, including an electric fence performance sensor, and an electronic soil moisture sensor that allows for more efficient irrigation systems.

## EARLY CAREER RESEARCHERS



Associate Professor **Geoff Rodgers**, University of Canterbury, received the **Cooper Award**, the Royal Society Te Apārangi Early Career Research Excellence Award for Technology, Applied Science and Engineering, for developing

safe buildings that do not require repairing after large earthquakes.



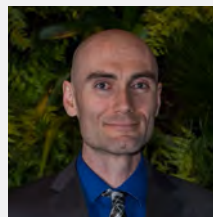
Dr **Ian Hamling**, GNS Science, received the **Hamilton Award**, the Royal Society Te Apārangi Early Career Research Excellence Award for Science, for advancing understanding of New Zealand's diverse tectonic and volcanic processes using satellite-based

techniques. He led work to rapidly define the Kaikoura M7.8 earthquake, the findings of which have implications for seismic hazard models used worldwide.



Dr **Aroha Harris**, University of Auckland, was awarded the inaugural **Royal Society Te Apārangi Early Career Researcher Award**

in Humanities for her substantial contributions to the award winning Māori history, Tangata Whenua: An Illustrated History, which spans the entirety of Māori history. She was lead author of the section on sociocultural history of twentieth-century Māori.



Dr **Danny Osborne**, University of Auckland, was awarded the inaugural **Royal Society Te Apārangi Early Career Research Award** in Social Sciences for advancing understanding of the psychological barriers to collective action. His research examines

New Zealanders' attitudes and shows that people's basic needs for stability, beliefs about their collective ability to change the system, and culture specific beliefs about past injustices, all undermine collective action.



**Ryan Thomas**, a PhD student at the University of Otago, received the **Hatherton Award** for experimental work leading to the first direct observation that certain atomic particles follow what's known as the Pauli exclusion principle when colliding multiple times, so long

as sufficient collision energy is maintained. This work demonstrates and extends our knowledge about the fundamental properties of quantum particles.

EXPLORE  
DISCOVER  
SHARE

# CLIMATE CHANGE WILL DISRUPT MANY FACTORS THAT CONTRIBUTE TO OUR HEALTH

IN OCTOBER WE RELEASED A THIRD REPORT IN OUR EXPERT ADVICE SERIES LOOKING AT CLIMATE CHANGE FROM A NEW ZEALAND PERSPECTIVE, THIS TIME CONSIDERING HEALTH.

The previous reports, published in 2016, were *Climate Change Implications for New Zealand*, which set out the likely risks and vulnerabilities for New Zealand from climate change and *Transition to a Low-Carbon Economy for New Zealand*, which outlined the country's mitigation options.

The third report *Human Health Impacts of Climate Change for New Zealand* found that many factors that contribute to our health and well-being as New Zealanders are threatened by climate change. We can expect direct effects on our health, such as increased exposure to heat waves and adverse weather events but also indirect effects, such as reduced water and food safety and challenges to our mental health.

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"We don't think that climate change will affect everybody equally or evenly. You can think of it a bit as a threat multiplier. Climate change is going to make life harder for people who are already suffering a bit. But, the sooner New Zealand and the global community act to reduce climate change, the less risk there is of us experiencing these negative effects on our health."

PROFESSOR ALISTAIR WOODWARD, EPIDEMIOLOGIST AND BIostatistician AT THE UNIVERSITY OF AUCKLAND, WHO CONTRIBUTED TO THE REPORT.



SEE MORE AT [ROYALSOCIETY.ORG.NZ/](https://royalsociety.org.nz/)  
CLIMATE-CHANGE-HEALTH

EXPLORE  
DISCOVER  
SHARE

# RESEARCHERS RECOGNISED FOR SUSTAINED RESEARCH EXCELLENCE



WE AWARDED THREE ESTABLISHED RESEARCHERS PRESTIGIOUS JAMES COOK RESEARCH FELLOWSHIPS IN 2017, WHICH PROVIDE FUNDING FROM THE GOVERNMENT FOR THEM TO UNDERTAKE STUDY OR RESEARCH IN THEIR FIELD OF ENDEAVOUR FOR TWO YEARS.

**Professor Katie Pickles**, University of Canterbury, will examine heroines in modern global history. She will research what these exceptional individuals reveal about women's changing roles and status over the past 200 years, focusing on Aotearoa New Zealand.

**Professor Vickery Arcus**, University of Waikato, developed a theoretical framework for explaining the behaviour of enzymes in response to changes in temperature. He will use the fellowship to explore if this framework continues to explain the behaviour of enzymes in more complex biological systems such as cells, organisms and ecosystems. This research might help us predict how biological systems will react to increasing global temperatures.

**Associate Professor Stéphane Coen**, University of Auckland, will further his research into optical fibres and microresonators. Heralded by the 2005 Nobel Prize in Physics, optical frequency combs allow light from lasers to be split into thousands of ultra-stable laser beams with different wavelengths. He will use his fellowship to develop new flexible ways to generate such combs, which have many potential applications, including in the telecommunications industry. The Royal Society Te Apārangī awarded him the Hector Medal in 2016 for research in this area.



VIEW MORE ON THE 2017 JAMES COOK RESEARCH FELLOWS

HIGHLY PROMISING  
RESEARCHERS  
AWARDED  
FELLOWSHIPS  
AND  
SCHOLARSHIPS



OUR RUTHERFORD FOUNDATION TRUST  
AWARDED FIVE POSTDOCTORAL FELLOWSHIPS  
AND TWO PHD SCHOLARSHIPS WITH FUNDING  
FROM GOVERNMENT IN 2017.

**Two-year New Zealand Postdoctoral Fellowships:**

**Dr Robin Lee**, University of Canterbury, for research entitled: Earthquake-induced ground motion prediction: Realising the paradigm shift from empirical relations to physics-based simulation methods.

**Dr Daniel Preston**, University of Canterbury, for research entitled: Building bigger and better cages: a novel approach to large and complex molecules.

**Dr Michael Price**, Victoria University of Wellington, for research entitled: Solar cells beyond the Shockley-Queisser limit: 2-D semiconductors at the interface.

**Dr Jessica Rodrigues**, Plant and Food Research, for research entitled: Harnessing sequence variation of MYB genes across plant genomes for a healthy and colourful future.

**Dr Erica Todd**, University of Otago, for research entitled: Epigenetic regulation of sex change.

**Three-year Cambridge Rutherford Memorial PhD Scholarships:**

**Alexander Sneyd**, University of Cambridge (currently at Victoria University of Wellington), for research entitled: Application of metal halide perovskites and other semiconductor materials to photovoltaic devices.

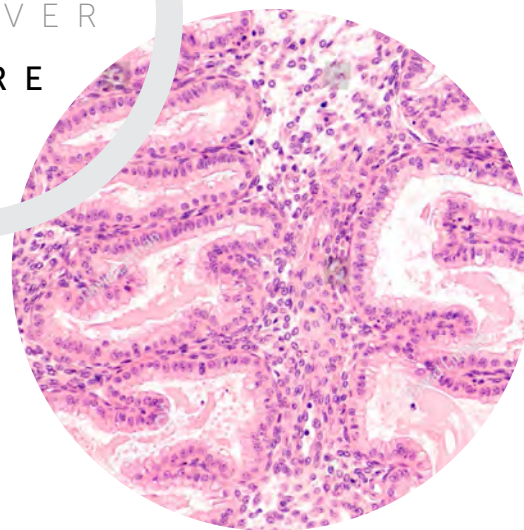
**Charlotte Steel**, University of Cambridge (currently at University of Otago), for research entitled: How protein misfolding can be prevented in neurodegenerative disease.



**VIEW MORE ON RUTHERFORD FOUNDATION  
2017 AWARDEES**

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DISCOVER  
SHARE

## GREAT KIWI RESEARCH, SHARING WOMEN'S DISCOVERIES



"The inner lining of the uterus is called the endometrium. I studied how it changed during the menstrual cycle, how it sheds during period and how it prepares itself to receive an embryo in the second half of the cycle but when people outside the profession ask me what I do, I would say 'Well there's this amazing tissue called the endometrium' and many times various women would stop me and say 'I know, I have it.' I would say 'yes, every woman with a uterus has an endometrium', but then I realised they were talking about endometriosis."

DR ANNA PONNAMPALAM, UNIVERSITY OF AUCKLAND,  
IN HER TALK 'LET'S TALK ABOUT ENDOMETRIOSIS' IN THE  
'PERIOD PAIN TO PREGNANCY WEIGHT GAIN: WHAT'S GOING  
ON IN THE FEMALE BODY?' SESSION.

In October we began a nationwide series of eight talks, each featuring two to four women researchers, celebrating the discoveries women are making throughout New Zealand. These talks featured different disciplines coming together to demonstrate the value of thinking in different ways about similar issues. The details of the talks were:

- 'Protecting taonga: snapshots from a conservation biologist and an environmental chemist' with Associate Professor Sally Gaw and Dr Tammy Steeves from the University of Canterbury.
- '#CommunicateNow: New tools for language learners and sport' with Dr Ashleigh-Jane Thompson and Professor Cynthia White from Massey University.
- 'Water women: Protecting our lakes, rivers and oceans' with Dr Joanne Clapcott, Dr Kirsty Smith and Dr Susie Wood from the Cawthron Institute.
- 'Science and the Arts: Creating futures' with Associate Professor Elspeth Tilley and Dr Jacqui Horswell from Massey University, Wellington.
- 'From populations to peoples: Re-imagining futures' with Professor Tahu Kukutai and Dr Jaimie Veale from University of Waikato.
- 'Nourishing knowledge: supporting our youth, athletes and coastlines' with Associate Professor Mere Berryman, Associate Professor Karin Bryan and Dr Stacy Sims from the University of Waikato.
- 'Period pain to pregnancy weight gain: What's going on in the female body?' with speakers Dr Anna Ponnampalam, Jasmine Plows, Dr Clare Reynolds and Dr Shikha Pundir from the Liggins Institute at the University of Auckland.
- 'Culturally informed research: Mathematics and the Classics in New Zealand' with Associate Professor Roberta Hunter and Dr Anastasia Bakogianni from Massey University, Auckland.



LISTEN TO TALK: PERIOD PAIN TO PREGNANCY WEIGHT GAIN

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HIGHLIGHTS 2017

11/17

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NOVEMBER | WHIRINGA-Ā-RANGI



EXPLORE  
DISCOVER  
SHARE

DIVERSE  
TOPICS  
IMPORTANT  
FOR  
NEW ZEALAND  
SUPPORTED BY THE  
MARSDEN FUND

A total of 133 research projects were successful in the 2017 funding round for the Marsden Fund, which the Society administers on behalf of government to support investigator-initiated research in the areas of science, engineering, mathematics, social sciences and the humanities. This was an increase on the 117 projects supported in 2016, due to the increase over four years foreshadowed in the government's National Statement of Science Investment.

The number of grants awarded to established researchers rose significantly from 68 in 2016 to 84 in 2017. Subjects to be investigated cover a range of topics of great interest to New Zealand, including improving our conservation efforts to protect New Zealand's unique birdlife, developing novel cholesterol-lowering therapies, and providing insight on the voyages that first brought humans to Aotearoa New Zealand.

Professor Kathy Campbell FRSNZ from the University of Auckland was awarded a standard grant. Her team will drill into the world's oldest land-based hot springs (3.5 billion years old) in outback Western Australia for new evidence on some of the earliest life on Earth, and clues to help find remains of past life on Mars.



"We will drill down into the ancient hot spring deposit to obtain a core of unweathered rock to sample for geochemical, mineral, and organic analysis to help solve the riddle of how life took hold on Earth."

PROFESSOR KATHY CAMPBELL



READ MORE: [COULD LIFE HAVE ORIGINATED ON LAND?](#)



Researchers from the University of Auckland (Associate Professor Rachel Fewster) and Massey University (Professor Stephen Marsland) also received funding to combine sound recordings with statistics, software, and genetic information to better estimate the populations of our endangered, but delightfully noisy, native wildlife.

“There are thousands of automatic recorders around New Zealand recording birdsong. But unless you have tools to analyse the data, you’ve just got a lot of memory used up storing sound that nobody will ever pay any attention to. Turning data into information isn’t easy, but it has to be done, and done well, to make the collection of the data worthwhile.”

PROFESSOR STEPHEN MARSHLAND, MASSEY UNIVERSITY AND  
TE PŪNAHA MATATINI



READ MORE: CELLS AND WHISTLES: SUPERCHARGING  
OUR BIODIVERSITY MONITORING TOOLKIT

EXPLORE  
DISCOVER  
SHARE





Strong support for early career researchers continued through the Fast-Start grants. Researchers will look at topics such as climate change, increasing the accuracy of predicting earthquake damage, the first systematic study of Māori rock art, and developing better disease-resistant crops.

Dr Chris McGann from the University of Canterbury received a Fast Start grant to develop methods to improve the prediction of ground shaking from earthquakes of different magnitudes, taking into account location-specific factors, such as soil structure. The current model for predicting earthquakes is too simple in most locations, only taking one dimension of the seismic waves into account, according to McGann.

“In the [current] model we tend to assume and only worry about the waves that are propagating (travelling) straight up. We’re trying to account for the fact that the soil is not in perfect horizontal layers.”

DR CHRIS MCGANN



READ MORE: EARTHQUAKE ACCOUNTING: A NEW WAY OF INCLUDING LOCAL SOILS IN THE PREDICTIONS OF GROUND SHAKING



Dr Naomi Simmonds (Ngāti Raukawa) from the University of Waikato was awarded a Marsden Fast-Start to lead a hīkoi to rediscover the journey of Ngāti Kahungunu ancestor Māhinaarangi, in order to reconnect descendants with the stories, land and sites of significance.

“This project has, at its heart, an assumption that reconnecting to the lands, environments and knowledges of our ancestors through pūrākau and hīkoi can provide positive pathways for descendants of Māhinaarangi in contemporary Aotearoa.”

DR NAOMI SIMMONDS



READ MORE: TAKU ARA RĀ: WALKING IN OUR ANCESTORS' FOOTSTEPS

# STUDENTS RISE TO THE CHALLENGE TO DEVELOP A HELPFUL APP

As part of the 2017 TechHub CREST Challenge, teams of Year 9 and Year 10 students from Auckland, Christchurch and Wellington designed a mobile app (to beta level) which would either help someone who has a daily challenge or help address or solve a social issue they identified at their school.

TechHub is run collaboratively by IT Professionals NZ and CREST (a Royal Society Te Apārangi programme) with the students working towards a Team Bronze CREST Award.

The national winner was Team Alzheimers (Kimberley MacKinnon, Zoe Evans and Fleur Johnson-Dunn) from Hornby High School in Christchurch with teacher Ben Carter. Their app was designed to provide help and support to Alzheimer's sufferers and their supporters by providing memory games and reminder notices.



[READ MORE ON THE 2017 TECHHUB CREST CHALLENGE](#)

EXPLORE  
DISCOVER  
SHARE



RESEARCHERS AND SCHOLARS  
AT THE TOP OF THEIR FIELDS  
ELECTED AS  
FELLOWS

Sixteen researchers and scholars who have advanced knowledge in the areas of history, theology, art, computer science, psychology, law, Māori studies, chemistry, soil science, poetry, linguistics, geology, education, engineering and mathematics were announced as Fellows in 2017, following the annual selection process. Being made a Fellow is an honour that recognises true international distinction in research and scholarship. Fellows can use the post-nominal 'FRSNZ' after their name to indicate this honour.

**Professor Charlotte Macdonald**, School of History, Philosophy, Political Science and International Relations, Victoria University of Wellington, is a historian who has used innovative methods to study 19th century colonies and empires, New Zealand history, gender and women's history and cultural history of bodies, modernity, sport and spectating.

**Professor Paul Trebilco**, Department of Theology and Religion, University of Otago, has made original contributions in three main areas: Jewish communities in Asia Minor; early Christians in the city of Ephesus, modern-day Turkey; and investigations into self-designation and group identity in early Christians.

**Professor Michael Parekōwhai**, University of Auckland, is an artist who explores perceptions of place and nationhood through sculpture, installation and photography. His research investigates the ambiguities of identity, the sensitivities of historical memory, the role of appropriation and assimilation in the artistic canon, and the significance of biculturalism.

**Professor Mengjie Zhang**, School of Engineering and Computer Science, Victoria University of Wellington, has made significant contributions in the area of artificial intelligence in the field of evolutionary learning and optimisation, particularly in the areas of image analysis; feature selection and pattern recognition; and transfer learning (where machine learning can be applied to a related problem).

**Professor Margaret Wetherell**, School of Psychology, University of Auckland, is internationally known for her work developing discourse theory and methods for social psychology for studying how do the things people say and do affect society and how does society influence people. She has also developed a new theoretical approach to affect and emotion for social research.

**Professor Tony Ward**, School of Psychology, Victoria University of Wellington, has primarily researched forensic and correctional topics, prominently centred on violent and sexual offenders and rehabilitation. His theoretical contributions have resulted in substantial empirical research projects and innovations in treatment around the world.

**Professor Mark Henaghan**, Faculty of Law, University of Otago, is New Zealand's leading family law scholar, who has had a major impact on the judicial system, legislative reform and legal practice in New Zealand.

**Professor Margaret Mutu**, Māori Studies, University of Auckland, has advanced scholarship with her cutting-edge analysis of Māori language texts relating to Te Tiriti o Waitangi and Māori claims against the Crown, oral histories and traditions, and Treaty settlements.

**Professor Jadranka Travas-Sejdic**, School of Chemical Sciences, University of Auckland, has made significant contributions to the research field of biosensing. She has developed hand-held, in-field detection systems using conducting polymers for fast sensing of biological molecules and small molecular targets of biological interest.

**Professor Michele Leggott**, English, Drama, and Writing Studies, University of Auckland, is a renowned poet and poetry scholar who seeks to open up poetry to as many audiences as possible. She was appointed New Zealand Poet Laureate in 2007-2009. Her first book of poetry *Like This?* won the International PEN First Book of Poetry and in 1995 *DIA* won the New Zealand Book Award for Poetry.

**Professor Miriam Meyerhoff**, School of Linguistics and Applied Language Studies, Victoria University of Wellington, is a leading sociolinguist, a discipline that studies the effect of any or all aspects of society on how language is used. Her research has focused on language use in New Zealand, the Pacific and the UK. Her latest research focusses on variation in the English of Auckland citizens, a richly linguistically diverse community.

**Professor Richard McDowell**, AgResearch, Invermay, is an international authority on the management of contaminant losses from agricultural land and their impact in freshwater, particularly phosphorus. He has developed 18 of the 21 strategies available internationally to reduce phosphorus loss from land to water.

**Dr Nicholas Mortimer**, GNS Science, Dunedin, is a geologist who has played a key role in exploring, revealing and promoting the continent of Zealandia. The foundation for this has been his multifaceted work on the older crystalline rocks of on-land New Zealand, including their relationships with Australia and Antarctica.

**Distinguished Professor Viviane Robinson**, Faculty of Education and Social Work, University of Auckland, has shown through her research the importance of educational leadership in student outcomes. She has designed and evaluated interventions to increase school leader's skills and has developed resources for leadership development that are trademarked and used internationally.

**Professor Noam Greenberg**, School of Mathematics and Statistics, Victoria University of Wellington, researches the computable contents of mathematics and algorithmic randomness. He has developed a new research programme in 'higher' randomness, in which computability is used to give a hierarchy of randomness: the more complex the tests, the higher the degree of randomness that is required to pass these tests.

**Professor Rick Millane**, Department of Electrical and Computer Engineering, University of Canterbury, is internationally recognised for his theoretical and computational methods for imaging biological molecules and tissue with wide applications across physical, biological and medical sciences.

The Society also announced the election of an Honorary Fellow. The election of Honorary Fellows aims to encourage strong ties with leading international scientists and scholars and New Zealand's research community.

**Professor Gerry Gilmore** FRS, Institute of Astronomy, University of Cambridge, UK, leads efforts to understand the structure and origin of our Galaxy and to deduce the nature of dark matter in the early Universe.

 [VIEW MORE ON THE 2017 FELLOWS](#)



## COMPLETE ONLINE RECORD OF 150 YEARS OF DISCOVERY

All copies of the *Transactions of the Royal Society of New Zealand*, one of New Zealand's most important research publications, were made available online in November, thanks to a collaborative project between the Society and the National Library of New Zealand.

Volumes from 1867 were already hosted on Papers Past and the project filled in the missing years between 1961 and 1970. Volumes from 1971 are hosted by Taylor & Francis, the academic publisher of the eight peer-reviewed journals produced today by Royal Society Te Apārangi.



"When our organisation was set up as the New Zealand Institute in 1867, its primary objective was to publish the findings from the regional research societies around New Zealand. The Transactions and Proceedings were the formal outlet of the discoveries and discussions taking place around the country about the unique flora, fauna and geology of New Zealand as well as considering the origins of Māori and describing mātauranga Māori learned from tangata whenua."

DR ANDREW CLELAND FRSNZ, CHIEF EXECUTIVE, ROYAL SOCIETY TE APĀRANGI



VISIT PAPERS PAST



## GUIDANCE ON AVOIDING PREDATORY PUBLISHING

In November we released 'Selecting a quality publisher' which provides guidance to researchers on how to assess the quality of publishing venues before submitting their work for publication. It outlines a number of questions to ask when assessing whether a publisher is a bona fide operation. It also discusses key issues in scholarly publishing, which has been transformed by the online environment. The ease of digital dissemination and the increasing emphasis on open access publication are two factors that have driven this transformation.



VIEW PUBLISHING GUIDANCE

# GOLD CREST PROJECT ABOUT HOROPITO

EXPLORE  
DISCOVER  
SHARE



Corrie Anderson, of Columba College, was awarded a Gold CREST medal in November for her investigation on the chemical analysis and insecticidal properties of horopito (*Pseudowintera colorata*). CREST is a Royal Society Te Apārangī programme with different levels to encourage students to be innovative, creative and to problem solve in science, technology and environmental studies.

Corrie had researched the anti-fungal properties of horopito for her Silver CREST project and extended this into horopito's chemical structure and insecticidal properties for her Gold CREST project. She chemically separated fractions from extracts of horopito prepared at different times of the year and tested the impact of these fractions on aphids. Her study shows the polygodial fractions of the horopito plant have the potential to be used in an insect repellent on leaves that aphids destroy.

"My Gold CREST project really inspired me. CREST let me explore the opportunities given at the University of Otago, which also made me apply for the uni because I loved the labs, the people and the experiences they offered."

CORRIE ANDERSON



READ MORE ABOUT CORRIE'S GOLD CREST PROJECT





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HIGHLIGHTS 2017



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DECEMBER | HAKIHEA

POWERING POTENTIAL:  
SELF-CLEANING  
HIKING BOOTS  
AMONG  
INNOVATIVE  
SOLUTIONS

EXPLORE  
DISCOVER  
SHARE



Forty talented secondary school science students from around New Zealand came up with many innovative solutions to future problems posed by scientist mentors during Powering Potential in December. This programme seeks to give the students valuable skills and experiences, and demonstrate to them the benefits of following a career in science and technology.

After less than 48 hours investigating their topics in groups with input from their mentors, the students presented their ideas to a public audience and received feedback.

One of the eight teams, Lil' Rusty explored the pathogens behind kāuri dieback and myrtle rust and came up with a suite of possible solutions for each including self-cleaning hiking boots and empowering communities and iwi to help reduce the pests spreading. Their science mentor was Dr Kirstin Wurms from Plant & Food Research.

“As science mentors we got as much, if not more, out of the exercise as the students themselves – these teenagers are the future of New Zealand science and I came away from Powering Potential feeling enormously buoyed and encouraged that our future is in very able hands.”

DR KIRSTIN WURMS



VIEW MORE ABOUT 2017 POWERING POTENTIAL

## CASE STUDIES FOR POTENTIAL USES OF GENE EDITING IN AOTEAROA



New gene-editing techniques are revolutionising the ease and accuracy of making changes to genetic material. This topic was the major expert advice project the Society was running in 2017 to consider the full range of ethical, social, legal, regulatory, environmental and economic implications of gene editing for New Zealand. We sought input from a large multidisciplinary expert panel and convened a Māori reference group to address cultural perspectives.

In December we released the first of several planned discussion papers on how gene editing could be used in New Zealand.

*The use of gene editing in healthcare* highlighted four scenarios of using gene editing to treat disease or enhance human function, making genetic changes that either would or would not be passed on to future generations.

The second discussion paper *The use of gene editing in pest control* set out how gene editing technologies could be used to control wasps, possums or rats and stoats in New Zealand and what the environmental, technical/scientific, legal and ethical considerations would be.

The scenarios in both documents were designed to help New Zealanders consider which uses they might be comfortable with and to send their feedback to the panel.

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“The technology of gene editing offers society a wide range of opportunities such as curing diseases and eradicating pests but, like all new technologies, there are uncertainties and there may be areas where collectively we are comfortable to use the technology and areas where we are not.”

PROFESSOR BARRY SCOTT FRSNZ, MASSEY UNIVERSITY,  
CO-CHAIR OF THE GENE EDITING PANEL.



[VIEW GENE EDITING IN AOTEAROA CASE STUDIES](#)

EXPLORE  
DISCOVER  
SHARE

# 2017 PRIME MINISTER'S SCIENCE PRIZES

EXPLORE  
DISCOVER  
SHARE

The Prime Minister's Science Prizes recognise the impact of science on New Zealanders' lives, celebrate the achievements of current scientists and encourage those of the future. The Society administers the prizes on behalf of government.

**The 2017 Prime Minister's Science Prize**, the premier award for science that is transformational in its impact, was awarded to **Plant & Food Research and the Psa Response Team** led by Chief Operating Officer Dr Bruce Campbell. This multidisciplinary team was recognised for its rapid and successful response to Psa, a bacterial disease that results in the death of kiwifruit vines.

**The Prime Minister's 2017 MacDiarmid Emerging Scientist Prize Winner** was awarded to **Dr Carla Meledandri** from the University of Otago, who is at the forefront of developing applications for nanotechnology. This research involves incorporating silver nanoparticles into a range of breakthrough products designed to treat and prevent dental disease.

**The Prime Minister's 2017 Science Teacher Prize** was awarded to Nelson science teacher **Sarah Johns** who is in charge of junior science at Nelson College for Girls. Sarah says she empowers her students by encouraging them to share her philosophy of life—to be curious, open to possibilities and willing to take a risk.

**The Prime Minister's 2017 Science Communication Prize** was awarded to **Damian Christie**, a lawyer-turned-journalist, who will use the prize money to establish New Zealand's first science video news agency to showcase some of the extraordinary achievements and discoveries from within New Zealand's science sector and promote the successes to new audiences here and overseas.

**The Prime Minister's 2017 Future Scientist Prize** was awarded to former Auckland Grammar School student **Jonathan Chan** for development of a sophisticated, 3D printed mesh emulating a spider web, as a novel approach to atmospheric water collection.

FROM LEFT DR CARLA MELEDANDRI; SARAH JOHNS; JONATHAN CHAN; RESEARCH, SCIENCE AND INNOVATION MINISTER HON DR MEGAN WOODS; PRIME MINISTER RT HON JACINDA ARDERN; DR BRUCE CAMPBELL AND DAMIAN CHRISTIE.



HIGHLIGHTS 2017

ON REFLECTION | NO TE HURIHURINGA

# ON REFLECTION NO TE HURIHURINGA

“WHEN I WAS ELECTED TO THE COUNCIL OF ROYAL SOCIETY TE APĀRANGI IN 2013 I DISCOVERED I KNEW LITTLE ABOUT THE RANGE OF ACTIVITIES THE SOCIETY WAS ENGAGED IN.”



EMERITUS PROFESSOR  
RICHARD BEDFORD QSO FRSNZ  
ROYAL SOCIETY TE APĀRANGI  
PRESIDENT 2015–2018

As a Fellow I knew something about the work of the Academy, and as a long-standing member of one of the Society's Constituent Organisations (the New Zealand Geographical Society) I was aware of the programmes for teachers and the support that was provided for New Zealand's involvement in the International Unions representing the sciences, social sciences and the humanities. As a former member of the Marsden Fund Council, I knew about the Society's role in managing the Marsden Fund. But, as I quickly discovered, there was a great deal I did not know.

When I reflect on my five years as a member of Council, including the opportunity of serving as President for the past three years, I am humbled by the reach, range and quality of the Society's activities and relationships. The annual review for 2017 captures well the essence of this reach and range – something which I think may surprise readers. New Zealand's national academy is unusual internationally because of its inclusion of all the major areas of intellectual endeavour – the physical sciences, the life sciences (including medicine), the social sciences, philosophy, mathematics and computing, engineering, technology and the humanities. Most national academies overseas span just one of these domains – Australia, for example, has five national academies, and the UK has numerous subject-related societies.

It has been a real privilege to work with a very talented and dedicated group of Council members and Society staff. When I joined the Council one of the key items on Sir David Skegg's agenda, as President, was raising the profile of the Society's independent expert advice function. A very productive engagement with the Prime Minister's Chief Science Adviser, Sir Peter Gluckman, and his team of Departmental Science Advisers, has evolved and the Society is well-positioned as an essential part of New Zealand's research advice ecosystem. This is not necessarily a new development – as John Martin's excellent history shows, expert advice provided by the Society has made major contributions to public and political debate in the past. In recent years I think we have seen a resurgence of this contribution, as well as in the respect the Society has earned as an independent source of excellent, evidence-based commentary.

A distinctive feature of Royal Society Te Apārangī is its 10 Branches. I am not aware of any comparable national academies overseas that have branches in different parts of the country. The Branches contribute powerfully to the Society's public engagement and a special position is reserved on Council for a representative. Their current representative, Emeritus Professor Ken Strongman, is an active champion of the distinctive contribution they make to our primary function. As President I have enjoyed my engagement with the Branches enormously; they played a very important role in the Society's 150th anniversary celebrations.

EXPLORE  
DISCOVER  
SHARE

Our 150th anniversary has provided an opportunity for reflection, reassessment and renewal. As I complete my term as President, I want to express my appreciation to the Society's staff for the leadership they have shown in driving a significant agenda for change. My term as President has overlapped with Dr Andrew Cleland's first three years as Chief Executive and he has demonstrated a strong commitment to making the Society as relevant as possible for New Zealand's 21st century research environment.

In a research environment where change, rather than the status quo, is the order of the day, I want to acknowledge the very constructive, robust debates we have had on Council about how to address a range of distinctive as well as general challenges that are facing national academies. A distinctive one in New Zealand is ensuring the national academy has relevance for our Māori research community and, through this, delivers on our obligations under the Treaty of Waitangi. The Council has been unanimous in its support for the moves we have been taking in this direction.

Accommodating diversity amongst researchers and their ways of knowing the world is an essential prerequisite for a successful national academy. As we navigate our 151st year, which also happens to be the 125th anniversary of women's suffrage in New Zealand, we are continuously affirming our commitment to becoming an academy that better represents our 21st century research community. In this regard, we are seeking to be recognised as the eye of the needle that features prominently in a famous whakataukī that is attributed by some to the first Māori king, Pōtatau te Wherowhero:

Kotahi te kōwhao o te ngira e kuhuna ai to miro mā,  
te miro pango, te miro wheno.

I muri, kia mau ki te aroha, ki te ture, me te whakaponono.

*Through the eye of the needle pass the white threads, the black threads, and the red threads.*

*Afterwards, looking to the past as you progress, hold firmly to your love, the law and your beliefs.*

The process of acknowledging inclusive ways of understanding phenomena and relationships makes for a much stronger knowledge base. It also gives space for much richer stories and more innovative ways of addressing challenges. This is the essence of our mission to enable everyone to discover, explore and share knowledge.

**Emeritus Professor Richard Bedford QSO FRSNZ**  
ROYAL SOCIETY TE APĀRANGI PRESIDENT 2015–2018



## OUR FINANCIALS



In the year to 30 June 2017 we consolidated our financial position. Income was \$7.79m and we were able to generate a \$0.86m surplus. We remain reliant on our professional services provision to government for about three quarters of our income. About half of the surplus was a gain on the revaluation of the development of our physical site and buildings in Turnbull St. We are pleased to see reinvestment in the site starting to pay off. The remainder reflected sound financial management.

Our balance sheet for the group combining the Society and its associated Endowment Trust shows an equity of \$17.2m, of which \$11.6m is represented in the physical assets – primarily land and buildings. The improved balance sheet enabled the Society to transfer \$2.5m to its Endowment Trust late in 2017, thereby building the funds invested to enable future support of worthwhile new activities such as the growing suite of awards.



[VIEW OUR AUDITED 2017 FINANCIAL STATEMENTS ONLINE](#)





HIGHLIGHTS

2017

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