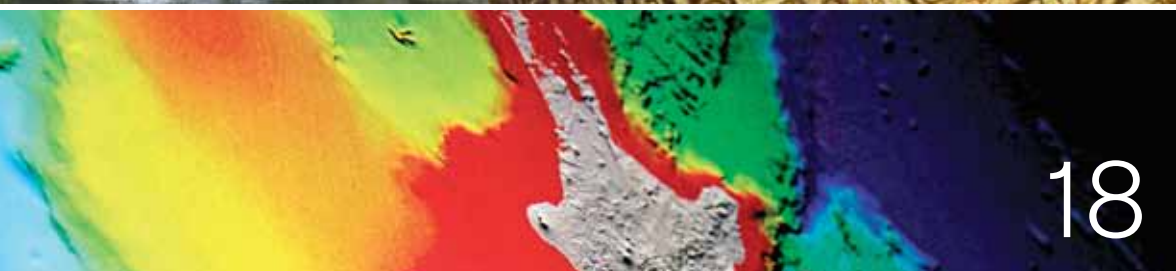




PROFILING EXCELLENCE 2011

*the* ROYAL  
SOCIETY *of*  
NEW ZEALAND  
TE APĀRANGI

# EXCELLENCE AND KNOWLEDGE





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## MESSAGE FROM THE PRESIDENT AND THE CHIEF EXECUTIVE

Welcome to *Profiling Excellence*, our annual publication which provides a snapshot of the Royal Society of New Zealand's activities during 2011.

In this you can read about some of the highlights from our work in the past year – including celebrating the achievements of some of New Zealand's top researchers, how we highlighted the International Year of Chemistry, and our involvement in organising New Zealand's first National Primary Science Week for schools.

As you will see, our work is varied, from our extensive lecture programme for the general public, to publishing peer-reviewed research journals, to our information papers designed to generate informed debate.

We are very fortunate to run a number of contracts which support emerging and established researchers as they undertake exciting research projects, including through the Rutherford Discovery Fellowships and the prestigious Marsden Fund.

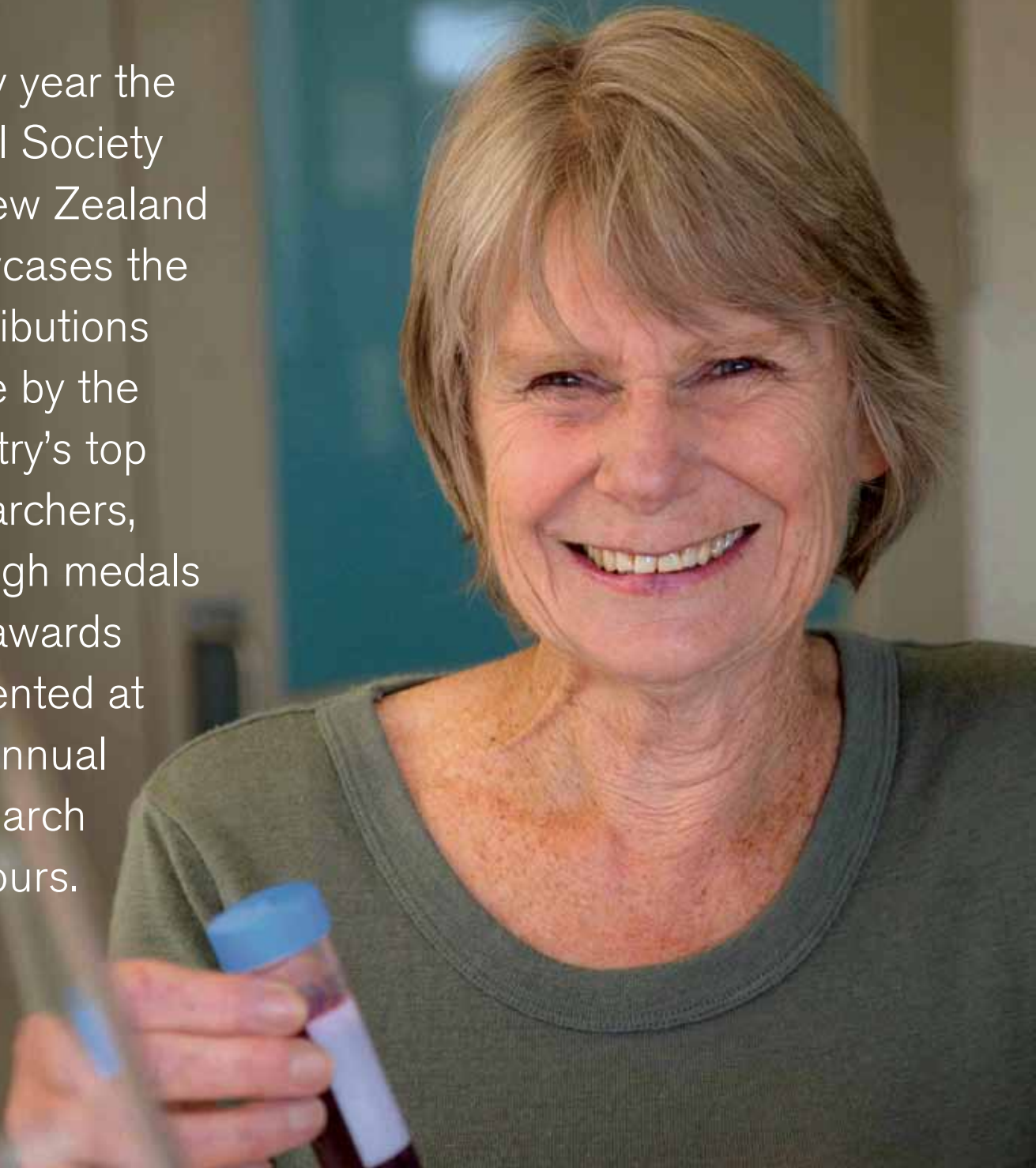
Thank you to our many supporters and sponsors who make our work possible and, of course, to our dedicated staff.

**Dr Garth Carnaby**  
MNZM FRSNZ  
President

**Dr Di McCarthy**  
ONZM  
Chief Executive

## CELEBRATING EXCELLENCE

Every year the Royal Society of New Zealand showcases the contributions made by the country's top researchers, through medals and awards presented at the annual Research Honours.



## 20-YEAR MILESTONE FOR RUTHERFORD MEDAL

In 2011 Professor Christine Winterbourn FRSNZ from the University of Otago, Christchurch, became the first woman to be awarded the prestigious Rutherford Medal in its 20-year history. She received New Zealand's highest science and technology honour for her outstanding achievements and discoveries in free radical biology. Together with the medal awarded by the Royal Society of New Zealand, she also received \$100,000 from the Government presented by the then Minister of Science and Innovation, Hon Dr Wayne Mapp.

Professor Winterbourn's research into free radical biology has opened the way for ground-breaking research into links to diseases. Her passion and dedication over the past 40 years into research on free radicals and antioxidants has led to her making several seminal discoveries which have important implications for medical research.

She was one of the first scientists to demonstrate that our cells produce free radicals as part of their normal function. She went on to characterise some of the chemical reactions of free radicals that we now know occur in diseases such as cancer, stroke, coronary heart disease and arthritis.

## OUTSTANDING SCIENCE COMMUNICATION

Three new medals were presented in 2011, two for science-related work and one for humanities research.

The inaugural Callaghan Medal for outstanding contribution to science communication was awarded to Professor Sir Peter Gluckman FRS FRSNZ for his achievements in science communication, in particular his contribution to raising public awareness of the value of science to human progress. The medal is named after renowned New Zealand physicist Professor Sir Paul Callaghan FRS FRSNZ.

Sir Peter Gluckman has had a wide-ranging influence on attitudes to science in New Zealand. The Liggins Institute, which he co-founded in 2001, has encouraged secondary school teachers and students to access and interact with the scientific research community.

Appointed in 2009 as New Zealand's first Chief Science Advisor to the Prime Minister, Sir Peter interprets science in its widest sense – as the organised acquisition of knowledge – and he promotes an evidence-based approach to policy formulation across government. His work in 2011 reflected this, with reports about the Canterbury earthquakes, science in education, evidence in policy, and improving the transition for adolescents.

**Images:** Professor Christine Winterbourn, Rutherford Medal winner; Dr Gary Evans, MacDiarmid Medal winner; Professor Sir Peter Gluckman, Callaghan Medal winner.



## NEW MEDAL FOR THE HUMANITIES

Professor James Flynn FRSNZ, from the University of Otago, was the recipient of the inaugural Humanities Aronui Medal. Amongst other outstanding work, his research into nature versus nurture and IQ has had far-reaching implications and continues to be one of the most cited discoveries to originate from New Zealand in the 20th century.

The Humanities Aronui Medal was created to acknowledge research of outstanding merit in the humanities. The design incorporates the meaning of Aronui 'knowledge that makes us human' through the woven Kete Aronui, the traditional kit of knowledge. The weaving incorporates modern symbols of technology and a fingerprint representing unique human individuality within our collective society.

## HONOURING MACDIARMID'S MEMORY

The inaugural MacDiarmid Medal was awarded to Dr Gary Evans of Industrial Research Limited who has pioneered the design and synthesis of new pharmaceuticals for treating major diseases. His research has resulted in clinical trials of drugs for gout, psoriasis and cancer of the immune system as well as the preclinical development of treatments for malaria, bacterial infections and solid tumour cancer. Dr Evans has developed strong relationships with key international research agencies, particularly the Albert Einstein College of Medicine in New York.

The MacDiarmid Medal, for outstanding scientific research that shows the potential for application to human benefit, is named in honour of Professor Alan MacDiarmid FRS Hon FRSNZ, a New Zealander who won the Nobel Prize in Chemistry in 2000.

## SHADES OF CHEMISTRY

2011 was the International Year of Chemistry and through our public programmes we celebrated the many facets of chemistry and how it impacts on our everyday lives.

### IN HONOUR OF MARIE CURIE

Twelve female New Zealand research chemists, twelve venues and the twelve months of 2011 combined to create this year's Marie Curie Lectures to honour Marie Curie's Nobel Prize in Chemistry for her ground-breaking studies in radium and polonium.

### INSIDE OUT

The role that chemistry plays in our everyday lives is enormous, but generally goes unnoticed. At the close of 2011 International Year of Chemistry, the Talking Heads series examined how chemistry answers some of life's complex questions. The series is a partnership between the Royal Society of New Zealand and Radio New Zealand. Recorded in Wellington, Christchurch and Auckland, broadcaster Kim Hill discussed with scientists the chemistry underpinning our lives.

### OUR CHEMICAL WORLD

One of the biggest questions in life is how did we get here? How did rock and steam become our world, full of life and diversity? The science community thought they had the answer with the achievement of the Human Genome Project just after the turn of the new millennium; however ten years on it seems that it may not be DNA which is the star but its sibling RNA. In the 2011 New Zealand Rutherford Lecture, Professor Warren Tate FRSNZ speculated on RNA's role and how it may lead us into the development of therapies for Alzheimer's disease, HIV and Chronic Fatigue Syndrome.

Professor Tate is currently Associate Dean of Research for the Division of Health Sciences at the University of Otago and was awarded the 2010 Rutherford Medal for his achievements in molecular biology and neuroscience.



## APPLYING SCIENCE TO ART

Rarely do scientific techniques make such an impact on seemingly unrelated disciplines, as in the area of Raman microscopy. This light-scattering technique enables the accurate identification of pigments in historical artefacts and leads to the detection of forgeries. When a major work of art is involved, the impact can be great. The 2011 Distinguished Speaker, internationally celebrated scientist Professor Robin Clark FRS Hon FRSNZ, has examined some of Europe's best known artworks using scientific techniques. His fascinating lecture was delivered in venues across the country.

## THE ART OF SCIENCE

Featuring the Royal Society of New Zealand's extensive collection of portraits of prominent scientists and past presidents, this exhibition represents many of the most eminent scientists New Zealand has produced. By connecting art and science, the exhibition tells the individual stories of each scientist portrayed – their innovations and successes. It also looks at the science of paint and its chemistry and the fascinating connections and disparities between artists and scientists, and between science and painting. In partnership with the New Zealand Portrait Gallery, the exhibition was on show on Wellington's waterfront mid 2011 and is now on national tour through to mid 2013.

**Images:** The Art of Science Exhibition in Wellington; Professor Robin Clark, 2011 Distinguished Speaker; Dr Bridget Stocker, a Marie Curie series lecturer and also the fiction winner of the Manhire Prize in Creative Science Writing.

## SCIENCE WRITING

*"I unhem creation a little, to work out the stitch."*  
So wrote poet Vincent O'Sullivan regarding Marie Curie's work on radiation 100 years ago. Short story writers were challenged to show how unpicking our world in order to comprehend its mysteries can lead to unsought consequences.

The annual short story competition, **the Manhire Prize in Creative Science Writing**, is organised in association with the New Zealand Listener magazine and the International Institute of Modern Letters at Victoria University of Wellington. The judge was Jo Randerson, writer and theatre maker.

The fiction section was won by Bridget Stocker for her story about Marie Curie *Radium – a Love Story*. The non-fiction section was won by Joanna Wojnar for her essay *100% Chemical Free*. Unusually, this year both winners were research chemists and this was noted by the competition judge – "There was a clear thematic to this year's fiction entries, and it stems from the evocative terminology which colours the world of chemistry. Reactions, bonds, lone pairs – many of the stories were based around relationships – totally in keeping with the chemist's theme."

Samuel Johnson said "If you are to have but one book with you upon a journey, let it be a book of science". To encourage and develop popular science writing, the Royal Society of New Zealand established its biennial **Science Book Prize** in 2009. The winner of the 2011 prize was Alison Ballance, with her evocative tale of a small group of scientists trying to save the world's most endearing bird, *Kakapo – Rescued from the Brink of Extinction*.



## HONOURING SPECIAL ACHIEVEMENTS

The Fellows of the Royal Society of New Zealand are the foundation of our organisation, providing valuable expertise. They are elected by their peers for distinction in research, or in the advancement of science, technology or the humanities.

**Fellows of the Royal Society of New Zealand regularly receive international awards and accolades for their work.**

**Professor Peter Schwerdtfeger** FRSNZ, Massey University, Albany, received two major awards in 2011. In January he was awarded the Fukui Medal for his achievements in quantum chemistry, in particular for deeper understanding of quantum relativistic effects. The medal is awarded to outstanding theoretical/computational chemists in the Asia-Pacific region. Then in March, he was awarded the Humboldt Research Prize for his work in theoretical chemistry. The prize is given by the Alexander von Humboldt Foundation in Germany.

Deputy Vice-Chancellor and Liggins Institute researcher **Professor Jane Harding** ONZM FRSNZ, from The University of Auckland, was awarded a prestigious individual investigator research project grant from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NIH). It is unusual for investigators outside the US to access direct NIH funding. The project, known

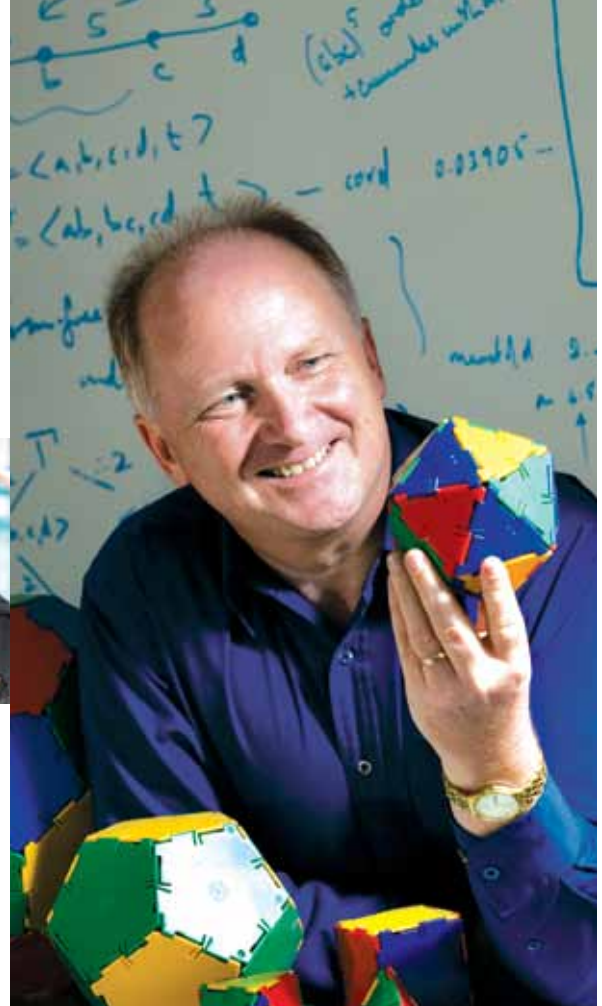
as the CHYLD Study (Children with Hypoglycaemia and their Later Development) will be funded over five years as investigators follow the development of a unique cohort of children.

Mathematician **Professor Marston Conder** FRSNZ, from The University of Auckland, was named the first Maclaurin Lecturer. He will tour universities in the United States as a visiting speaker in 2012/13 and give a plenary address to the American Mathematical Society. The Maclaurin Lectureship is a new reciprocal exchange between the New Zealand and American Mathematical Societies.

**Professor Rick Sibson** FRS FRSNZ, University of Otago, was presented with the 2011 Career Contribution Award by the Structural Geology and Tectonics Division of GSA at the Geological Society of America Annual Meeting in October. It is awarded to an individual who throughout his/her career has made numerous distinguished contributions that have clearly advanced the science of structural geology or tectonics.



**Images:** Professor Susan Schenk; Professor Peter Schwerdtfeger; Professor Marston Conder.



## RESEARCH FELLOWSHIPS AWARDED

James Cook Research Fellowships are awarded to researchers who have achieved national and international recognition in their field. The Fellowships allow them to concentrate fully on their chosen research for two years.

**Professor Susan Schenk** FRSNZ, from the School of Psychology at Victoria University of Wellington, is researching brain mechanisms of drug abuse. Drug abuse is a chronic relapsing disorder and drug-seeking persists for a long time even after extensive periods of abstinence, which suggests long-lasting wiring of specific brain circuitry. As a result, addicts are continually thrown into a condition of drug-craving that ultimately leads to drug-seeking and a relapse to drug-taking. Some of these circuits have been identified but the mechanism underlying the rewiring is still unknown. Professor Schenk is applying novel techniques to identify the relevant mechanisms underlying these long-term changes in brain structure and function.

Modern medicine is both blessed and cursed with vast amounts of data. Understanding how these data relate requires multi-scale modeling to link measurements via their biochemical, biophysical, anatomical and developmental processes.

**Associate Professor Poul Nielsen** from the Auckland Bioengineering Institute at The University of Auckland is developing the FieldML project for defining, sharing and solving biological models.

The Modern Evolutionary Synthesis is the cornerstone of biology. Its formulation took place when understanding of the connection between genotype and phenotype (development) was in its infancy and difficult to reconcile with the Darwinian view of gradual evolution. As a result, development was left out of the Modern Synthesis. **Professor Paul Rainey** FRSNZ from the New Zealand Institute for Advanced Study at Massey University, Albany, is researching development as a causal process in evolution.

**Associate Professor Tony Poole**, from the University of Otago, is researching cellular cybernetics. His research has focused on connective tissue biology, including studies on articular and growth plate cartilages, tendons and repair, skin and scarring, cornea transplants and keratoconus, and osteoarthritis and joint degeneration, for regenerative medicine using stem cells. These studies have shown that connective tissue cells not only produce an extracellular matrix structured according to the mechanical function of the tissue, but they also sense, and respond too, biomechanical and physico-chemical changes in these matrices during development, maturation, repair and degeneration. However, the mechanism by which this cellular cybernetic loop operates during normal tissue activity, or in disease processes, still remains a fundamental question. Associate Professor Poole's Fellowship is allowing him to pursue questions about the dynamic interaction between connective tissue cells and their biomechanical microenvironment.



## TEACHING AND LEARNING

Engaging young New Zealanders with science, mathematics and technology is a key objective for the Royal Society of New Zealand. It is achieved through a range of initiatives designed to support and reward teachers and students.

### PRIMARY SCIENCE WEEK CREATES A BUZZ

In May 2011, primary schools from all around the country took part in a National Primary Science Week, the first of its kind to be held in New Zealand. The week was jointly organised by the Royal Society of New Zealand and the New Zealand Association of Primary Science Educators.

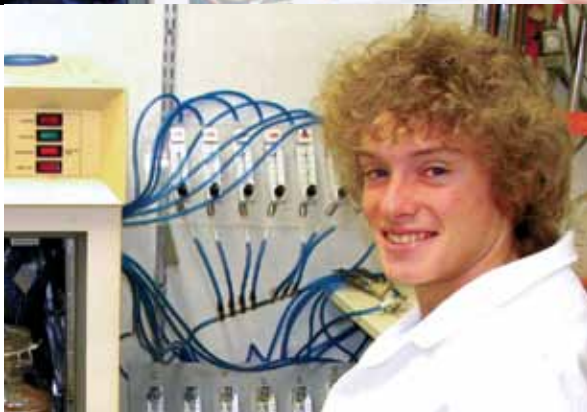
The aim was to not only involve students, parents and the wider community in exciting science activities, but also to provide professional development for teachers in science. Programmes were run regionally, including free workshops for teachers giving them practical help. Workshop topics ranged from electricity and ocean farming, to hands-on chemistry and the teaching of astronomy in the classroom. Teachers from more than 300 schools attended the events.

Schools were encouraged to focus on science during the week, with daily practical experiments for the classroom. Competitions included a science poetry competition, and a competition for the best student poster about 'Why is science important for

New Zealand?' For the first time, a nationwide school science experiment took place. Called 'The Big Milk Experiment', it involved students investigating the properties of milk.

### ADDRESSING CHALLENGING ISSUES IN SCIENCE EDUCATION

A major report on science education in New Zealand schools was released in April 2011 by the Prime Minister's Chief Science Adviser, Professor Sir Peter Gluckman. *Looking Ahead: Science Education for the Twenty-First Century* was the result of more than a year's collaborative work between the Royal Society of New Zealand, the New Zealand Council for Educational Research (NZCER), and the Office of the Prime Minister's Chief Science Advisor, supported by the Ministry of Science and Innovation. Contributing groups considered whether a mismatch exists between how science is taught and the needs of 21st century learners. Priorities for future engagement with young New Zealanders were identified and recommendations made for future action. The final package plus a letter to the Prime Minister was launched via an online broadcast.



The Royal Society of New Zealand has since facilitated two forums at primary and secondary school level to contribute to a policy paper for release in 2012. Some of the key issues identified to date include the multiple aims of science education, the way science is taught, and the need to form strong links between schools and the wider science community.

These papers have raised the profile of science education and resulted in a desire across sectors to address the issues raised and work together to provide better opportunities for students.

**Images:** Zoe Ferreira, Eastern Hutt School; Nuan-Ting Huang, Genesis Energy Realise the Dream Supreme Award winner; Kieran Gainsford, BayerBoost scholar; Caitlyn Taverner, Rolleston School.

## BY THE NUMBERS

**100** students were selected from all over New Zealand to attend international science and technology events by applying for the Talented Secondary School Students Travel Awards. Among them was the New Zealand team of Benjamin Bai, Richard Chou, Vicky Tai and Jack Zhou, who brought home a hat trick of medals from the International Biology Olympiad in Taiwan.

**29** primary and secondary teachers were selected as teacher fellows. There are two teacher fellowship programmes – one enabling primary school teachers to become effective leaders of science in their schools, and the other designed to expose teachers to contemporary research and technology. Both help teachers establish relationships between their school and the science and technology communities, with the teachers being hosted by research organisations during their fellowships.

**19** secondary school students were selected to attend the Genesis Energy Realise the Dream national event in December. The week-long event rewards students who have carried out excellent science research or technological development. Their research projects ranged from fig preservation to investigating the movement of whelks. During the week the students were hosted by Leigh Marine Education Centre, the Liggins Institute, DairyNZ, Genesis Energy, Massey University and NIWA. The event culminated in an awards function at Government House where scholarships and travel awards were presented by the Governor-General.

**9** school students were awarded Gold CREST awards in 2011. CREST is an international scheme designed to encourage students to be innovative, creative and to problem-solve in science and technology. Gold awards are for advanced investigative projects by Year 12 and 13 students and take six terms to complete.

**5** BayerBoost scholarships were awarded to senior secondary school students and undergraduates giving them the opportunity to gain experience in environmental research during their summer break.

**4** teachers received Primary Science Teacher Fellowship Alumni Awards funded by the Ministry of Science and Innovation. The overall winner of the new award was Eastern Hutt School teacher Kerry Harrison, who won \$20,000 for her school to spend on science education. Three runners-up were also recognised. The award is for a teacher fellow who has returned to his/her school and made a significant difference in the school science programme.

## SUPPORTING RESEARCHERS

The Royal Society of New Zealand manages large research contracts designed to support New Zealand researchers in physical and life sciences, mathematics, engineering, social sciences and the humanities.



## MARSDEN FUND

On behalf of the Marsden Fund Council, the Royal Society of New Zealand manages the Marsden Fund which supports leading edge research. In 2011, 88 research projects were allocated a total of \$53.8 million worth of funding.

### Scavenger and hunter

Professor Marti Anderson, Massey University, and Dr Clive Roberts and Dr Vincent Zintzen from Te Papa Tongarewa, are leading a project to quantify how biodiversity in fish communities alters with changes in latitude and ocean depth. In the course of this work, the team made the fundamental discovery that the pejoratively named hagfish is not only a scavenger but also a hunter. Captivating footage of hagfish seeking out prey, and also repelling shark attacks by releasing a dramatic slime, went viral on YouTube in late 2011, following publication of a paper in *Nature's Scientific Reports*.

### Nanotube droplets

Professor Shaun Hendy, from Industrial Research Ltd (IRL) and Victoria University, and Dr Bridget Ingham from IRL, have led a recently completed project on melting in metal nanoparticles using theory, experiment and computer simulation. A major, serendipitous finding was that droplets of non-wetting metal (such as palladium) can be absorbed by a carbon nanotube, provided the droplet is below a critical size; the metal can then be extracted by increasing the size of the droplet above the critical size. This new effect has potential applications in the synthesis of new catalysts, the fabrication of advanced materials for solar cells and even the measurement of the mechanical properties of living cells.

### The sound of speech

Professor Jennifer Hay from the University of Canterbury is investigating the role of childhood memories in speech production and perception. Using the university's unique Origins of New Zealand English archive, which records almost the entire history of English spoken in New Zealand from 1850, the team has been able to show that older words, such as 'frock' or 'wireless', are more easily understood when said by older voices. Similarly, the topic of conversation also affects speech – the way people talk about the 'olden days' is more old-fashioned, and speech about Australia is more Australian-sounding. This work on the nature of speech has wider implications for understanding what happens when language breaks down, for example with Parkinson's disease.

### Traffic flows

Professor Matthias Ehrgott and a team of engineers from The University of Auckland are studying how to predict traffic in networks, such as roading systems. Existing approaches assume there is a single objective that users are seeking to optimise, such as travel time. Professor Ehrgott's team is looking at solutions when there is more than one objective to

**Images:** Jason Watson, team member from Professor Craig Cary's Marsden-funded team on Mt Erebus; Dr Anthony Poole, Rutherford Discovery Fellow; Dr Nick Shears, Rutherford Discovery Fellow.



be met, such as minimising time and toll cost, and this requires new mathematical methods. One year into their 3-year project, they have already successfully extended current methods into some multi-objective problems. This work has implications for other fields where networks occur, such as finance, supply chains and energy.

## RUTHERFORD DISCOVERY FELLOWSHIPS

Ten top researchers were awarded highly sought-after fellowships in 2011 to help them develop their research careers in New Zealand.

The Rutherford Discovery Fellowships provide financial support of \$160,000 to \$200,000 per year to these researchers over a five-year period, with the funding going towards both their salary and programme of work.

The recipients work in research fields ranging from microbiology and mathematics, to law and psychology. Their research programmes include control mechanisms for space rockets, Antarctica's contribution to sea level rise, solar materials, privacy issues and the law, and sedimentation in coastal environments.

The Rutherford Discovery Fellowship scheme was set up by the Government in 2010, and the fellowships are awarded annually. With this scheme, the Government has moved to fill a major gap in career opportunities for the most talented early- to mid-career researchers. The Fellowships will develop and foster future leaders in the New Zealand science and innovation sector by encouraging their career development and enabling them to establish a solid track record for future research.



## ON THE WORLD STAGE

Taking advantage of international opportunities enables New Zealanders to not only develop new capabilities, but also to bring back fresh ideas to contribute to the country's economic progress.

### WELCOMING VISITORS TO AOTEAROA

On behalf of New Zealand's research base, the Royal Society of New Zealand manages the country's representation in more than 30 international scientific unions and associations, and regularly hosts international visitors to New Zealand.

In 2011 the Society collaborated with the European Space Agency to host an international colloquium exploring opportunities for New Zealand to use satellite imagery more widely and improve data and image access. The Society also hosted delegations from the Chinese Association for Science and Technology and the Beijing Association for Science and Technology, strengthening its relations with the science community in China. Other visitors were welcomed from CERN, UNESCO, the American Association for the Advancement of Science and the Australian Academy of Science.

The Royal Society of New Zealand successfully led a bid for the rights to host the International Council for Science General Assembly in 2014 in New Zealand. Preparations are now under way to welcome delegates from all around the world to the week-long event.

### OPPORTUNITIES FOR OVERSEAS STUDY

The Rutherford Foundation supports early career researchers, funds PhD scholarships and postdoctoral fellowships, and helps bring outstanding overseas New Zealand researchers back home.

In 2011, the Foundation awarded postdoctoral fellowships to Dr Ben Mackey and Dr Gillian Gibb. These awards brought them back from overseas to take up postdoctoral positions. Dr Mackey is developing a new technique for dating the exposure age of basalt rocks for seismic hazard assessment at the University of Canterbury. Dr Gibb is studying the genetic basis of flightlessness in island birds at Massey University. A fellowship was also awarded to Dr Rachel Blagojevic to begin postdoctoral work at The University of Auckland studying the use of physical objects in combination with touch screen technologies.

The Rutherford Foundation provided two full PhD scholarships to Robert Hoye and Jeremy Minton to attend the University of Cambridge in the United Kingdom. Robert will study the effect of interface nano-engineering on performance of solar cells, and Jeremy will work in acoustic engineering.



**Images:** Dr Gillian Gibb, Rutherford Foundation Fellow; Robert Hoye, PhD scholarship to Cambridge, UK; Craig Stewart, PhD scholarship to Cambridge, UK.



## SUPPORTING RESEARCH LINKAGES

Supported by funding from the Ministry of Science and Innovation, the Royal Society of New Zealand operates several schemes that help New Zealand researchers connect with their counterparts in other countries.

In 2011 more than 100 researchers received financial assistance to travel to 18 different countries, including Japan, China, UK, USA, Germany and Spain. Joint workshops on health innovation were held with the USA, on agriculture and food research with India, and on biotechnology with Taiwan.

## INTERNATIONAL ADVISORY SERVICES

The Royal Society of New Zealand provides support services for external clients. For example, it acts as the secretariat for the New Zealand Synchrotron Group Limited, a company formed by several of New Zealand's universities and Crown Research Institutes to manage New Zealand's part ownership of the Australian Synchrotron and to coordinate access for New Zealand researchers to that facility. Through the secretariat, 66 groups of researchers travelled to Melbourne to use the Australian Synchrotron in 2011.

The Society also provides consultancy services and in 2011 conducted seven performance reviews of centres of research excellence in the Middle East. These reviews were coordinated by the Society and involved people drawn from its international network of experts.

To commemorate the centenary of Scott's final expedition to the South Pole in 1911–12, a PhD scholarship was awarded to Craig Stewart, an outstanding young polar scientist from New Zealand, to study at the Scott Polar Research Institute at the University of Cambridge.

## COLLABORATIONS WITH EUROPE

The Royal Society of New Zealand is currently involved in a project aimed at encouraging collaboration between New Zealand and European researchers. This includes reviewing the New Zealand research funding system for its degree of reciprocity with the European Union programmes, undertaking a census of current research collaborations, and reviewing New Zealand's research strengths and priorities as a way of promoting collaboration opportunities.

## HUMANITIES ARONU

With increasing specialisation in the generation of knowledge, the humanities offer the social and cultural context for its use. Aronui 'the knowledge that makes us human'.





## POU ARONUUI AWARD

The 2011 Pou Aronui Award for distinguished services to the humanities-aronui was awarded to historian **Dr Jock Phillips**, General Editor of *Te Ara, The Encyclopedia of New Zealand*.

Dr Phillips was the founder and first Director of the Stout Research Centre for New Zealand Studies at Victoria University; he has also been Chief Historian within the Ministry for Culture and Heritage, the Concept Leader in History at Te Papa Tongarewa, and the General Editor of *Te Ara, The Encyclopedia of New Zealand*.

Dr Phillips' combination of leadership and research has made an outstanding contribution to the role of scholarship and to the development of our understanding of ourselves as human beings in Aotearoa/New Zealand. He has brought scientists and social scientists together with humanities scholars; he has provided opportunities for Māori scholars to flourish; and he has been an important sponsor of oral history and of public history in New Zealand.

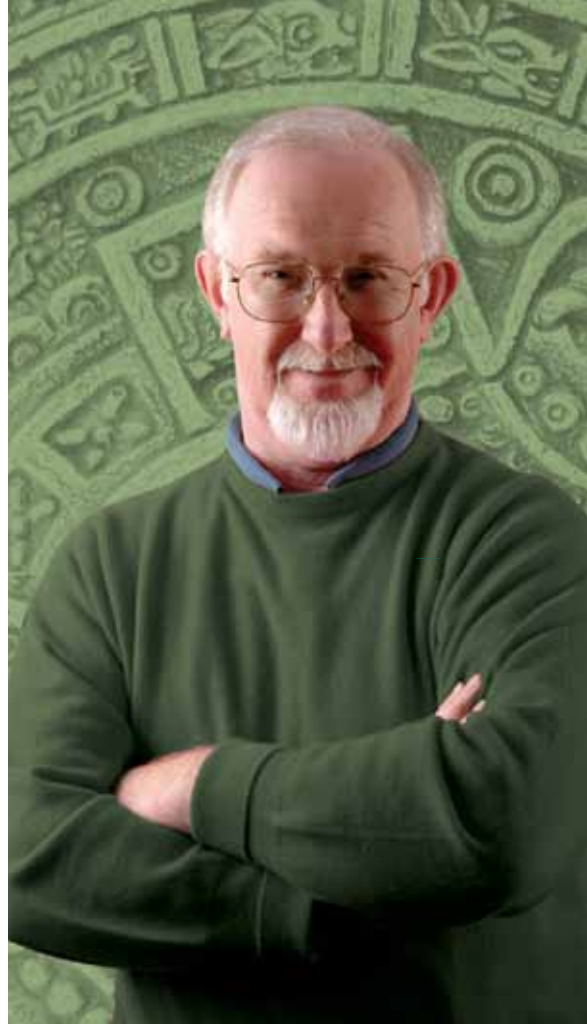
## KNOWLEDGE SHARING FOR AUTHORS AND ARTISTS

With the rise of digital technologies, people are connecting and sharing knowledge in ways that were never possible before. New and flexible solutions have had to be found to enable the creators of scientific, educational and creative material to share their work while retaining appropriate copyright protections.

A non-profit international organisation, Creative Commons was founded in 2001 and offers a variety of copyright protections for authors and artists. The Royal Society of New Zealand holds the New Zealand jurisdiction and has a range of New Zealand-specific copyright licences, which are freely available, and allow those creating and distributing intellectual property to mark their work with the freedoms they want it to carry.

In 2011, the Creative Commons Aotearoa Project worked with DigitalNZ to reward innovative reuse of public sector information by citizens. It also teamed up with the Ministry of Education to promote legal reuse of copyright materials in schools and to maximise teaching resources. The new 'Creative Commons Kiwi' animation video, produced in 2011, has been reused in workshops and conference presentations around the world by those promoting open access practices.

This work fuels a wider goal to support the uptake of the New Zealand Government Open Access and Licensing Framework ([nzgoal.info](http://nzgoal.info)) which recommends Creative Commons for public sector data and materials.



## ANCIENT CIVILISATIONS

Professor Norman Hammond, internationally renowned archaeologist, presented the 2011 New Zealand Aronui Lecture 'The Mysterious Maya'. Professor Hammond has had a distinguished career in archaeology, specialising in the ancient Maya civilisation of Central America. He holds senior positions at Boston, Harvard and Cambridge universities, is the archaeology columnist for *The Times* newspaper, and a Fellow of the British Academy.

The purpose of the annual Aronui Lecture is to stimulate debate about knowledge, culture and society. Professor Hammond's lecture considered what lessons we can learn from the rise and fall of accomplished ancient civilisations like the Maya and how this can help our understanding of modern society and current concerns. An accomplished communicator, Professor Hammond spoke to full lecture theatres throughout the country during August 2011 and stimulated much discussion and debate.

**Images:** 2011 Pou Aronui Award; Professor Norman Hammond, 2011 Aronui Lecturer.



## NEW ZEALAND RESEARCH UNPLUGGED

There were many different opportunities in 2011 to shine the spotlight on New Zealand research and its contribution to society.

### SCIENTISTS SPEAK AT PARLIAMENT

Members of Parliament are given the opportunity to hear first-hand about New Zealand science through the annual Speaker's Science Forum series. The Society runs the series, in partnership with Science New Zealand, IRANZ and Universities New Zealand. It is designed to provide an understanding of the science underlying the issues being addressed in Parliament.

In 2011 the series included presentations about Antarctic science, charcoal in agriculture, aquaculture research, the Square Kilometre Array, faults and earthquakes, and the importance of maternal nutrition on children's development.

### SCIENCE SCREENS ON TV

What better way to communicate science to the public than through the medium of television? In 2011 a second *Ever Wondered?* series was produced by TVNZ 7 in partnership with the Royal Society of New Zealand who provided advice and expertise. These programmes have proved to be a wonderful way to showcase the work of New Zealand scientists and the direct relevance of their work to people's lives. Topics examined in the second 10-part series included mathematics, chemistry, genetics, water and virtual worlds.

### INFORMING THROUGH RESEARCH

To help inform public debate and understanding the Royal Society of New Zealand publishes information pieces on current and emerging issues. In 2011, in the wake of the Canterbury earthquakes, a paper was produced examining building design. It reported on damage to buildings from the September 2010 earthquake and aftershocks, and what this means for future building design. The paper brought together the science and engineering expertise of several organisations.

One of the Society's roles is to build conversations between research experts and decision-makers. New Zealand faces some impasses around the use of natural resources (such as the use of water in agriculture) where existing thinking has led to problems that are difficult to resolve without new thinking. An example of new thinking about natural resources is the concept of 'ecosystem services'. This concept has been introduced into policy discussions via an Emerging Issues paper, a research and policy workshop and ongoing discussions.

The Society provides a route for researchers to make their expertise available to inform Government decisions. Drawing on the expertise of its membership, submissions were made on greenhouse gas emissions targets, indigenous biodiversity, traditional Chinese medicine, environmental reporting and eco-innovation.



## TAKING OUR RESEARCH TO THE WORLD

The Royal Society of New Zealand publishes eight peer-reviewed research journals of particular importance to Australasia, the Pacific Basin and Antarctica, and with relevance to researchers worldwide. Work began in 2009 on a new editorial model, using academics from New Zealand's universities and Crown Research Institutes as honorary editors, and publishing in conjunction with international academic publisher, Taylor and Francis.

Subsequently there has been a significant increase in the number of manuscript submissions through the introduction of an easy-to-use online manuscript handling software for authors. With the involvement of Taylor and Francis, the journals are now more readily available electronically and in the major international databases; they consequently are now read all around the world.

Special issues in 2011 highlighted important New Zealand research. In March the *NZ Journal of Geology and Geophysics* commemorated the life and work of New Zealand's leading palaeontologist, the late Phillip Maxwell, with a special issue of palaeontology and malacology papers from authors around the world. The September issue of the *NZ Journal of Marine and Freshwater Research* published 15 papers focussing on the need for a holistic approach to the management of a single river catchment (the Motueka River).

## DISASTER ON DEADLINE

Some of the biggest stories of the past year happened to be science-related as the media scrambled to cover the Canterbury earthquakes, the Fukushima nuclear meltdown in Japan and the Rena oil spill.

The Science Media Centre played an important role finding experts to respond to the media on all science-related aspects of these disasters, organising press briefings, helping develop graphics and using the global Science Media Centre network to track down the most up-to-date information for journalists.

The popular press briefings saw the Science Media Centre partner up with science institutions, universities, crown research institutes and the Prime Minister's Chief Science Advisor to launch new research findings. The Centre's advisors travelled the country holding media training workshops for scientists and visiting journalism schools to talk to the next generation of reporters.

The complex stories of the last year have highlighted the need for effective science communication. By assisting journalists working on science-related stories and those scientists keen to offer their expertise to the media, the Science Media Centre is helping to improve the coverage of science in New Zealand.

Visit [www.sciencemediacentre.co.nz](http://www.sciencemediacentre.co.nz) for more on the centre's activities.

**Image:** Christchurch earthquake damage.



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## A PLACE FOR KNOWLEDGE AND EXCELLENCE

Royal Society of New Zealand, 4 Halswell Street, Thorndon, PO Box 598, Wellington 6140, New Zealand  
Telephone: +64 4 472 7421, [www.royalsociety.org.nz](http://www.royalsociety.org.nz)

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