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2011 Academy Annual Report

The 2011 Academy Annual Report details the accomplishments of the Academy of the Royal Society of New Zealand throughout the year.

Chair's foreword

As Chair of the Academy Executive Committee since July 2011, I would like to extend my unreserved thanks to Professor Keith Hunter, who preceded me during the first 6 months of 2011, for his effort in guiding the Academy during that time. Thereafter, he supported and advised me in my role as Chair. Also over the last year the Academy Executive Committee members that sit on the Society's Council, comprising Professor Geoff Austin, Professor Michael Corballis, Professor Keith Hunter, Professor Richard Le Heron, Professor Ken Strongman, Dr Garth Carnaby (Society President) and myself, have worked to enhance the profile of the Academy as the intellectual centre of Royal Society of New Zealand.

A significant role of the Chair of the Academy is to chair the annual Fellowship election process. The 2011 round resulted in the selection of 12 new Fellows and one new Honorary Fellow. The Fellowship now stands at 375 and Honorary Fellowship at 57 with representation from 8 countries. This last year has seen considerable discussion within the Academy Executive Committee regarding the size of the Academy and an argument has been put forward that if the Fellowship were to be expanded, then there would be more active Fellows to contribute to the work of the Society. This led to some equivocation and consequently, the 2012 Academy Executive Committee will be undertaking an international comparison regarding the size of the Fellowship.

This year some modifications were trialled regarding the Fellowship selection process. In particular, a representative from each discipline-based Fellowship Selection Panel served on the final Fellowship Selection Committee. This contribution was found to positively inform the process and will be continued in future rounds. It was also agreed that in future, at least one independent referee should come from overseas, that referees' reports need not be biographical, but be streamlined to focus solely on what a candidate has done to advance and have impact in a field and that Honorary Fellowship nominations should state clearly the nature of the candidate's ongoing engagement with New Zealand science. The

issue of whether the descriptors for the various discipline-based Fellowship Selection Panels are uniformly adequate was raised and the Academy Executive Committee will be reviewing them for consistency in the near future.

In part because of tectonic and other events over the year, 2011 has been busy for the Academy in assisting and supporting the activities of the Royal Society of New Zealand. Appropriately many Fellows have been involved in the preparation of scientific reports, in reviewing the Society's scientific, technological and science education reports and in contributing to government and non-government advisory committees.

Of particular mention is input by Fellows into producing information pieces on:

- *The Darfield Earthquake: the value of long term research;*
- *Science as a public enterprise;*
- *The Canterbury earthquakes: scientific answers to critical questions;*
- *Competition for land use;*
- *Ecosystem services;*
- *Environmental reporting.*

The Academy Executive Committee has also agreed that emerging issues papers on *Future resource exploitation of the marine environment* and *The sustainable carrying capacity of New Zealand* be published during 2012.

The Academy Executive Committee has recently engaged in discussion of issues such as a review of the HSNO Act as it affects research involving new organisms, the lack of science and scientists in Government Departments and whether there is appropriate emphasis on technology and the humanities within the Society.

At the 2011 46th Fellows' AGM in Auckland on 2 November there was excellent attendance and lively (constructive) discussion ensued. Furthermore, in the afternoon seven of the 10 Fellows elected in 2010 gave talks on their research at the informative and stimulating New Fellows' Seminar introduced in 2001 by Past President, Professor Sir Paul Callaghan. This year's topics included science for conservation, exploring New Zealand's seaweed flora: the intriguing lives of microalgae, plant-microbe symbiosis, cracking ancient codes, connecting with tephros, stainless steel, rarefied atmospheres and biology, and building better software tools faster.

During 2011 I fulfilled the usual Chair's activities, such as presenting medals and certificates; selecting and recommending James Cook Research Fellowships; reviewing James Cook Research Fellows' annual and final reports; attending the Science & Technology in Society Forum

8th Annual Meeting, 2-4 October 2011 in Kyoto, Japan, on behalf of Dr Carnaby and representing the Academy on the Site Development Working Group.

Looking ahead, I believe that the role of the Royal Society of New Zealand as influenced by the Academy, has a major role to play on behalf of New Zealand science and indeed its members. Quite rightly, the Society has considerable heft with government and this is likely to grow in significance as New Zealand increasingly recognises the importance of science, technology, innovation and scholarship. Should there be further change to New Zealand' science system and priorities, then it will be incumbent on the Society to give free and frank advice in the interest of New Zealand and its members. This may sometimes require political courage.

It has been a privilege to Chair the Academy through this year and I have greatly appreciated the support of the President Garth Carnaby, Keith Hunter and my fellow members of the Academy Executive. I also gratefully acknowledge the support and professionalism of the Chief Executive Dr Di McCarthy, Dr Marc Rands, Gill Sutherland, Judy Lyons, Jenny Porter and all the other staff who have variously covered for any shortcomings on my behalf.

I look forward to working with the Academy over the next few months until I hand over the reins to Professor Richard Le Heron.

Stephen Goldson
Chair, Academy of the Royal Society of New Zealand

2011 Academy Annual Report

Academy Executive Committee

Until 30 June 2011

Chair: Professor Keith Hunter FRSNZ

Members:

- Dr Garth Carnaby MNZM FRSNZ
- Professor Michael Corballis ONZM FRSNZ
- Dr Stephen Goldson FRSNZ
- Professor Richard Le Heron FRSNZ
- Professor Ken Strongman FRSNZ

After 30 June 2011

Chair: Dr Stephen Goldson FRSNZ

Members:

- Professor Geoff Austin FRSNZ
- Dr Garth Carnaby MNZM FRSNZ
- Professor Michael Corballis ONZM FRSNZ
- Professor Richard Le Heron FRSNZ
- Professor Keith Hunter FRSNZ
- Professor Ken Strongman FRSNZ

Fellowship And Honorary Fellowship

There were 375 Fellows and 57 Honorary Fellows as at 31 December 2011.

Deaths

It is noted with regret that **Dr John Titheridge** FRSNZ, formerly of the Dept of Physics, The University of Auckland, died at the end of December 2010; **Dr Lindsay Wallace** CBE FRSNZ, former Director of Ruakura Agricultural Research Centre, died in January; **Professor Dame Judith Binney** DNZM FRSNZ, formerly of the Dept of History, The University of Auckland and **Dr Bob McDowall** FRSNZ, formerly of NIWA Christchurch, died in February; **Professor John Morton** QSO FRSNZ, formerly of the Dept of Zoology, The University of Auckland died in March; **Professor Kenneth Cumberland** CBE FRSNZ, formerly of the Dept of Geography, The University of Auckland, died in April; **Dr Jack Fergusson** FRSNZ, formerly of the Dept of Chemistry, University of Canterbury, died in May; **Professor Jacob Bercovitch** FRSNZ, formerly of the School of Political Science and Communication, University of Canterbury, died in June; **Professor Keith Syers** FRSNZ, formerly of the Dept of Soil Science, Massey University and latterly from the Office of the President, Naresuan University, Thailand died in July; **Dr Bill Robinson** QSO FRSNZ, formerly of Robinson Seismic Limited, died in August; and **Dr Ted Bollard** CBE FRSNZ, formerly of DSIR and a former President of the Royal Society of New Zealand, died in November.

Their Obituaries are being lodged on the Royal Society website as they are received and edited.

Public Honours

New Years Honours 2011

Companion of the New Zealand Order of Merit (CNZM)

- **Professor Emeritus Roy Kerr** FRSNZ, of Christchurch, for services to astrophysics.
- **Professor Ian Warrington** FRSNZ, of Palmerston North, for services to science.

Queen's Birthday Honours 2011

Companion of the New Zealand Order of Merit (CNZM)

- **Professor Warren Tate** FRSNZ, of Dunedin, for services to science.

National Appointments And Awards

Prime Minister's Science Prize

The 2011 Prime Minister's Science Prize was awarded in December to a joint NIWA (National Institute of Water and Atmospheric Research) /University of Otago team of scientists which has carried out some of the largest experiments ever undertaken on the planet to better understand the role the ocean plays in influencing climate. The team was led by **Professor Philip Boyd** FRSNZ and included **Professor Keith Hunter** FRSNZ.

Victoria University Honorary Degrees

Victoria University of Wellington conferred honorary degrees on two Royal Society Fellows: **Dr Bob Buckley** FRSNZ and **Dr Ross Ferguson** ONZM FRSNZ.

World-leading physicist and manager of Industrial Research Limited's (IRL) Superconductivity and Energy Group, Dr Buckley is an IRL Distinguished Scientist. Dr Ferguson is the international authority on kiwifruit biology and an ambassador for New Zealand science. Projects under his leadership have been fundamental to New Zealand's kiwifruit breeding programme and to the New Zealand kiwifruit's expansion to an international market.

University of Otago Vice-Chancellor

Leading psychology researcher **Professor Harlene Hayne** ONZM FRSNZ took over the reins from **Professor Sir David Skegg** KNZM OBE FRSNZ as the University of Otago's Vice-Chancellor at the end of July. She is the first woman Vice-Chancellor appointed at the University of Otago.

James Cook Research Fellowships

Professor Matt Visser FRSNZ and **Professor Marston Conder** FRSNZ were awarded James Cook Research Fellowships for 2 years starting in early 2012.

Lifetime Contributions to Behaviour Analysis

Professor Michael Davison FRSNZ was awarded the NZ Association for Behaviour Analysis award for Lifetime Contributions to Behaviour Analysis in August 2011.

Distinguished Fellow of the Institution of Professional Engineers NZ

Professor Bruce Melville FRSNZ was promoted to DistFIPENZ i.e. Distinguished Fellow of the Institution of Professional Engineers NZ in March.

Medicines New Zealand Award

Professor Ian Reid FRSNZ was awarded the inaugural Value of Medicines Award from Medicines New Zealand in August. The Value of Medicines Award recognises a New Zealand researcher or health care professional for their outstanding contribution to improving the understanding, effectiveness or safety of the use of medicines. Professor Reid's work has contributed to all of these areas.

Te Waka Toi Awards celebrate Māori achievements

Sir Hirini Moko Mead FRSNZ was acknowledged for his contribution to Maori Arts in the Annual Creative New Zealand Te Waka Toi Awards in September. Sir Hirini was named this year's recipient of Te Tohu Aroha mo Te Arikinui Dame Te Atairangikaahu in recognition of more than half a century of contributions in education, literature, music and iwi politics.

NZ Botanical Society's Allan Mere

Dr Wendy Nelson MNZM FRSNZ was officially awarded the 2011 Allan Mere in November. The Allan Mere is awarded by the New Zealand Botanical Society to outstanding botanists to acknowledge their contribution and work.

Maclaurin Lecturer

University of Auckland mathematician **Professor Marston Conder** FRSNZ was named the first Maclaurin Lecturer. He will tour United States universities as a visiting speaker in 2012/13 and also give a plenary address to the American Mathematical Society. The Maclaurin Lectureship is a new reciprocal exchange between the New Zealand Mathematical Society and American Mathematical Society. A New Zealand and a United States-based mathematician will tour each other's countries on alternate years, with the lecturers to be chosen by both societies.

National Tertiary Teaching Excellence Award

Professor Michael Walker ONZM FRSNZ received the Supreme Award for tertiary teaching excellence in August along with a “sustained excellence in teaching in a kaupapa Māori context” award. The awards are managed and administered by Ako Aotearoa – The National Centre for Tertiary Teaching Excellence. They aim to recognise and celebrate excellence in tertiary teaching.

J. C. Andrews Award

Professor Harjinder Singh FRSNZ received the J. C. Andrews Award, the New Zealand Institute of Food Science and Technology’s (NZIFST) most prestigious award in June. The award recognises Institute members who have made a substantial contribution to science and technology and leadership in the food industry.

Honorary Degree of Doctor of Laws

Professor David Skegg KNZM OBE FRSNZ was awarded the honorary degree of Doctor of Laws (HonLLD) by the University of Otago in May. He finished his term as the University of Otago’s Vice-Chancellor at the end of July.

Dame Marie Clay Award

In August **Professor Ian Evans** FRSNZ was awarded the New Zealand Psychological Society’s Dame Marie Clay Award, which is an award for contributions to developmental psychology and psychology applied to education.

NZ Institute of Chemistry Maurice Wilkins Prize

Professor David Williams FRSNZ was awarded the 2011 NZ Institute of Chemistry Maurice Wilkins Prize for chemistry research in November.

AUT Vice Chancellor Individual Research Excellence

Professor Nik Kasabov FRSNZ was awarded the 2010 AUT Vice Chancellor Individual Research Excellence Award in March 2011.

International Awards And Appointments

President of the Royal Society of South Africa

New Zealander **Professor Don Cowan** FRSSAf Hon FRSNZ was elected as President of the Royal Society of South Africa, effective from 1 April 2011.

Prestigious NIH research grant

University of Auckland Deputy Vice-Chancellor and Liggins Institute researcher **Professor Jane Harding** ONZM FRSNZ 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 a very unusual achievement for investigators at institutions outside the US to access direct NIH funding, reflecting an NIH judgement that the project presents a special research opportunity which will lead to health benefits in the United States as well as elsewhere in the world. 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.

Fukai Medal and Humboldt Prize

Professor Peter Schwerdtfeger FRSNZ was awarded the Fukui Medal in January for his achievement in quantum chemistry, in particular for deeper understanding of quantum relativistic effects and the Humboldt Research Prize for his fundamental work in the area theoretical chemistry in March.

The Fukui Medal is awarded for outstanding theoretical/computational chemists in the Asia-Pacific region. The Humboldt Prize is given by the Alexander von Humboldt Foundation, in Bonn, Germany, to academics whose new theories, discoveries or insights have had a significant impact on their discipline and who expect to continue producing cutting-edge research in the future.

Career Contribution Award for Structural Geology and Tectonics

Professor Rick Sibson FRS FRSNZ 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.

Adrien Albert Award for Medicinal Chemistry

Professor Margaret Brimble MNZM FRSNZ was officially awarded the Adrien Albert Award for Medicinal Chemistry from the Royal Australian Chemical Institute in December. This is the premier award of the Division of Organic and Biomolecular Chemistry and is given for sustained, outstanding research in the field of medicinal or agricultural chemistry.

International Neural Network Society membership

Professor Nik Kasabov FRSNZ was elected as a Member of the Board of the Governors of the International Neural Network Society in January for a term of 2 years. He was elected Distinguished Lecturer of the IEEE (Institute for Electrical and Electronic Engineers) (2011-2013) also in January.

Kurt Gödel Research Prize Fellowship

Professor Andre Nies FRSNZ was presented with a 2011 Kurt Gödel Research Prize Fellowship Silver Medal in April. The purpose of these fellowships is to support original research in, and areas surrounding, the foundations of mathematics.

Award for distinguished contributions to basic behaviour analysis

Professor Michael Davison FRSNZ received the APA Division 25 "Distinguished Contributions to Basic Behavior Analysis" award in Washington, DC, August 2011. He gave a plenary lecture when it was awarded at the APA Convention, entitled "What reinforcers really do to behavior".

Fellow of the Institute of Mathematical Statistics

Professor Estate Khalmadze FRSNZ was elected a Fellow of the Institute of Mathematical Statistics (IMS) in April. The IMS is an international professional and scholarly society devoted to the development, dissemination, and application of statistics and probability.

John G. Haddad Jr Award

Professor Ian Reid FRSNZ was awarded John G. Haddad Jr Award by the International Bone and Mineral Society in May. The Award recognises outstanding contributions to clinical research in bone and mineral metabolism that have led to significant changes in understanding of

physiology or disease, or to changes in disease management or prevention.

Membership of Max Planck Society

Professor Paul Rainey FRSNZ was elected a Member of the Max Planck Society and External Scientific Director at the Max Planck Institute for Evolutionary Biology in March.

Editor's citation for excellence

Professor David Lowe FRSNZ was awarded the "Editor's Citation for Excellence" in July 2011 for outstanding service in 2010 as an associate editor for the *Soil Science Society of America Journal*.

Van Wijngaarden Award 2011

Emeritus Professor John Butcher FRSNZ received the Van Wijngaarden Award 2011 in February. The award is intended for scientists who have contributed significantly to their fields. John works on numerical methods for ordinary differential equations. Applications include the simulation of waves.

Inaugural Aitken Lecturer

Professor Geoff Whittle FRSNZ was selected as the first Aitken Lecturer, jointly by the London Mathematical Society and the NZ Mathematical Society. The Aitken Lectureship occurs every two years when a mathematician from New Zealand is invited by both Societies to give lectures at different universities around the UK over a period of several weeks. Geoff gave talks during October at St. Andrews, Manchester, Cambridge, QMUL and Oxford.

Fellow of Royal Society of Chemistry

Professor Sally Brooker FRSNZ was elected a Fellow of the Royal Society of Chemistry (FRSC) in July.

2011 Norman R Farnsworth Research Achievement Award

Professor John Blunt FRSNZ and **Professor Murray Munro** FRSNZ received a joint award of the 2011 Norman R Farnsworth Research Achievement Award from the American Society of Pharmacognosy at their annual meeting in San Diego in July. This was the first time in its 24-year

history that the award had ever been awarded jointly, and the first time to anyone from the southern hemisphere.

International Institute of Refrigeration's Science and Technology Medal

Dr Andrew Cleland FRSNZ received the International Institute of Refrigeration's Science and Technology Medal at the 23rd International Congress of Refrigeration in Prague in August 2011.

New Dean of the ANU College of Engineering

Professor John Hosking FRSNZ, Director of the Centre for Software Innovation and Professor of Applied Science at the University of Auckland was appointed as the new Dean of the ANU College of Engineering and Computer Science from January 2012.

Foreign member of The Royal Society of Arts and Sciences

Dr David Galloway FRSNZ was elected a Foreign Member of The Royal Society of Arts and Sciences in Gothenburg in December 2011.

Visiting Fellowships

Professor Vaughan Jones KNZM Hon FRSNZ was appointed to a Distinguished Professorship at Vanderbilt University, Tennessee, from August 2011.

Professor Nik Kasabov FRSNZ was awarded the European Union FP7 Marie Curie Fellowship (2011-2012), in March 2011, hosted by ETH Zurich and the University of Zurich.

Professor Michael Corballis ONZM FRSNZ was Visiting Distinguished Fellow of the Sage Center for the Study of the Mind at the University of California Los Angeles during May 2011.

Dr Robert Franich FRSNZ spent a sabbatical during 2011 at Wuerzburg, Germany for the NMR imaging and 1H and 13C spectroscopy at high-pressures studies.

Professor Sally Brooker FRSNZ is the holder of this year's Royal Society of Chemistry Australasian Lecturership.

Professor Leon Phillips FRSNZ was awarded a JILA Visiting Fellowship at the University of Colorado, Boulder for six months.

Professor Cliff Abraham FRSNZ is Honorary Professor at the University of Queensland, Australia until 31 December 2013.

Royal Society Awards

The following Medals and Awards for 2011 were announced in September and have been or will be awarded at a relevant local event:

The **2011 R. J. Scott Medal** in technologies associated with biological, food, natural products processing (meat, wool, dairy, skin etc) and medical practice technologies was awarded to **Professor Stephen Henry** from AUT. Professor Henry is a world leader in the field of glycoscience and has developed a unique technology that represents a step change in the ability of scientists to create, manipulate and study the effects of carbohydrate structures on intercellular processes.

The **2011 Pou Aronui Award** for distinguished service to the humanities-aronui was awarded to **Dr Jock Phillips**, Ministry for Culture and Heritage, Wellington. Dr Phillips' service to the humanities-aronui has occurred over a period of more than 30 years, and in varied settings: universities, museums and government departments; and in the context of a wide range of nationally important trusts and committees. Dr Phillips is known as a champion of the study of New Zealand, but from a perspective which is non-parochial and informed by wider international understandings.

Dr Adam Day from the School of Mathematics, Statistics and Operations Research, Victoria University of Wellington was awarded the **2011 Hatherton Award** for his paper entitled "*Increasing the Gap Between Descriptive Complexity and Algorithmic Probability*" which was published in the Transactions of the American Mathematical Society in October 2011. This paper is in the area of pure mathematics and reports a fundamental contribution to the area of algorithmic information theory, concerned with the relationship between the *a priori* probability of an event and the event's shortest descriptive length. The author has solved a 26-year-old question in the area and his work is a tour de force of lasting value. It has been described as one of the best and deepest results in algorithmic information theory.

The **2011 Hamilton Memorial Prize** was awarded to **Dr Mark Bolland**, a Senior Research Fellow in the Department of Medicine at The University of Auckland. Dr Bolland has an outstanding research record in the study of the risks and benefits for bone and cardiovascular health of vitamin D and calcium supplements. Of particular note, he was the first to show that calcium supplements increase the risk of cardiovascular accidents. He then showed in a breakthrough meta-analysis of published clinical trials that this increased cardiovascular risk abrogates the beneficial effects of

calcium supplements on fracture risk. These findings have received an immense amount of scientific and media interest, and have had a significant impact on the prescription policies for calcium supplements.

At the Royal Society's 2011 Research Honours Dinner in Wellington in November, the Society announced and awarded the winners of the following medals: Rutherford Medal; Pickering Medal; Thomson Medal; Te Rangi Hiroa Medal; Hector Medal; Hutton Medal; and the inaugural Callaghan, MacDiarmid and Humanities Aronui medals.

The country's highest science and technology honour, the **Rutherford Medal**, was awarded to biochemist **Professor Christine Winterbourn** FRSNZ from the University of Otago, Christchurch, for her outstanding achievements and discoveries in free radical biology which have established her as a leading world authority in this field. Together with the medal awarded by the Royal Society of New Zealand, she also received \$100,000 from the Government. Professor Winterbourn is the first woman to be awarded the prestigious Rutherford Medal in its 20 year history.

The top award for achievement in technology, the **Pickering Medal** and \$15,000, was awarded to **Professor David Ryan** FRSNZ, Professor of Operations Research and Deputy Dean of Engineering, at The University of Auckland, for developing technology which is at the heart of optimisation software used worldwide for solving complex logistics problems, such as airline scheduling.

The **Thomson Medal** and \$15,000 was awarded to **Mr Neville Jordan** CNZM, for his outstanding contribution to leadership in the management of science leading to the development and application of science and technology to wealth generation through his management of MAS Technology Ltd, Endeavour Capital Ltd and his role as a director of numerous spin-out companies he has supported through the latter.

The inaugural **Callaghan Medal** for outstanding contribution to science communication was awarded to **Professor Sir Peter Gluckman** FRS FRSNZ, Chief Science Advisor to the Prime Minister, for his achievement in science communication, in particular raising public awareness of the value of science to human progress.

The inaugural **MacDiarmid Medal** for outstanding scientific research that demonstrates the potential for application to human benefit was awarded to **Dr Gary Evans** of Industrial Research Limited who has pioneered the design and synthesis of new pharmaceuticals for the treatment of major diseases including gout, psoriasis and cancer of the immune system.

The **Hutton Medal** for animal sciences was awarded to **Professor Robert Poulin** FRSNZ from the University of Otago, for his leading

research in the field of parasitic diseases, especially for his work in ecological parasitology, an area of particular relevance to New Zealand's marine and freshwater ecosystems.

The **Hector Medal** for mathematical and information sciences was awarded to **Professor Rod Downey** FRSNZ from Victoria University of Wellington, for his influential and innovative work in mathematical logic.

The **Te Rangi Hiroa Medal** was awarded to **Professor Colleen Ward** from Victoria University of Wellington for her outstanding contributions to the advancement of the psychological study of immigration, acculturation, intercultural relations and cultural diversity.

The inaugural **Humanities Aronui Medal** was awarded to **Professor Jim Flynn** FRSNZ from the University of Otago for his outstanding work in political philosophy, in particular his discovery of historical gains in IQ, now known as the 'Flynn Effect'.

Academy Representation On Royal Society Of New Zealand Council

The Academy Executive Committee representatives on the Royal Society of New Zealand Council until 30 June 2011 were **Professor Keith Hunter** FRSNZ (VP Physical Sciences, Mathematics, Technology and Engineering, Chair); **Professor Ken Strongman** FRSNZ; **Dr Garth Carnaby** FRSNZ (RSNZ President); **Dr Stephen Goldson** FRSNZ (VP Biological and Life Sciences); **Professor Michael Corballis** ONZM FRSNZ; and **Professor Richard Le Heron** FRSNZ (VP Social Sciences and Humanities) were the Academy Executive Committee representatives on Council.

From 1 July 2011, **Dr Stephen Goldson** FRSNZ (VP Biological and Life Sciences, Chair); **Professor Geoff Austin** FRSNZ (VP Physical Sciences, Mathematics, Technology and Engineering); **Professor Ken Strongman** FRSNZ; **Dr Garth Carnaby** FRSNZ (RSNZ President); **Professor Michael Corballis** ONZM FRSNZ; and **Professor Richard Le Heron** FRSNZ (VP Social Sciences and Humanities) have been the Academy Executive Committee representatives on Council.

Academy Activities

Fellowship

The confirmed panels in 2011 were:

- Animal and Plant Sciences;

- Applied and Technological Sciences;
- Biochemical and Molecular Biological Sciences;
- Chemical and Physical Sciences;
- Earth Sciences;
- Ecological and Environmental Sciences;
- Engineering;
- Human and Behavioural Sciences;
- Humanities
- Mathematical and Information Sciences;
- Medical and Health Sciences;
- Social Sciences;
- Interdisciplinary Panel.

In 2011 there were 85 nominations for Fellowship, including 14 women scientists, 19 from CRIs, and 31 new nominations.

The breakdown of nominations considered (Honorary Fellowship in brackets) in 2011 was:

Animal and Plant Sciences 7

Biochemical and Molecular Biological Sciences 5

Chemical and Physical Sciences 7 (1)

Earth Sciences 7 (1)

Ecological and Environmental Sciences 8 (1)

Engineering 3

Human and Behavioural Sciences 4

Humanities 9

Mathematical and Information Sciences 7

Medical and Health Sciences 9 (1)

Social Sciences 9

Technology and Applied Sciences 8

Interdisciplinary Panel 2

Nominations for Fellowship remain eligible for election for five years.

Twelve panels met by teleconference call and recommended candidates, in priority order, in both traditional and applied areas of research. For the first time this year there was a Interdisciplinary Panel assessing nominations across disciplines, but with only 2 nominations to assess that panel did not require a teleconference. As well as providing a supporting statement on behalf of each highly recommended candidate, each panel was asked to supply the names of independent referees for each candidate as a quality control measure. The independent referees were sent the candidates' curriculum vitae, publications list, background information about the Academy and the criteria for election to Fellowship, and asked to provide an evaluation of the quality of the scientific career, the excellence of research and international reputation.

The Fellowship Selection Committee, which was an expanded Council of 25 to ensure that all areas of science, technology and the humanities are appropriately represented, received the following information on each candidate highly recommended by the 12 discipline-based Panels (a total of 33 highly recommended):

- nomination form;
- curriculum vitae;
- publication list;
- references from referees noted in nomination;
- panel supporting statement outlining the reason why the candidate is highly recommended;
- independent reference(s);

as well as a copy of the minutes of the Fellowship Selection Panel teleconference meetings where such meetings were held.

At the 2011 Fellows' Annual General meeting, 12 new Fellows in science, technology and the humanities were elected.

The new Fellows are:

- **Professor Richard Blaikie** FRSNZ, Department of Electrical and Computer Engineering, University of Canterbury – is a leading international contributor to the rapidly developing field of nano-scale optics. He has pioneered important developments, including a controversial superlensing phenomenon.
- **Professor Tony Conner** FRSNZ CRSNZ, Plant and Food Research, Lincoln – is recognised internationally for his work integrating effective genetic manipulation strategies into applied plant breeding programmes, and assessing the environmental and food safety risks of genetically improved crops. He has made major contributions to public debate on GM technology.
- **Professor Jack Copeland** FRSNZ, Department of Philosophy, University of Canterbury – is known for his pioneering work in hyper-computation (extremely powerful models of computation), the field he named in 1999. His work on the early history of electronic computing is well known.
- **Emeritus Professor Max Cresswell** FRSNZ, Department of Philosophy, Victoria University of Wellington – is a world-leading philosopher, with his principal work in logic, the study of reasoning.
- **Professor Pablo Etchegoin** FRSNZ, School of Chemical and Physical Sciences, Victoria University of Wellington – is one of the most successful condensed matter physicists worldwide, and a research leader in both experimental measurement and theory.
- **Professor Rod Gover** FRSNZ, Department of Mathematics, University of Auckland – is recognised internationally as a leading expert in geometry and its applications to analysis, differential equations, and theoretical physics.
- **John McEwan** FRSNZ, AgResearch Invermay, Mosgiel – has been the intellectual and technical driving force behind the introduction of modern molecular genetics to the New Zealand sheep industry.
- **Professor Martha Savage** FRSNZ, Institute of Geophysics, Victoria University of Wellington – is an international leader in understanding the seismology of the mantle. She excels at making intelligent use of seismic observations to form models of mantle structure and tectonic evolution.
- **Professor Susan Schenk** FRSNZ, School of Psychology, Victoria University of Wellington – is a behavioural neuroscientist specialising in drug addiction. She is currently studying the effects of drugs of abuse, including MDMA (“ecstasy”) and methamphetamine (“P”).
- **Professor Paul Spoonley** FRSNZ, College of Humanities and Social Sciences, Massey University, Albany – has developed new approaches in understanding inter-group relations, and is acknowledged for his work on anti-Semitism and political extremism, immigrant settlement, and labour markets.
- **Professor Gerald Tannock** FRSNZ, Department of Microbiology and Immunology, University of Otago – is a world-leading authority on

gastrointestinal microbes and their role in health and disease, who has pioneered the amalgamation of traditional methods with DNA-based technologies.

- **Dr Simon Thrush** FRSNZ, National Institute of Water and Atmospheric Research (NIWA), Hamilton – is an international expert on the ecology of the coastal sea floor. He has highlighted the environmental impacts of rapid sedimentation in New Zealand coastal waters.

Honorary Fellowship

In 2011 there were four nominations for Honorary Fellowship of the Royal Society of New Zealand and two were highly recommended to the Fellowship Selection Committee. One Honorary Fellow was elected by the Academy Executive Committee on recommendation from the Fellowship Selection Committee—**Dr Donna Eberhart-Phillips** Hon FRSNZ, who is working at the Geology Department, University of California, Davis, in the USA. She is a world leader in the development and application of three-dimensional seismic tomography codes (the earthquake wave equivalent of a medical CAT scan).

Donations

The Royal Society has a designated Endowment Fund, into which non-specific donations to the Academy are placed. The Academy Executive Committee gratefully acknowledges the donations made by Fellows and Honorary Fellows to the Academy's activities.

Functions

Fellowship certificates were presented during the year at functions in Auckland, Dunedin and Wellington.

Fellows' Contribution To Society Activity

Many Fellows continue to actively contribute to the Royal Society of New Zealand's activities through:

- Fellowship Selection Panels and Fellowship Selection Committee;
- Selection Committees for Academy Medals/Awards;
- James Cook Research Fellowship Assessment Panels and Selection Committee;
- Marsden Assessment Panels and Council; and

- Membership of standing and ad hoc RSNZ committees.

Fellows have also been actively involved in the preparation of scientific reports; review of scientific, technological and science education reports published by the Society; and Membership, via the Society, of government and non-government advisory committees;

These include the following:

Expert Groups

Professor Peter Barrett NZAM FRSNZ – Royal Society Expert Panel on Antarctic Sciences

Dr Clive Howard-Williams NZAM FRSNZ – Royal Society Expert Panel on Antarctic Sciences

International Union Delegates

Asian Crystallographic Association (AsCA) – Professor Ted Baker CNZM FRSNZ

International Astronomy Union (IAU) – Professor Geoff Austin FRSNZ

International Commission for Optics (ICO) – Professor John Harvey FRSNZ

International Union for Physiological Sciences (IUPS) – Professor Tony MacKnight FRSNZ

International Union for Pure & Applied Biophysics (IUPAB) – Professor David Parry CNZM FRSNZ

International Union for Pure & Applied Physics (IUPAP) – Professor John Harvey FRSNZ

International Union of Crystallography (IUCr) – Professor Ted Baker CNZM FRSNZ

Advice Papers

Dr Garth Carnaby MNZM FRSNZ – Darfield Earthquake: the value of long term research; Science as a public enterprise

Sir Peter Gluckman KNZM FRS FRSNZ – The Canterbury Earthquakes: Scientific answers to critical questions

Professor Tim Stern FRSNZ – The Canterbury Earthquakes: Scientific answers to critical questions

Professor Keith Hunter FRSNZ – The Canterbury Earthquakes: Scientific answers to critical questions

Dr Stephen Goldson FRSNZ CRSNZ- The Canterbury Earthquakes: Scientific answers to critical questions; Competition for Land Use; Ecosystem Services; Environmental Reporting

Dr Janet Grieve ONZM FRSNZ – National policy statement of indigenous biodiversity

Professor Richard Le Heron FRSNZ – Competition for Land Use; Ecosystem Services

Professor Steve Wratten FRSNZ – Competition for Land Use; Ecosystem Services; response to the Green Growth Advisory Group

Dr Robert Franich FRSNZ – Competition for Land Use;

Professor Dick Bedford QSO FRSNZ- Competition for Land Use;

Professor Roger Bowden FRSNZ- Competition for Land Use;

Dr Brent Clothier FRSNZ – Ecosystem Services; Environmental reporting

Dr Clive Howard-Williams NZAM FRSNZ – Environmental reporting

Professor Dick Bellamy CNZM FRSNZ – response to the Green Growth Advisory Group

Workshops

Professor Philip Boyd FRSNZ – Geoengineering Workshop

Dr Lionel Carter FRSNZ – Geoengineering Workshop

Dr Brent Clothier FRSNZ – Ecosystem Services Workshop

Professor Steve Wratten FRSNZ – Ecosystem Services Workshop

Speaker's Science Forum

Sir Paul Callaghan GNZM FRS FRSNZ

Access4EU project

Professor Peter Hunter MNZM FRS FRSNZ on the NZ Advisory Board for the RSNZ's Access4EU project

The Society is grateful to all who contribute to these activities; collectively they provide a major input to the work of the Society and the advice given to Government and other agencies.

Chairs' Activities

In addition to the activities mentioned earlier in this report, Professor Keith Hunter (Chair of the Academy Executive Committee until 30 June 2011) and Dr Stephen Goldson (Chair of the current Academy Executive Committee from 1 July 2011) have been active in the following activities:

- reviewing nominations for Fellowship as part of the Fellowship Selection Committee;
- selecting and recommending James Cook Research Fellowships;
- reviewing James Cook Research Fellows' annual and final reports;
- providing feedback to Gill Sutherland on various issues;
- Dr Goldson attended the Science & Technology in Society Forum 8th Annual Meeting, 2-4 October 2011 in Kyoto, Japan, on behalf of Dr Carnaby.
- Dr Goldson represents the Academy on the Site Development Working Group.