



Profiling Excellence

Highlights of 2013

As the Royal Society of New Zealand, our purpose is to advance and promote science, technology and the humanities in New Zealand.

In 2012 we set a strategic plan with five goals:

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Meet New Zealand's need for information on challenging issues

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RECIPIENTS of the Rutherford Medal since 1991

10,000 MEDIA ITEMS

contributed to by the Science Media Centre in its five years

Leading-edge research

9 SPECIES OF MOA

Quinn Berentson's *Moa* WINNER OF THE 2013 SCIENCE BOOK PRIZE

500 POSTDOCS SUPPORTED by the Marsden Fund since 1994

Improving science learning

147 YEARS OF OPERATION

43 TEACHER FELLOWSHIPS awarded in 2013

Financial report

37 STAFF MEMBERS

\$6.6 MILLION 2013 gross income

1.3

BILLION PEOPLE
living in absolute poverty

as reported in People and the Planet, the 2013 Rutherford Memorial Lecture

Challenging
issues

140

**LANGUAGES
SPOKEN IN
New Zealand**

10

YEARS
of the Speaker's
Science Forum

100

RECIPIENTS
of the Hector Medal
since 1912

10.5%

SUCCESS RATE
for Rutherford
Discovery Fellowships

Promoting
research

1022

**PAPERS
SUBMITTED**
to Royal Society of
New Zealand journals

Celebrating
excellence

\$1m

AWARDED BY
Rutherford
Foundation Trust yearly

\$67.9

MILLION
allocated to Marsden Fund
research grants in 2013

267,256

**JOURNAL
ARTICLES**
downloaded in a year

34

MEMBERSHIPS
of international science
and technology bodies

388

CURRENT FELLOWS
of Royal Society of
New Zealand

International
engagement

1444

**INTERNATIONAL
GRANTS AWARDED ANNUALLY**

\$14

MILLION
total asset value

Enduring
organisation

15

EAPSI US
STUDENTS VISIT
New Zealand each year



From the President

The Royal Society is New Zealand's national academy of science, technology, and the humanities. Established as the New Zealand Institute in 1867, its functions now include promoting and recognising excellence in research and scholarship, awarding funding for research in all disciplines, assisting early-career researchers with scholarships and awards, supporting science education in schools, promoting international collaboration, publishing New Zealand science journals, and providing independent advice to government and the community.

Profiling Excellence is our annual report. I hope it will give you some idea of the range of activities of the Society during 2013. This was the first full year in which we occupied our superb new headquarters in Wellington, and we are already seeing the benefits of that development.

The Royal Society of New Zealand is unique in that, as well as hosting an academy of Fellows, it has regional organisations or branches that arrange a myriad of activities locally. That invaluable regional contribution is not detailed here.

The Academy is at the heart of the Society. One of our key initiatives during 2013 was to seek ways of involving Fellows more actively in the policy advice functions of the Royal Society. Our Fellows include many of New Zealand's leading scientists and scholars in the humanities. This group of individuals has the capacity to make a powerful contribution to New Zealand's progress.

Reflecting on a busy and successful year, I thank my colleagues on the Council and Academy Executive, as well as the leaders of our constituent organisations. Special thanks are due to the excellent staff in the secretariat, ably led by our Chief Executive, Dr Di McCarthy. Towards the end of the year, Dr McCarthy announced her intention to retire during 2014. We will want to thank her for her exceptional contribution: during the last seven years, she has played a key role in transforming the Royal Society of New Zealand into one of the most successful national academies in any small country.

A handwritten signature in black ink that reads "David Skegg". The signature is written in a cursive, slightly slanted style.

Professor Sir David Skegg
KNZM OBE FRSNZ
President



From the Chief Executive

2013 was the second year of implementing our strategic plan and this continuity has allowed significant achievements. A reorganisation has created cross-functional teams in the secretariat which has brought new levels of accountability and a renewed focus on consistent delivery of our programmes and initiatives, many of which we highlight in this report.

The year 2013 marked the tenth year of the Speaker's Science Forum, where cutting-edge science is presented to Parliament, and the fifth birthday of the Science Media Centre, an independent resource centre assisting media to cover science and technology topics. The year 2013 also saw the creation of our tenth branch – the Wanaka Branch of the Royal Society of New Zealand.

We drew on the expertise of our Academy and others to present information papers on sustainability and languages in New Zealand in 2013 and began work on several others.

Wind energy and wildlife, the Leigh Marine Laboratory and pollination biology were the topics of special journal issues produced in 2013 for some of the eight peer-reviewed journals we produce with international publisher Taylor & Francis.

We continued to run education programmes to improve science, technology, engineering and mathematics (STEM) learning in New Zealand. These include teacher fellowships, and a student product development challenge, which gives students the opportunity to develop new food products, mentored by food technologists.

We ran a number of public lecture tours in 2013. Two highlights were the 10x10 lecture series, which saw ten mathematicians travel to ten venues to demonstrate how mathematics can help find solutions to today's problems, and Einstein's Universe. For this we partnered with Chamber Music New Zealand to bring UK duo physicist Brian Foster and violinist Jack Lieback back to New Zealand.

Whale stranding, volcanic eruptions, genetic screening and the birth of European political thought in mediaeval times were some of the research topics supported by the research schemes we administer including the Marsden Fund, James Cook Research Fellowships and Rutherford Discovery Fellowships. We are grateful to be able to support emerging and established researchers through these schemes.

In addition to supporting the work of New Zealand-based researchers, we administer programmes to encourage international research collaboration. The establishment of FRIENZ to facilitate research and innovation cooperation between Europe and New Zealand was a particular highlight of 2013.

Finally, our financial report demonstrates that we are in a strong financial position.

My sincerest thanks to our many supporters and sponsors who make our work possible, and our dedicated staff.

A handwritten signature in black ink, appearing to read 'Di McCarthy', written over a light blue circular stamp.

Dr Di McCarthy
ONZM
Chief Executive

Goal 1



Meet New Zealand's need for information on challenging issues

Challenging issues

Each year we utilise the research expertise of Royal Society of New Zealand Fellows, Members and associates to explore issues facing society so that New Zealanders gain the information they need on challenging issues.

Information papers

During 2013 the Society completed and published three Emerging Issues papers and made progress on a further three, including a major paper *Te Pae Tawhiti: Our Futures*, which is a broad review of the rapidly changing New Zealand population and the implications of this change for a range of issues including the economy, social cohesion, education and health. This paper is being released in 2014.

Languages in Aotearoa New Zealand

New Zealand is now more diverse than ever before, having seen unprecedented increases in the ethnic, cultural, social and linguistic diversity of the New Zealand population. There are now over 160 different languages spoken in New Zealand, and Auckland is one of the most culturally diverse cities in the world.

In March 2013, the Society released a paper presenting a broad view of language use in New Zealand using international and national research. It explored the case for a national languages policy in order to unify disparate policies and areas of practice.

The paper explores several areas of contemporary languages research, such as the advantages that language learning provides for both monolingual and bilingual students. For monolingual students, learning another language may have benefits across the whole curriculum, whilst there is evidence for cognitive improvements when children are raised bilingually.

The paper presents issues specific to New Zealand, such as support for te reo Māori and New Zealand Sign Language (NZSL), along with the role of languages in Pasifika education. Some of the urgent language issues identified were the uncertain trajectory of te reo Māori, the endangered languages of the New Zealand Pacific region, minimal recognition for community languages in the education system and the lack of support in New Zealand government departments for multilingual citizens.

Read paper at: www.royalsociety.org.nz/languages



Living sustainably

Research has shown that New Zealanders would need at least two Earth planets to sustain our current lifestyles compared with a 'fair Earth share' of one. Some estimates put this number as high as five Earths. In addition, New Zealand currently produces enough calories for 20 million people and enough protein for 45 million people.

Two papers released by the Society in 2013 explore how many people, and to what standard of living, New Zealand can support sustainably. This simple question opens up a range of complex issues about well-being, living standards, thresholds, limits and vulnerabilities.

The papers argue that the use of land, water and other resources, and our levels of well-being and prosperity, are not simple tradeoffs between the economy and the environment. Instead, the relationships are complex and interwoven.

The papers offer a framework for looking at how New Zealand generates well-being for New Zealanders and our trading partners, and present strategies for how to operate within the constraints of our resources in areas such as climate change, food production, water quality, native biodiversity, transport and fisheries. The framework allows New Zealanders to consider the risks to well-being faced due to our dependence upon these finite resources.

Read papers at: www.royalsociety.org.nz/sustainable



Image: Presenters at the sustainability papers launch: Dr Daniel Rutledge, Dr Jez Weston, Dr Suzie Greenhalgh, Dr Ella Lawton.

Speaker's Science Forum a decade on

The Speaker's Science Forum was established in 2003 after the Chair of the Science and Education Select Committee approached the Society to organise the forum. The forum presents cutting-edge research to MPs and decision-makers, informing them about issues being addressed in Parliament and other select topics. Since its inception, the series has been strongly supported by the Speaker of the House, and hosted by the Chair of the Science and Education Select Committee.

In 2013, 134 MPs registered to attend the seven talks of the series:

May – 'Innovative solutions: how can science guide future water management in New Zealand?'

High-quality freshwater is vital for New Zealand's economic prosperity, environmental sustainability and human and stock health. This presentation gave on-the-ground science solutions to degradation of water quality and increasing demand for water.

June – 'Future streets' and 'When networks go bad: queues, delays and bottlenecks'

Smarter use of the urban road network can improve road safety, public health, congestion, the economy and social cohesion. Probability models can help us understand why traffic congestion occurs.

July – 'Sustainable fisheries – what's the catch?' and 'Shellfish aquaculture: opportunities and challenges'

New challenges for fisheries science include sustainable fishing and multiple-use marine ecosystems. New Zealand can contribute to meeting global demands for seafood through better understanding of shellfish biology and complex marine environments.

August – 'Prosperity from trees – a very different future for New Zealand wood and fibre'

Specialist forests and turning forest residues and saw-mill waste into biofuels, bioplastics and other renewable products are some of the exciting avenues for New Zealand's forestry industry.

September – 'An innovative future for New Zealand – how can we grow science and technology in the education sector?'

Does our science and technology education fit our young people for an innovation-based future?

October – 'Cancer screening: not as simple as it sounds'

Screening for cancers of the cervix, breast, large bowel and prostate has attractions, but it also poses challenges for individuals as well as governments.

November – 'The future energy economy of New Zealand' and 'Energy efficiency opportunities for New Zealand houses'

What are the opportunities for New Zealand as we move into a future where energy supplies will be more diverse, costly and demand better management, and what can be done to improve the energy efficiency of our homes?

Communicating science

The Royal Society of New Zealand provides New Zealanders with opportunities to learn about the latest scientific findings and issues.

Science Media Centre turned five

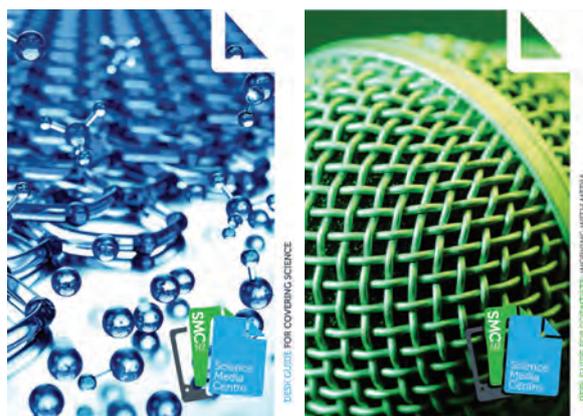
In mid 2013 the New Zealand Science Media Centre celebrated its fifth birthday. Over five years, it has contributed to 10,000 media items on everything from the Christchurch earthquakes and swine flu to the sequencing of the bovine genome and the Higgs Boson discovery. Its goal is to promote accurate, bias-free reporting on science and technology by helping the media work more closely with the scientific community.

To achieve this, the Science Media Centre maintains a database of scientific experts to link journalists with the best contacts for their stories, maintains a desk guide on covering science for journalists, gathers comment on breaking news topics and holds virtual briefings which provide a platform for scientists to explain complex research to journalists who can dial in from around the country to ask questions.

Over the last year, the Science Media Centre launched the Science Media SAVVY programme – a two-day intensive media and communication skills workshop for scientists and researchers across New Zealand. Designed specifically to orient scientists and researchers to the realities of a rapidly changing media environment, these workshops offer practical skills and experience that will help participants work more effectively with media. Activities include a newsroom tour, media discussion panel and a chance to pitch a story to journalists. Peter Griffin, Manager of the Science Media Centre, says that Science Media SAVVY gives participants many benefits. “By developing their communication skills, it allows them to get their science across more effectively via the media. These new skills can also be put to immediate use with improved public lectures, grant applications, interactions with students, colleagues and potential investors as well as other forms of outreach.”

Visit: www.sciencemediacentre.co.nz/media-savvy-workshops

Image: Science Media SAVVY workshop invited media panel, Dunedin, March 2013, from left: Joanna Wane, North & South; Rebecca Fox, Otago Daily Times; Ian Telfer, Radio New Zealand; Max Bania, TVNZ ONE News.



Climate change stakeholder workshop

In October, the Society co-hosted a stakeholder workshop with the New Zealand Climate Change Centre and Victoria University of Wellington on the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment (AR5) Working Group I (WGI) Report *The Physical Science Basis*. The workshop featured IPCC WGI Co-chair Dr Thomas Stocker and IPCC WGI Vice-chair Dr David Wratt and other New Zealand WGI lead authors speaking on the report's findings. It was attended by researchers, scientists, central and local government policymakers and planners, non-governmental organisation staff, members of the public and media.

The workshop was video-recorded and is available to view: www.royalsociety.org.nz/ipcc



2013 Rutherford Memorial Lecture – People and the Planet

How we can all live and flourish on a finite Earth was the subject in 2013 of the Rutherford Memorial Lecture, which is held every three years.

From 2010 to 2012, Sir John Sulston FRS led the Royal Society of London's international working group that studied the links between global population and consumption and the implications for a finite planet. He shared the findings from the *People and the Planet* report in his lecture tour.

The report called for more equity with how resources are distributed and for the billion-plus people living in poverty to be lifted out of it.

The report also found that there must be a shift away from material consumption and alternatives found to Gross Domestic Product (GDP), which drives greater material resource use.

To enable population growth to stabilise, education must be available to all, particularly to women, and family planning needs to be made available to all who wish to use it.

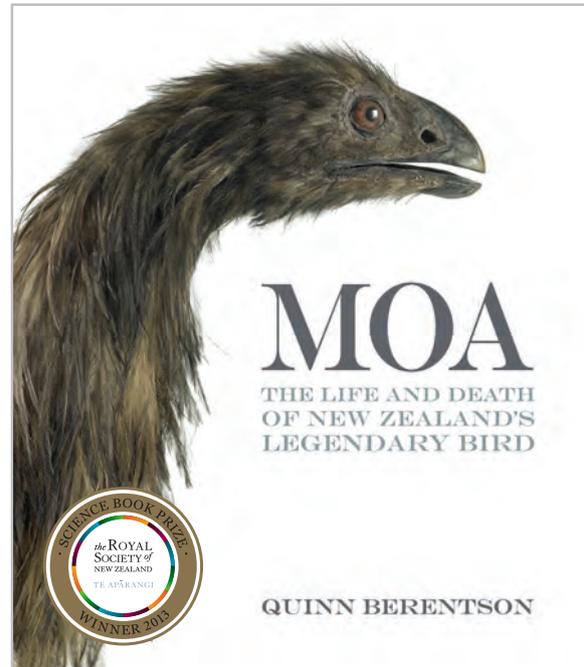
Finally, the report found that advances in science and technology may allow some progress towards meeting the challenges facing the planet, but these advances won't be enough. Governments, international bodies and non-governmental organisations need to work together to collectively reduce our resource use, while enabling every person on the planet to live as healthy and fulfilling a life as possible.

Read more on this report and view presentation:
www.royalsociety.org.nz/peopleandthepplanet

Extinct moa a winning subject

New Zealand's extinct moa and the historical characters who strove to solve the mysteries of this flightless giant are the engaging subjects of the winning book for the Royal Society of New Zealand's 2013 Science Book Prize for popular science writing.

Moa – the Life and Death of New Zealand's Legendary Bird is the first book by documentary film-maker and photographer Quinn Berentson. The judges – Professor Michael Corballis FRSNZ, Professor Shaun Hendy FRSNZ and Alison Ballance – commented on the author's flair for story-telling. "He's crafted dramatic tales of professional jealousy and rivalry that bring two centuries of scientific discovery, tales of



The Royal Society of New Zealand established the biennial prize for popular science books in 2009 to celebrate the very best in the genre written by New Zealand authors.

Māori exploration and settlement, and even an extinct bird, to life on the page. Berentson deftly weaves together compelling narratives about science history, archaeology, natural history and palaeontology that flesh out a flightless bird we know largely from bones." *Moa* was published by Nelson-based Craig Potton Publishing.

The runners up were *Science on Ice: Discovering the Secrets of Antarctica* by Veronika Meduna (Auckland University Press) which describes the wide range of research that takes place in Antarctica, and *Graft* by Helen Heath, a book of poetry that explores science and scientists as well as family, emotion and travel (Victoria University Press).

Goal 2

2

Raise awareness of New Zealand research and scholarship

Celebrating excellence

The Royal Society of New Zealand supports knowledge and excellence and runs annual awards programmes to celebrate research excellence in New Zealand from school age to those at the pinnacle of their research career.

Research honours

In November the Society presented medals and awards to researchers at the 2013 Research Honours Dinner in Dunedin.

Distinguished Professor Dame Anne Salmond

FRSNZ was the first social scientist to be awarded the **Rutherford Medal**, New Zealand's highest science honour.

An anthropologist at the University of Auckland, Dame Anne Salmond was recognised for her eminent work on Māori social structures and interactions with the European world, and on European exploration and engagement in the Pacific.

Her widely acclaimed books have challenged thinking on cultural interaction in the Pacific, and deepened understanding of the individuals, social structures and political forces that collided in the eighteenth and nineteenth centuries in New Zealand.

Dame Anne Salmond is grateful to Māori and Pacific communities for sharing their insights and knowledge with her. "They have opened up pathways into worlds that would have remained inaccessible to me and sent me off on a lifelong journey of voyaging and exploration."

Other medallists

The **Callaghan Medal** for outstanding contribution to science communication was awarded to microbiologist, blogger, media commentator and social media enthusiast **Dr Siouxsie Wiles**, University of Auckland.

The **Hector Medal** was awarded to **Professor Richard Blaikie** FRSNZ, University of Otago, for his contributions to the field of nano-optics.

The **Hutton Medal** for plant science was awarded to **Professor Dave Kelly** FRSNZ, University of Canterbury, for developing knowledge of native flora in New Zealand and defining the key interactions between plants and animals.

The **MacDiarmid Medal** was received by **Professor Neil Broom** FRSNZ, University of Auckland, for his research that, by combining engineering and biological concepts, has led to better understanding of human heart valves and joint and spinal tissues.

Images from left: Dame Anne Salmond FRSNZ; Dr Siouxsie Wiles, Dr David McNamara; Professor Jim McQuillan FRSNZ, Professor Michael Baker, Professor Richard Blaikie FRSNZ.





Image: Genesis Energy Realise the Dream awards presentation at Government House.

The **Mason Durie Medal** was awarded to criminologist **Professor John Pratt** FRSNZ, Victoria University of Wellington, who has advanced the field of the sociology of punishment and comparative penology, specifically why the punishment of offenders changes over time and comparisons between English-speaking and Nordic societies.

The **Pickering Medal** was awarded to **Emeritus Professor Sir Harold Marshall** FRSNZ for his innovative research-based acoustical designs for concert halls.

The **R.J. Scott Medal** for engineering sciences and technologies was awarded to **Professor Andrew Buchanan**, University of Canterbury, for his work in developing design techniques for large-scale timber buildings and designing for fire safety.

The **T. K. Sidey Medal** was awarded to **Professor Jim McQuillan** FRSNZ, University of Otago, for his role in the research partnership that created a new chemical analytical technique called surface-enhanced Raman scattering (SERS) in 1973 and developing subsequent infrared spectroscopy methods.

The **Thomson Medal** was awarded to **Dr Peter Lee** for his contribution to commercialisation of scientific research through his work as Chief Executive of the University of Auckland's commercialising arm, Auckland Uniservices Ltd.

The Health Research Council of New Zealand awarded the **Liley Medal** to **Professor Michael Baker**, University of Otago, Wellington, for his outstanding contribution to the field of public health. Professor Baker's research has shown a marked rise in the incidence of serious infectious diseases and rising inequalities across populations in New Zealand.

Realising their dreams

Twenty of New Zealand's top secondary school science students took part in the annual Genesis Energy Realise the Dream programme, travelling south from Auckland to Wellington and visiting a number of science and technology organisations including Genesis Energy, Fisher & Paykel Healthcare, DairyNZ, AgResearch and NIWA.

The students were selected for their excellent scientific and technology projects that covered a range of topics including air and water quality, nutrition, physics, engineering, robotics, medicinal properties of natural products and ecological restoration.

The purpose of the programme is to reward the students for their projects and introduce them to the many different science and engineering careers that are possible in New Zealand.

The Genesis Energy Supreme Award winner was Tom Morgan, from Marlborough Boys' College, who received the 2013 Prime Minister's Future Science Prize, also administered by the Royal Society of New Zealand.

Tom grew oyster mushrooms in the dark and then exposed them to ultraviolet (UV) light for varying periods of time before testing their concentration of Vitamin D (ergocalciferol) with a method he developed using simple lab equipment. His results show that there is a strong correlation between length of exposure to UV light and the concentration of Vitamin D in oyster mushrooms, which may have a useful application in preventing osteoporosis.

The week concluded with an award ceremony hosted by the Governor General at Government House where a number of travel awards and scholarships for the participants were announced.

Promoting research

The Royal Society of New Zealand seeks to raise awareness of New Zealand research and scholarship by organising public talks that give researchers the opportunity to share their findings with the public and by publishing eight peer-reviewed journals.

10x10

The year 2013 was dedicated internationally to the Mathematics of Planet Earth (MPE2013). To celebrate it, the Society organised a series of talks that saw ten mathematicians visit ten centres in ten months, speaking about how they are helping find solutions to today's problems through mathematics.

Professor James Sneyd FRSNZ, University of Auckland, spoke on mathematical physiology, where mathematical models are built to better understand physiological processes such as asthma.

Dr Alex James, University of Canterbury, showed how biomathematics can help answer conservation or ecology questions such as the population dynamics of the endangered West Coast snails in captivity.

Associate Professor Mark McGuinness, Victoria University of Wellington, discussed his work to understand how material is ejected in volcanic eruptions.

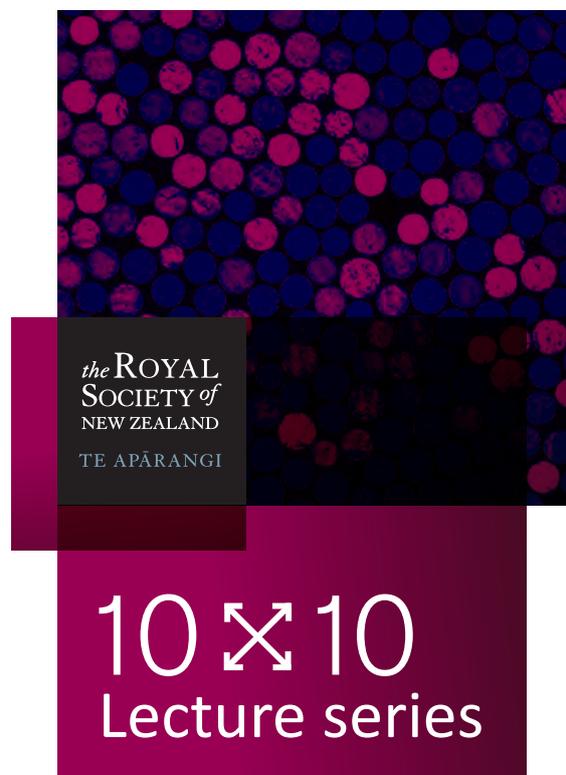
Dr Dillon Mayhew, Victoria University of Wellington, explained how codes and ciphers transmit information accurately and securely over the internet.

Professor Mick Roberts FRSNZ, Massey University, Albany, demonstrated how modelling infectious diseases, such as measles and whooping cough, can allow design of vaccination schedules that prevent epidemics.

Professor Robert McLachlan FRSNZ, Massey University, spoke on how to 'predict' the unpredictable using chaos theory and supercomputer simulations.

Professor James Curran, University of Auckland, talked about the growth in forensic evidence presented in court and how judges, lawyers and juries can be helped to better interpret this evidence.

Dr Boris Baeumer, University of Otago, reflected on the recurrence of the power law in many complex systems such as ecosystems, landforms, social networks and seismic activity.



Dr Claire Postlethwaite, University of Auckland, highlighted animal behaviour in homing pigeons, bees and electric fish and her attempts to understand it mathematically.

Dr Mike Plank, University of Canterbury, explained that maths has led to a new fishing strategy that may be more sustainable: balanced harvesting where the catch reflects the natural population distribution of lots of small fish and few big fish.

For video and audio of these talks, visit: www.royalsociety.org.nz/10x10



Image: Leigh Marine Laboratory's 50th anniversary was celebrated in a special issue of the *New Zealand Journal of Marine and Freshwater Research*.

Journal special issues

The Society publishes eight peer-reviewed journals in partnership with international book and academic journal publisher Taylor & Francis. Highlights for 2013 included the publication of a number of special themed issues.

In March 2013 the *New Zealand Journal of Zoology* published an issue on 'Wind energy and wildlife' guest-edited by Associate Professor Stuart Parsons from the University of Auckland and Dr Phil Battley from Massey University. This issue focussed on studies from the southern hemisphere. It is hoped that publication of these studies will encourage others working on the effects of wind energy facilities to publish their work and thus contribute to the global information base on which regulatory decisions must be made.

In September, the *New Zealand Journal of Marine and Freshwater Research* produced a special issue to celebrate fifty years of the Leigh Marine Laboratory, guest-edited by Dr Richard Taylor and Professor Kendall Clements, both from the University of Auckland. It is hoped that the contents of this special issue will serve to inspire and inform current and future generations of graduate students working at the Leigh Marine Laboratory and elsewhere.

The *New Zealand Journal of Botany* also published a themed issue in September on 'Recent advances in pollination biology in New Zealand', guest-edited by Dr David Pattermore from Plant and Food Research and Associate Professor Brian Murray from the University of Auckland. Pollination biology as a discipline is becoming widely recognised because of the ongoing decline in native pollinator populations and the increasing health threats to honey bees. In-depth studies of the pollination requirements of crop species and native plants are still required, as well as an increased focus on understanding how pollinator perception and behaviour interact with floral traits.

Einstein's Universe

“If I were not a physicist, I would probably be a musician. I often think in music, I live my daydreams in music, I see my life in terms of music” – Albert Einstein

In July 2013 the Society, together with Chamber Music New Zealand, brought an evening of science and music to audiences around the country. Professor Brian Foster and violinist Jack Liebeck interwove music and science in a presentation which linked Einstein's favourite instrument, the violin, with many of the concepts of modern physics that he founded.

Their illustrated talk covered the grand sweep of modern physics – from Einstein's theories of relativity to the Large Hadron Collider and the Higgs Boson – illustrated with the violin music that Einstein loved to play. It was followed by a concert which featured music beloved by Einstein or inspired by him.



Goal 3

3

Nurture talented people to support research and scholarship

Leading-edge research

The Royal Society of New Zealand supports a number of established researchers through the administration of the Marsden Fund and James Cook Research Fellowships.

The Marsden Fund is New Zealand's fundamental research fund for the physical and life sciences, mathematics, engineering, social sciences and humanities.

An increase in funding of \$20 million over the next four years announced in the 2013 budget has allowed for a large boost in the number of projects funded under the current funding round. A total of 109 projects were selected for funding, which was 23 more than the previous year.

Marsden Fund by the numbers 2009 – 2013

Proposals received	2009	2010	2011	2012	2013
Fast-Start	259	295	296	305	330
Standard	675	808	783	820	837
Contracts started					
Fast-Start	36	34	32	32	40
Standard	73	68	57	54	69
Grants \$m (GST incl)	42.9	51.1	57.8	59.0	67.9

A new type of volcanic eruption

Professor Colin Wilson FRSNZ and students at Victoria University of Wellington, and Professor Ian Wright at the National Oceanography Centre in Southampton have used a Marsden Fund grant to discover evidence for a new type of underwater volcanic eruption. Described as being like a “lava lamp on speed”, these underwater volcanoes do not erupt in either a violent explosion or a slow flow but instead produce buoyant lava balloons.

The team found that much of the seafloor pumice blanket around Mt Macauley, in the Kermadec Arc just north of New Zealand, shows an unusual mixture of densities and textures within a single fragment. They argue that this reflects a distinctive submarine eruption style in which magma–water interaction and the overlying column of water have significantly affected the way in which these fragments are formed.

The ‘Tangaroan’ eruptive style, named after the NIWA research vessel used in this work (itself named for the Māori god of the sea) is thought to be intermediate between explosive and slow flow activity. The team thinks that in this eruptive style the magma rises from the vent of the volcano as a foam, from which balloon-like pieces detach and rise due to buoyancy forces.

When these pieces contact the water a rind forms on the surface of the piece, trapping volatile gases and allowing the interior of the piece to remain molten. Gas bubbles within the molten segment can expand due to a pressure decrease as the piece floats towards the surface. These bubbles can also coalesce, allowing the interior of the piece to reach extreme levels of porosity and very low densities. Further disintegration of these pieces would give the observed mixture of densities and textures.



Image: Pilot whale stranding at Golden Bay, photo courtesy of Project Jonah New Zealand.

Oh mother, where art thou?

Why groups of whales and dolphins strand themselves on beaches has been a puzzle to biologists since Aristotle. It had been suggested that healthy individuals follow sick or disoriented whales into the shallows in an effort to support their family members, but new research led by Dr Marc Oremus from the University of Auckland questions this explanation.

The research team studied the DNA of 490 long-finned pilot whales involved in 12 mass strandings in New Zealand and Tasmania to map kinship relationships of stranded animals. The research team analysed both mitochondrial DNA, which is inherited exclusively from the mother, and microsatellite genotypes which are inherited from both parents. In some strandings, the researchers assessed the spatial relationships of individual whales on the beach. The position of each stranded whale was mapped to determine if individuals found near each other were related.

“If kinship-based social dynamics were playing a critical role in these pilot whale strandings, first, we would expect to find that the individuals in a stranding event are, in fact, all related to each other; second, we would expect that close relatives, especially mothers and calves, would be found in close proximity to each other when they end up on the beach during a stranding event,” explained Dr Oremus.

But the study found that stranded groups are not necessarily members of one extended family. Furthermore, many stranded calves were found with no mother in evidence.

“Several scenarios could account for this finding,” commented Dr Oremus. “In fact, the separation of related whales might actually be contributing to the strandings, rather than simply a consequence.”

This raises an important question: where are the missing mothers? Had these adult females successfully refloated or had they never stranded in the first place?

Marsden-funded scholar wins Suntory prize

Associate Professor Takashi Shogimen from the University of Otago won the 2013 Suntory Prize for social sciences and humanities (history and civilisation section) for his book, written in Japanese, on the birth of European political thought in mediaeval times: *Yoroppa Seiji Shiso Tanjo*.

Associate Professor Shogimen says the prize-winning book, published in August 2013 by the University of Nagoya Press and on sale in Japan, is popular and already in reprint. The book was a spin-off from earlier Marsden-funded research into the origins of European political thought.

“Mediaeval political thought has long been considered to be impenetrable by Japanese historians, so I tried to make the book as accessible as possible and to provide a birds-eye view of the history of mediaeval political thought as a process in the making of European political thinking,” says Associate Professor Shogimen.

James Cook Research Fellowships

James Cook Research Fellowships support qualified and experienced researchers to pursue their research programme full-time. Two were awarded in 2013.

Professor James Noble, Victoria University of Wellington: ‘Reliable software via patterns and ownership’. Professor Noble’s research aims to verify recurring patterns in the design of software and develop tools to verify those patterns have been constructed correctly.

Professor Gerald Tannock FRSNZ, University of Otago: ‘A path to understanding bowel bacteria’. Professor Tannock will research the bacteria that live in the human bowel, determining how diet can influence the growth and function of different bacterial communities.

Opportunities for postdoctoral researchers

The Royal Society of New Zealand supports a number of early-career researchers through the Rutherford Foundation Trust, Marsden Fund and the Rutherford Discovery Fellowships.

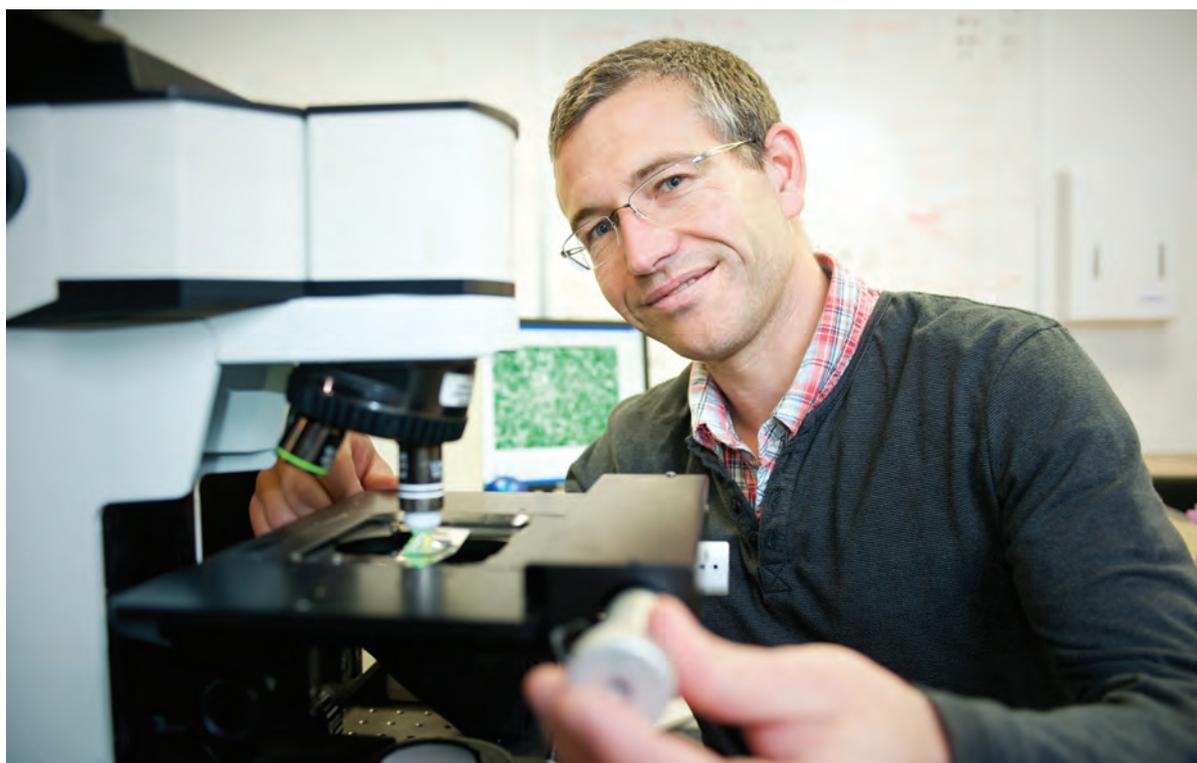


Image: Associate Professor Eric Le Ru, photo courtesy of Colin McDiarmid, Victoria University of Wellington.

500 and counting

The Marsden Fund has supported over 500 postdoctoral fellows within Standard and Fast-Start contracts since it was set up in 1994. Of those who have been postdoctoral fellows on Marsden grants, 45 have become principal investigators on their own Fast-Start or Standard Marsden grants. Three individuals have been postdoctoral fellows, Fast-Start principal investigators and Standard proposal principal investigators on Marsden grants during their research careers. One such individual is Associate Professor Eric Le Ru from the Department of Physics, Victoria University of Wellington.

Associate Professor Le Ru started as a postdoctoral fellow in 2006 under the instruction of Professor Pablo Etchegoin, working on ultra-sensitive laser techniques. In 2009 he received a Marsden Fast-Start grant to look at ways of detecting very small amounts

of metallic nano-particles by researching their optical properties. Associate Professor Le Ru is currently funded on a Standard grant to explore new frontiers in microscopy by combining surface-enhanced Raman scattering (SERS) microscopy with surface plasmon resonance (SPR) spectroscopy, with the aim of using SERS to detect single molecules on flat metallic surfaces. Each of these projects has built on the last, which has put Associate Professor Le Ru on the cutting edge of the detection of molecules on surfaces, an important area of materials science and sampling.

During the last financial year, the Marsden Fund supported 67.5 full-time equivalent (FTE) positions as postdoctoral fellows. It is anticipated that this cohort of researchers will become New Zealand's next generation of research leaders.

Detecting genetic heart abnormality in time

Dr Ivone Leong is one of three new postdoctoral fellows supported by the Rutherford Foundation Trust in 2013. Her research aims to improve genetic screening to detect a rare inherited heart condition. Known as long QT syndrome (LQTS), this condition is a disorder of the heart's electrical activity. It can cause sudden uncontrolled heart rates, which may lead to fainting or sudden death in response to exercise or stress. LQTS is the most common cause of unexplained death in New Zealanders under 40. Once a diagnosis is made, treatment is available; however, it often goes undiagnosed because not all people affected by LQTS display symptoms, so a genetic test can help identify those in a family at risk.

The current LQTS screening strategy is a time-consuming and expensive method which can only screen six of the currently known thirteen LQTS genes in one patient at a time. Dr Leong's project aims to establish the use of a newly developed screening technology that scans scores of genes from many patients at once in New Zealand. The project will also develop an automated software programme to improve data analysis. Overall, the project will lay a foundation for improved diagnostic capability that will be transferable to a wide range of heritable disorders.

Rutherford Discovery Fellowships

Rutherford Discovery Fellowships support New Zealand's most talented early- to mid-career researchers. The following Rutherford Discovery Fellowships were awarded in 2013.

Dr Jonathan Sperry, University of Auckland: 'Inert C-H bonds: A gateway to molecular complexity'. Dr Sperry's research will look at new ways of selectively breaking specific carbon-hydrogen bonds to make everyday products.

Dr Dillon Mayhew, Victoria University of Wellington: 'The mathematics of space and language: matroids and model theory'. The project is dedicated to learning more about matroids and discrete space, focussing on using the tools of formal languages.

Dr Angela Wanhalla, University of Otago: 'History and art history marriage: The politics of private life in New Zealand'. Dr Wanhalla's research seeks to understand the role of marriage in forming civic culture.

Dr Suresh Muthukumaraswamy, University of Auckland (returning from University of Cardiff): 'High-frequency brain activity in health and disease'. Dr Muthukumaraswamy's research will look for biomarkers from brain imaging for individualised treatment of depression.



Image: Dr Ivone Leong.

Dr Suetonia Palmer, University of Otago, Christchurch: 'Improving evidence for decision-makers in chronic kidney disease'. Dr Palmer will bring together data from historically separate sources to investigate the best ways for treating chronic kidney disease.

Dr Elizabeth Stanley, Victoria University of Wellington: 'What happened to human rights? Exploring the changing status of human rights in New Zealand'. Dr Stanley will study shifts in the observation and curtailment of human rights in New Zealand from the end of World War II to the present day.

Dr Brendon Bradley, University of Canterbury: 'Earth-shattering detective work: Uncovering the mysteries of unresolved ground motion and geotechnical case histories from the 2010–2011 Canterbury earthquakes'. Dr Bradley will study the 2010–2011 Canterbury earthquakes using state-of-the-art analyses.

Dr Craig Radford, University of Auckland, Leigh Marine Laboratory: 'Using passive acoustics to monitor ecosystem health'. Dr Radford's research will study whether underwater sound can be a cost-effective way of monitoring ocean health.

Dr Rob McKay, Victoria University of Wellington, Antarctic Research Centre: 'Antarctic Ice Sheet–Southern Ocean interactions during greenhouse worlds of the past 23 million years – and consequences for New Zealand climate'. Dr McKay's research looks at the climate in the geological past when parts of the Antarctic ice sheet melted.

Dr Daniel Stouffer, University of Canterbury: 'Toward a general theory of evolution in ecological networks'. Dr Stouffer's research programme aims to build a general theory of evolution in ecological networks.

Improving science learning

The Royal Society of New Zealand administers a number of programmes to assist science, technology, engineering and mathematics (STEM) education in primary and secondary schools.

Empowering teachers

The Society runs fellowship programmes for teachers to develop curriculum leaders who can create lasting changes in their school.

Caro Begg from Corinna School in Wellington completed her fellowship at GNS Science in 2012. In 2013 she facilitated many changes at her school to achieve the twin aims of increasing student interest in science, and teacher confidence in teaching the subject. For the year they replaced the normal science curriculum with “lots and lots of science”, in a programme they called “playing in the sandpit”.

For professional development, all thirteen teachers voluntarily submitted videos of themselves teaching science and received feedback from an assessor from the New Zealand Council for Educational Research and other teachers. “Teachers can be nervous about teaching science when they don’t think they have a lot of knowledge about the subject. But when you are demonstrating the nature of science with experiments and having lots of fun, the teachers enjoy it and are

keen to do more of it. They can see that the capabilities you use in science are the capabilities you use for everything else,” says Ms Begg.

To measure whether the student interest and capability in science had improved, the school administered the ‘Science: Thinking with Evidence’ tests, developed by the New Zealand Council for Educational Research for years 7 and 8. “At the end of the year, the results were significantly better than they’d been in any other year. Also, anecdotally, especially in junior students, they self-identified that science learning was helping them in other subjects.”

In 2014 the emphasis on science teaching will continue at Corinna School. The next phase is to develop a relationship with ESR, the Institute of Environmental Science and Research, to enable other teachers to have ‘mini fellowship’ experiences and to develop benchmarks for their students in science.





Images from left: Students at Corinna School engaged in 'hands-on' learning; The school grounds of Motueka High School are now the 'workshop' for Jake Stow's technology class.

Building careers

Jake Stow, a technology teacher at Motueka High School, spent the first half of 2013 completing an Endeavour Teacher Fellowship. He updated his knowledge of building best practice by working with building professionals and visited schools and polytechnics around New Zealand to learn from their teaching methods.

Mr Stow says the experience transformed his approach to teaching and gave him many ideas on how his programme could better bridge the gap between school and working in the trades for his students. "My vision is to take a lot of our learning outside the classroom. Many students, particularly boys, don't like being within the constraints of four walls, don't like being sat down at a desk, so what I'm trying to do is have a programme where we can merrily build simple things outside, like decks, fences and stairs."

Initially the students will be building on land within the school grounds but Mr Stow would like to see the students building simple things for the community. "In the past, students worked on a piece of furniture individually, but the updated programme will see students working in teams of three or four, which will make it a lot more like being in the workplace," says Mr Stow.

A full class is enrolled for 2014 and Mr Stow hopes that over the next three years he will be able to teach an additional class and grow community involvement. "The idea is to link in with our local building community in Motueka to give the students an idea of where the subject may take them."

Collaborating to meet the challenge

The 2013 New Zealand Institute for Food Science and Technology (NZIFST) Excellence Award for Service and Supply was awarded to the NZIFST/ CREST Student Product Development Challenge, which gives teams of senior secondary school students the chance to develop new food products with the aid of mentors.

The Challenge, set up five years ago by the NZIFST and the Royal Society of New Zealand's CREST programme, has involved 58 schools, 83 teachers and 293 secondary school students and many other people as mentors, sponsors, judges, educators and more. The students who successfully complete the Challenge receive a Team Silver Challenge CREST Award.

For the Challenge, each student team works with a CREST mentor and a professional from the food industry, including Futureintech Ambassadors and NZIFST members, to develop a new food product to a brief. Participating teachers receive professional development from Massey, Lincoln and Otago Universities.

CREST co-ordinator Jessie McKenzie says the collaboration between the various participants in the programme has been its greatest strength and it has encouraged many students to continue studying food science and technology.

Winning teams in 2013 created a savoury snack bar, an improved tortilla and a berry 'power' bar.

Goal 4

4

Engage with the international research community

International engagement

The Royal Society of New Zealand represents New Zealand in international fora, supports the showcasing of New Zealand research and improves international connections by encouraging and supporting research exchanges.

Launch of FRIENZ

In 2013 the Society assisted in the establishment of FRIENZ (Facilitating Research and Innovation cooperation between Europe and New Zealand). FRIENZ builds on two previous EU/NZ bilateral relationship projects: ACCESS4EU:NZ and FRENZ. It provides information, guidance and support to organisations in both Europe and New Zealand with regard to bilateral cooperation opportunities. FRIENZ is led by the Society in partnership with the New Zealand Ministry of Business, Innovation and Employment (MBIE), with funding from the European Commission.

Highlights from the year include the launch of the FRIENZ website (www.frienz.org.nz), participation in the Science and Technology Cooperation review and the first FRIENZ project partners meeting in Brussels. In November 2013 the first of sixteen study group tours took place, which saw a New Zealand contingent visit Europe to review cooperation opportunities in the overall interdisciplinary theme of personalised healthcare.

Image: European and New Zealand project partners attending the inaugural FRIENZ meeting at the Royal Society of New Zealand.



New Zealand–China Scientist Exchange Programme

Under the New Zealand–China Scientist Exchange Programme, a number of New Zealand scientists travel to China, and a reciprocal number of Chinese scientists travel to New Zealand each year, to undertake scientifically-focussed visits of four to six weeks duration. In April 2013 a new arrangement was agreed, and the numbers of scientists taking part in each exchange was increased from five to ten, resulting in nine Chinese scientists travelling to New Zealand in June–July 2013 and nine New Zealand Scientists travelling to China in August–September 2013.

Rodent research

Dr Penny Fisher from Landcare Research was hosted by the College of Agriculture and Biotechnology at China Agricultural University in Beijing in November 2013 for a research visit on sustainable management of rodent pests.

New Zealand and China share common challenges in controlling the unwanted impacts of rodents, usually through reducing their populations. Broad-scale use of rodenticides is a common management tool, and increased attention to managing rodenticide residues and the development of improved rodenticides will contribute significantly to achieving economic, environmental and human health goals in both countries and beyond.

Between-country comparisons will help to identify step changes that are needed to retain and develop rodent control tools that are cost-effective, target-specific, environmentally friendly and as humane as possible.



Images from top: Dr Penny Fisher and Chinese researchers check corn crop for signs of rodent damage during a New Zealand–China Exchange Programme research visit; Rotorua’s extensive geothermal field was the subject of Peter Johnson’s EAPSI project.

East Asia and Pacific Summer Institutes (EAPSI) programme

The EAPSI programme provides funding for up to 15 US students each year to work in New Zealand research institutions on agreed projects for eight weeks. The students are selected by the US National Science Foundation. The Society provides support for travel to New Zealand, an induction in Wellington and ongoing support until the students return to the US.

The price is right

Elizabeth Sneller from the University of Pennsylvania was hosted by Professor Beth Hume at the linguistics department at the University of Canterbury. Her project was called ‘The PROICE is ROIGHT: A Longitudinal Acoustic Analysis of New Zealand English Vowel Shift’.

She used the New Zealand Institute of Language, Brain and Behaviour’s “Origins of New Zealand English” (ONZE) corpus to accomplish this. The ONZE corpus is a database of speech containing speakers that were born between 1851 and 1987. This time range gives a span of over 100 years of acoustic sound change information. Her research project involved normalising the vowel measurements for every speaker, and using the normalised measurements to analyse more detailed aspects of language change. Through acoustic analysis, she created a motion diagram that illustrates how vowels have changed over time.

This motion diagram can be accessed at:
www.ling.upenn.edu/~esneller/onze_motion.html

Geothermal modelling

The geothermal field under Rotorua, famous for its geysers and geothermal lakes, was the project subject for Peter Johnson, from the University of Arizona. He was supervised by Professor Mike O’Sullivan at the University of Auckland to improve a computer model of the Rotorua geothermal field. He compared results of the model to actual measurements taken in the Rotorua field, which is two kilometres deep, and then made changes to the code to have the model more accurately represent the measured data, a process known as inverse modelling.

Peter was very grateful to the EAPSI program for assisting him in his goal of pursuing a career in the geothermal engineering field. “New Zealand is a global leader in the geothermal power field and my visit to the country allowed me to visit some of its world-renowned power plants first hand, meet with experts in the field and spend two months under the direction of the foremost geothermal reservoir modeller in the world.”



Goal 5

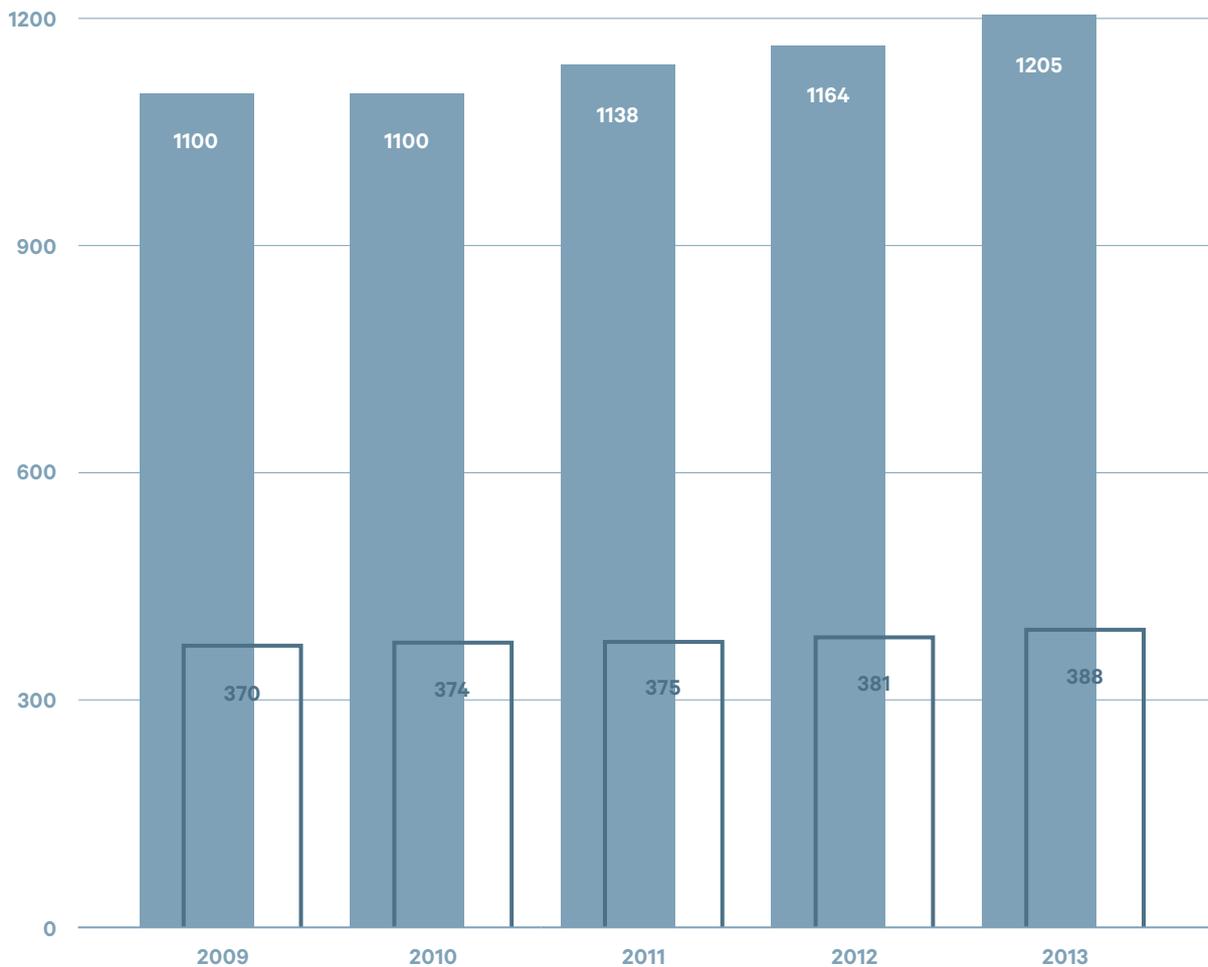
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Create an enduring organisation with effective resource management

Enduring organisation

The Royal Society of New Zealand seeks to create an enduring organisation through growing and maintaining its wide network of Members, Fellows and Branches.

Membership of Royal Society of New Zealand



The numbers of Members and Academy Fellows of the Society have increased over the past five years, as demonstrated in this graph.

■ Members
□ Fellows

Academy

At the core of the Society are the Fellows, the country's top scholars and scientists, elected by their peers for distinction in research. Thirteen researchers and scholars in fields as diverse as linguistics, mathematics, computer interfaces, housing and health, and anthropology were elected as Fellows of the Royal Society of New Zealand in 2013.

Professor Marti Anderson, Massey University, Albany, is an ecological statistician specialising in the development of new quantitative methods for community ecology.

Professor Mark Billinghurst, Director of the Human Interface Technology Laboratory New Zealand, University of Canterbury, is a researcher developing innovative computer interfaces that explore how virtual and real worlds can be merged together.

Professor Antony Braithwaite, University of Otago, has established himself as one of the world's authorities on a protein called p53, which is a central molecular player in the processes by which the body resists virus infection and the development of cancer.

Professor Gregory Cook, University of Otago, is a world-leading authority on the metabolism and energetics of microbial growth.

Distinguished Professor Rod Ellis, University of Auckland, is a world-renowned expert in the field of second language acquisition and language teacher education.

Professor Jörg Frauendiener, University of Otago, is an international expert on Einstein's general theory of relativity, working mainly on mathematical issues and numerical simulation techniques.

Professor Robert Hannah, University of Waikato, is the current leading international authority on the measurement of time and calendar systems in ancient Greece and Rome.

Professor Philippa Howden-Chapman, University of Otago, Wellington, leads two internationally recognised research programmes: housing and health (He Kainga Oranga) and sustainable cities (New Zealand Centre for Sustainable Cities).

Professor Philip Hulme, Lincoln University, is recognised worldwide for his scholarship and scientific achievements that have significantly progressed global understanding of the causes and consequences of biological invasions.

Professor Lisa Matisoo-Smith, University of Otago, is a biological anthropologist who has made huge contributions to knowledge about the human settlement of the Pacific.

Professor Charles Semple, University of Canterbury, is a world-leading researcher in two quite different fields: matroid theory (a branch of pure mathematics) and phylogenetics (an applied area at the interface of computer science, discrete mathematics and evolution biology).

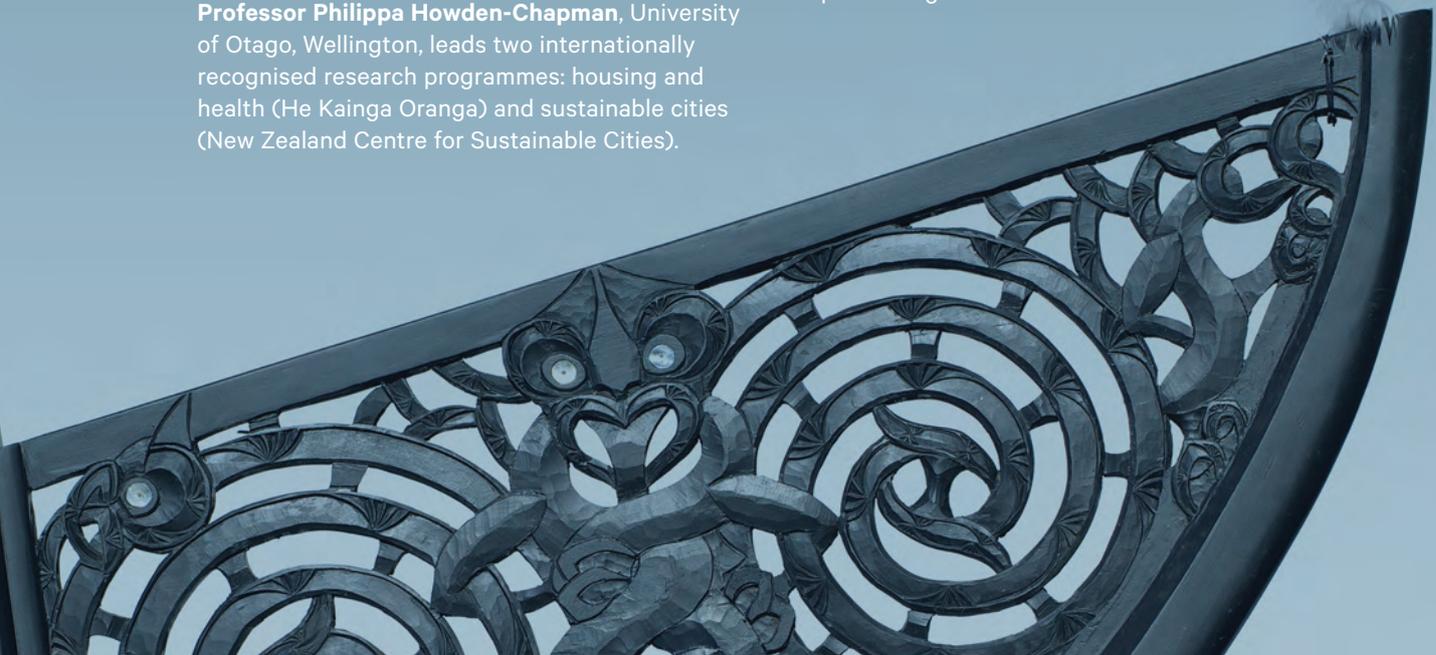
Dr Rupert Sutherland, GNS Science, Wellington, is one of New Zealand's leading earth science researchers with an international reputation in the area of plate motions of the south west Pacific, kinematics of the Alpine fault, structure of petroleum bearing basins of New Zealand and flow and processes in the mantle that control surface topography.

Professor Richard Walter, University of Otago, is an internationally-renowned scholar of Pacific archaeology and indigenous tradition.

The Society also announced the election of two Honorary Fellows in 2013.

Nobel Prize winner **Professor Sir John Walker** FRS, Wellcome Trust, United Kingdom, has used protein chemical methods to gain critical insights into the function of the key enzyme involved in cellular energy production, the adenosine triphosphate (ATP) synthase.

New Zealander **Professor Andrew Roberts**, Australian National University, is a world leader in environmental magnetism, rock magnetism and palaeomagnetism.



Branches of the Royal Society of New Zealand

The Society maintains close links with ten Branches, formally known as Regional Constituent Organisations. The Branches are distinct, separate organisations that run their own local programmes of lectures, meetings and events and have their own members.

In 2013 we welcomed our tenth Branch: the Wanaka Branch of the Royal Society of New Zealand. It formed in early 2013 to advance and promote science, technology and the humanities in the Wanaka region.

The ten Branches are:

Auckland Museum Institute
Waikato Branch
Rotorua Branch
Hawke's Bay Branch
Manawatu Branch
Wellington Branch
Nelson Science Society
Canterbury Branch
Otago Institute for the Arts and Sciences
Wanaka Branch

WANAKA

A Branch of
the ROYAL SOCIETY
of NEW ZEALAND



Financial report

Financial security is a base requirement for any organisation. Its financial report demonstrates that the Royal Society of New Zealand has both a strong asset base and the ability to generate operating income to support its goals.

Summary financial statements

The summary financial statements presented here have been extracted from the consolidated audited financial statements of the Royal Society of New Zealand for the year ended 30 June 2013, approved for issue by Council on 21 November 2013. Review full statements online: www.royalsociety.org.nz/financial

Royal Society of New Zealand Statements of comprehensive income for the year ended 30 June 2013

	2013 \$000's	2012 \$000's
Revenue		
Society membership	258	296
Income from products and services	5,558	6,244
Sponsorship and donations	573	453
Rental of investment property	143	57
Total revenue	6,532	7,050
Interest income	132	269
Total other income	132	269
Expenditure		
Audit expense	42	42
Operating lease expense	40	171
Depreciation expense	183	73
Employee benefits expense	3,507	3,675
Grants	30	17
Other expenses	2,520	2,608
Total expenses	6,322	6,586
Net surplus	342	733
Losses on revaluation of land and buildings	(797)	(3,106)
Total income for the year	(454)	(2,373)

Royal Society of New Zealand
Balance sheet
as at 30 June 2013

	2013 \$000's	2012 \$000's
Assets		
Current assets		
Cash and cash equivalents	1,988	2,628
Trade and other receivables	291	591
Investments and other financial assets	1,531	1,184
Prepayments	30	142
Inventories	6	11
Total current assets	3,846	4,556
Non-current assets		
Property, plant and equipment	10,587	11,512
Total assets	14,433	16,068
Liabilities		
Current liabilities		
Trade and other payables	1,105	2,192
Income in advance	398	492
Total liabilities	1,503	2,684
Net assets	12,930	13,384
Equity		
Retained earnings	11,769	11,888
Property revaluation reserve	–	341
Designated purpose reserve	1,161	1,155
	12,930	13,384

The financial statements have been prepared in accordance with Generally Accepted Accounting Practice (NZ GAAP) in New Zealand. They comply with the New Zealand equivalents to International Financial Reporting Standards (NZ IFRS) and other applicable Financial Reporting Standards, as appropriate for public benefit entities that qualify and apply differential reporting concessions.

They are prepared subject to the provisions of the Royal Society of New Zealand Act 1997.

Basis of Preparation

The principal accounting policies adopted in the preparation of the financial statements are set out below. These policies have been consistently applied to all the periods presented, unless otherwise stated.

Statutory base

The Society was established under the Royal Society of New Zealand Act 1997. The financial statements have been prepared in accordance with NZ GAAP as defined in the Financial Reporting Act 1993.

Differential reporting

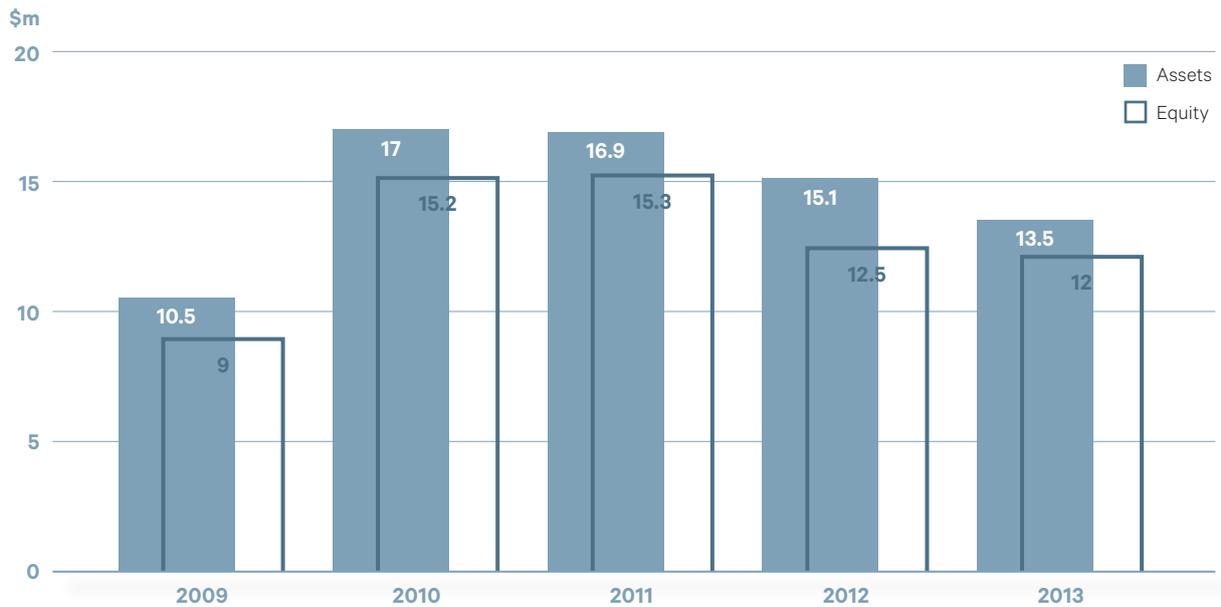
The Society and the Group are qualifying entities within the Framework of Differential Reporting. The Society and the Group

qualify on the basis that they are not issuers and are not large (have less than 50 employees and total income below \$20 million). The Society and the Group have taken advantage of all differential reporting concessions available to them except for NZIAS 18 revenue paragraph NZ6.1 with which they have complied with fully.

Historical Cost convention

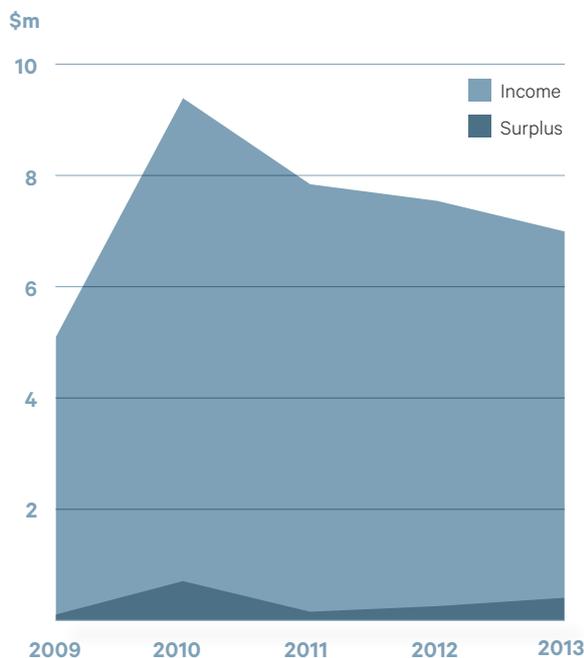
These financial statements have been prepared under the historical cost convention, as modified by the revaluation of certain assets as identified in specific accounting policies.

Movement of asset values and associated equity interests



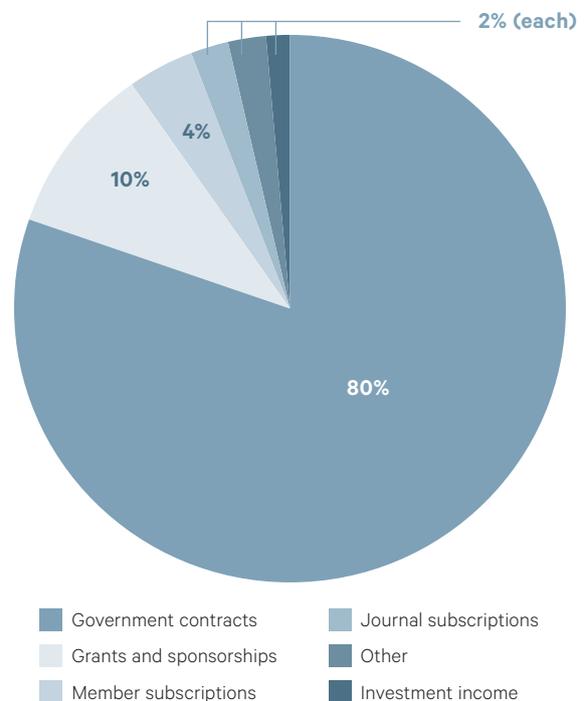
The reduction of asset value and associated equity interests since 2011 is due to downwards valuation of the Thorndon property against the site redevelopment costs. The Society is in a strong position, holding 80% equity of its assets.

To demonstrate trend of income and surpluses generated over a 5 year timeframe



The downward trend of income for the Society over five years reflects reduction in income received from government grants due to decreases in government spending. The 2010 year includes income from a significant one-off international project. Society surpluses have increased for the past two years.

Analysis of income sources 2013 year



The Society is dependent on income generated from the performance of business and contract work. This income provides the means for the Society to meet its objectives for the advancement and promotion of science, technology and the humanities in New Zealand.

A place for knowledge and excellence

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