

2019 ACADEMY ANNUAL REPORT

CHAIR'S FOREWORD

The Academy celebrated the centenary of the Fellowship in 2019 with the appointment of 20 new Fellows at a ceremony held in Wellington on 14 February, followed by the New Fellows' Symposium. The diversity and range of scholarship in the academy was significantly enhanced with these appointments, which included 11 women, 2 outstanding Māori scholars and one internationally recognised for original thinking and influence on the application of the Treaty of Waitangi in our law and society. In addition, three new Honorary Fellows were inducted at the ceremony: Professor Thomas Higham, Director of the world's leading radiocarbon dating laboratory at the University of Oxford; Professor Ichiro Kawachi, based at Harvard University; and Professor Warrick Couch, based at Australia's Swinburne University of Technology.

All three Honorary Fellows joined the new Fellows and friends of the Academy at a special dinner that evening, including Dame Anne Glover, President of the Royal Society Edinburgh, who gave the after-dinner address. To recognise the Academy's centenary a cake was cut at the dinner by the oldest Fellow Dr Eddie Robertson OBE CBE FRSNZ who had turned 100 in January. A geophysicist, he was Director General of the DSIR in the last 10 years before his retirement. He was elected a Fellow in 1963.

The following day, 14 February, Dame Anne Glover contributed alongside a number of other distinguished speakers to a hui on how we might better recognise many and diverse forms of excellence in science, technology, the humanities and mātaurangi as we strive to expand the scope and relevance of the Society and Academy to all New Zealanders. This was an extremely important discussion where we could share knowledge and practice across our scholarly communities to continue to improve our processes. We can take some pride in progress to date, but ongoing effort is needed to maintain momentum and ensure processes do not slip into disciplinary homogeneity over time.

In addition to the new Fellows, six people were awarded status as Companions of Royal Society Te Apārangi in 2019. Dr Judith Bateup, John Bongard, Dr Ian Griffin, Dr Barbara Hayden and Dr Rob Whitney were inducted at a ceremony in Wellington on 30 July coinciding with Professor Lerner's Presidential Address, and Tā Tipene O'Regan was honoured at the Research Honours Aotearoa celebration in Ōtepoti Dunedin, Te Waipounamu, in October. The election or appointment as a Companion is an honour recognising outstanding leadership or sustained contributions to promoting and advancing science, technology, or the humanities in Aotearoa, and there are now 54 Companions.

The election of Fellows and Companions for appointment in 2020 was also completed, with the Fellowship Selection Committee recommending the appointment of 19 new Fellows and 1 new Honorary Fellow. The induction ceremony and Fellows' Forum will take place on 12 and 13 February 2020 in conjunction with the 54th Fellows' Forum.

Changes to the criteria for election to Companionship progressed through the Academy Executive Committee and Council in 2019, to recognise leadership in *knowledge holding* as a vital part of our research environment, and also to acknowledge the importance of mātauranga and indigenous knowledge in Aotearoa. Companions can now be nominated for their leadership in institutions or communities that hold nationally or internationally significant knowledge sources mātauranga or taongi, such as galleries, libraries, archives, museums, or within iwi communities. Knowledge transfer, including intergenerational transfer through oral traditions, can

also be recognised through Companionship. We are looking forward to seeing the size, scope and contributions of the Companionship grow through new nominations under these expanded criteria.

One of the highlights of the 2019 calendar, as with most years, was Research Honours Aotearoa, held at the Dunedin Town Hall in October. The scale and prestige of the event and the awards was outstanding again in 2019, with the presentation of Tā Tipene's Companionship at a place rooted within the heartland of the Kāi Tahu rohe deeply significant. The Rutherford Medal was presented to Distinguished Professor Jane Harding of the University of Auckland as one of our highest awards, and it is our great fortune to have Professor Harding as a new member of the Academy Executive Committee. As with the Fellowship, there was pleasing diversity in the awardees and the areas of disciplinary excellence that were celebrated with medals and awards at the 2019 RHA. One new Royal Society Te Apārangi awards was presented for the first time, the Te Rangaunua Hiranga Māori Award to recognise co-created research conducted by Māori, and a new medal celebrating excellence in invention and creation was announced, supported by Callaghan Innovation, named **Tahunui-a-Rangi** which translates as "Great Glowing of the Sky".

Academy-related activities also included contributing to the work of the Society's *Expert Advice and Practice* programme, which was highly productive in 2019 with the ongoing and extensive work of the gene editing Deliberative Panel and the production of a *Fact Sheet* on medical cannabis in the lead up to the 2020 national referendum on the legalisation of cannabis. In coordination with the Office of the Prime Minister's Chief Science Advisor (PMCSA) significant work was undertaken to produce an evidence-based summary on plastics in the environment, which has had strong uptake from schools as an education resource as well as sitting alongside the PMCSA's policy- and industry-facing work that has led to changes in the way we allow many single-use plastic products to be deployed in Aotearoa.

With all of these activities being undertaken with a degree of oversight by a part-time and voluntary Academy Executive Committee, many thanks are necessary to those who have helped to keep the work progressing. Firstly, thanks to my Deputy Chair, Tony Connor, for his help and guidance and to all the members of the newly constituted AEC. The change to six Domain Convenors from three Vice-Presidents has proven successful with the ability for voices to be heard from the wide range of disciplines in the Academy now more clearly embedded. This structure and the effectiveness of our operation as a broad academy was reinforced during a visit to a number of the separate academies in Australia early in the year, where a separate Council (ACOLA – the Australian Council of Learned Academies) is required to foster the interdisciplinary cooperation we gain naturally in our Academy. To help promote good practice across the Tasman, one of the tangible outcomes from this visit was the inclusion of relevant representatives of the Australian academies as contributing members of our Fellowship Selection Committee in 2019, a practice that will hopefully continue in future years.

Unreserved thanks must also go to the staff of Royal Society Te Apārangi for the wisdom, knowledge and hard-working dedication to the advancement of the Society's objectives. After many years of dedicated service we were sad to receive the news late in 2019 that we will lose the outstanding management and strategic expertise of Gill Sutherland, Director – Academy Operation, from March 2020. Gill has decided to move to a well-earned retirement status, to travel and have more time to commit to whanau, and we wish her every joy in the many years of happiness that lie ahead. Māku te ra e tō ana; kei a koe te urunga ake o te rā.

Richard Blaikie FRSNZ
Chair, Academy of Royal Society Te Apārangi

ACADEMY EXECUTIVE COMMITTEE AND ACADEMY REPRESENTATIVES ON ROYAL SOCIETY OF NEW ZEALAND TE APĀRANGI COUNCIL

Until June 2019

Chair:

Professor Richard Blaikie FRSNZ

Members

Professor Wendy Lerner FRSNZ

Dr Ian Brown FRSNZ

Dr Tony Conner FRSNZ

Professor Catherine Day FRSNZ

Professor Margaret Tennant FRSNZ

Professor Phillippa Howden-Chapman FRSNZ

Professor Ken Strongman FRSNZ

From 30 June 2019

Chair:

Professor Richard Blaikie FRSNZ

Members

Professor Wendy Lerner FRSNZ

Dr Tony Conner FRSNZ

Professor David Schiel FRSNZ

Professor Jane Harding ONZM FRSNZ

Professor Charlotte Macdonald FRSNZ

Professor Gaven Martin FRSNZ

Professor Stephen May FRSNZ

Professor Geoff Chase FRSNZ

FELLOWSHIP AND HONORARY FELLOWSHIP

There were 439 Fellows and 56 Honorary Fellows as at 31 December 2019.

DEATHS

The deaths of the following were noted during the year:

- Dr **George Grindley** FRSNZ, formerly of New Zealand Geological Survey, died on 2 February;
- Professor **Brian Halton** FRSNZ, formerly of Victoria University of Wellington, died on 23 February;
- Dr **David Kear** FRSNZ, formerly of DSIR, died on 5 March;
- Professor **Warren Moran** FRSNZ, formerly of the University of Auckland, died on 13 August 2019;
- Dr **Lawrie Creamer** FRSNZ, formerly of the Dairy Research Institute, died on 7 September 2019;
- Professor **Ken Strongman** FRSNZ, formerly of the University of Canterbury, died on 29 December.
- Dr **Diana Martin**, formerly of ESR, died on 31 December.

Obituaries have been, or will be lodged on the Royal Society website as they are provided.

PUBLIC HONOURS

New Year Honours 2019

Dame Companion of the New Zealand Order of Merit (DNZM)

Distinguished Professor Margaret Anne Brimble, CNZM, of Auckland, for services to science.

Queen's Birthday Honours 2019

Officer of the New Zealand Order of Merit (ONZM)

Professor Charles Ninian McGhee, of Auckland, for services to ophthalmology.

NATIONAL AWARDS AND APPOINTMENTS

Royal Society of New Zealand Medals and Awards

Awarded at Research Honours Dinner

Hosted by Royal Society Te Apārangi, the achievements and contributions of innovators, kairangahau Māori, researchers and scholars were recognised at this year's Research Honours Aotearoa at the Dunedin Town Hall in Ōtepoti Dunedin on 17 Whiringa-ā-nuku October. During this ceremony, the Society presented 17 medals and awards and the Health Research Council of New Zealand (HRC) presented three medals and awards. Tā Tipene O'Regan was also made a Companion.

The **Rutherford Medal** was awarded to Distinguished Professor **Jane Harding** ONZM FRSNZ for her pre-eminent work determining the causes of newborn conditions and long-term consequences of interventions around the time of birth. Professor Harding is based at the Liggins Institute at the University of Auckland. Her research has led to new therapies and understandings that have improved outcomes for mothers and babies around the world. She pioneered a simple treatment for low blood sugar in babies, has shown that a routine-therapy was actually causing brain damage in premature babies, and has provided some of the first evidence that the health and treatment of a pregnant woman not only influences her baby's growth, but also her baby's disease risk as an adult.

Dr **Ocean Mercier** (Ngāti Porou), Victoria University of Wellington, was awarded the **Callaghan Medal** from Royal Society Te Apārangi for her pioneering work engaging audiences in science and mātauranga Māori. Dr Mercier's science communication spans television, public talks, writing, and university teaching.

The **Thomson Medal** was awarded by Royal Society Te Apārangi to Dr **Tim Haskell** NZAM, formerly of Callaghan Innovation, for his outstanding contributions to the organisation, support and application of science and technology in New Zealand. Dr Haskell's endeavours range from developing DSIR's first computer network, implementing earthquake-safe building systems, NMR development, mānuka honey extraction and large-scale telescope componentry

Professor **Jadranka Travas-Sejdic** FRSNZ from the University of Auckland and the Macdiarmid Institute was awarded the **Hector Medal** by Royal Society Te Apārangi for an outstanding contribution to the field of advanced polymers and nanomaterials. Professor Travas-Sejdic explores the fundamental aspects of materials composed of polymers and applies these findings to create electronic devices for a wide range of biomedical applications.

Distinguished Professor **Philip Hulme** FRSNZ from the Bio-Protection Research Centre at Lincoln University was awarded the **Hutton Medal** by Royal Society Te Apārangi for advancing knowledge on how non-native plants become invasive weeds in New Zealand. Aotearoa has more non-native plant cover than almost anywhere else in the world, representing one of the most intractable issues facing New Zealand's environment. Professor Hulme's research has established that many pest plants have come from botanic gardens, ornamental nurseries and the pastoral sector and he calls exotic plants "ticking

time-bombs”. He has presented clear and practical policy recommendations, which are changing how scientists and policymakers address plant invasions worldwide.

Professor **Edwina Pio**, Auckland University of Technology, was awarded the **Te Rangi Hiroa Medal** by Royal Society Te Apārangi for her pioneering research into intersectional diversity and its implications for business, government, education and society. Professor Pio studies how the intersection of ethnicity, religion and gender impacts on – and is influenced by – the world of work.

Associate Professor **Selina Tusitala Marsh** ONZM FRSNZ, University of Auckland, was awarded the **Humanities Aronui Medal** by Royal Society Te Apārangi for her outstanding creative and scholarly work to bring the voices of Pasifika poetry to a broad audience. An acclaimed poet, Associate Professor Marsh has just finished her two-year term as New Zealand’s Poet Laureate and was the Commonwealth Poet in 2016.

Emeritus Professor **Roger Horrocks** MNZM, University of Auckland, was awarded the **Pou Aronui Award** by Royal Society Te Apārangi for his tireless work over five decades to support New Zealand culture in the creative arts. Professor Horrocks pioneered teaching Film, Television, and Media Studies in universities, just as a new film industry was emerging in New Zealand in the 1970s.

Royal Society Te Apārangi presented a new award that recognises excellent, innovative co-created research, conducted by Māori, that has made a distinctive contribution to community wellbeing and development in Aotearoa. The inaugural **Te Rangaunua Hiranga Māori Award** was presented to **Ngā Pae o te Māramatanga**, New Zealand’s Māori Centre of Research Excellence, for successful fostering and leadership that has carved out a space for community-led mātauranga Māori, te reo and tikanga Māori science research in Aotearoa. Without the infrastructure that long established disciplines have, Ngā Pae o te Māramatanga has developed and implemented new processes and structures to support Indigenous community co-created research in a tertiary environment.

Professor **Keith Gordon** FRSNZ, University of Otago, was awarded the **MacDiarmid Medal** by Royal Society Te Apārangi for his innovative use of light to understand the molecular structure of a wide range of materials from solar cells, fish oils, to plastics in the environment. He uses interactions between light and matter—known as spectroscopy—to achieve this. His research has optimised solar cells, and he has developed methods to identify the different crystalline forms of pharmaceuticals, even at the nano-scale.

Professor **Cather Simpson** FRSNZ, University of Auckland, received the **Pickering Medal** from Royal Society Te Apārangi for her pioneering research and commercialisation of innovative photonic technologies, which are addressing challenges with a New Zealand focus and global impact. Professor Simpson’s research uses ultrafast laser pulses to probe molecules in the millions of billionths of seconds after absorbing light.

Professor **Don Cleland**, Massey University, was awarded the **Scott Medal** by Royal Society Te Apārangi for making advances in the field of food refrigeration and heat pump technology. Professor Cleland has provided a suite of tools that allow accurate predictions for how a food will respond during processing, cool storage and transport. He has made advances in understanding how product shape affects rates of freezing, thawing, cooling and heating and the movement of water in and out of a food product during refrigeration.

Dr **Lee Streeter**, University of Waikato, received the **Cooper Award** from Royal Society Te Apārangi for making key advances in the theory and practice of time-of-flight imaging, a technique used in many industries to produce rapid 3D images of moving objects.

Dr **Lisa Te Morenga** (Ngāpuhi, Ngāti Whātua Ōrākei, Te Uri o Hau, Te Rarawa), Victoria University of Wellington, was awarded the **Hamilton Award** by Royal Society Te Apārangi for providing irrefutable evidence that sugar in the diet contributes to weight gain. Dr Te Morenga’s breakthrough meta-analysis

study, published in the British Medical Journal, clearly demonstrated a link between free sugars in the diet and the risk of excessive weight gain.

Dr **Bronwyn Wood**, Victoria University of Wellington, received the **Early Career Research Excellence Award for Social Sciences** by Royal Society Te Apārangi for her research on how today's young people engage as citizens – especially in the school context. Dr Wood led a team that evaluated a NCEA initiative for personal social action within the social studies curriculum.

Christian Offen, a PhD candidate at Massey University, was the winner of the **Hatherton Award** for his paper that outlines the development of a new framework to study a class of non-linear differential equations that have values at which the number of solutions changes. These equations can be used to model physical systems with tipping points or where effects lag behind causes.

Dr **Anne-Marie Jackson** (Ngāti Whātua, Ngāpuhi, Ngāti Wai, Ngāti Kahu o Whangaroa, Te Roroa), University of Otago, received the **Te Kōpūnui Māori Research Award** from Royal Society Te Apārangi for forging new knowledge at the interface of mātauranga Māori and the physical sciences. Dr Jackson studies how traditional connections with water and ocean can bring flourishing health.

The Health Research Council of New Zealand awarded the **Te Tohu Rapuora Award** to Dr **Matire Harwood** (Ngāpuhi) of the University of Auckland for her outstanding leadership and contribution to Māori health. Dr Harwood is a doctor at a busy general practice and an inspirational leader and teacher in hauora Māori, yet she has still managed to find the time to excel in a clinical research career that has improved Māori health in key areas such as asthma, stroke, heart disease and diabetes.

For excellence in translational health research, the Health Research Council of New Zealand presented the **Beaven Medal** to Professor **Richard Beasley** FRSNZ from the Medical Research Institute of New Zealand. Professor Beasley's research helped halt an epidemic of asthma deaths in New Zealand and has gone on to change the way the world manages asthma, saving hundreds of thousands of lives.

Distinguished Professor **Ian Reid** FRSNZ, Dr **Anne Horne**, and their team (University of Auckland) were awarded the **Liley Medal** from the Health Research Council of New Zealand for their significant medical breakthrough in the field of bone disease prevention. Their groundbreaking paper, published in the New England Medical Journal, could help reduce the number of older women presenting with fractures by up to half, and is leading to a global rethink of how to prevent fractures in older people.

JAMES COOK RESEARCH FELLOWSHIPS

Professor **Alexei Drummond** FRSNZ, University of Auckland, received a James Cook Research Fellowship to develop the next paradigm for scientific computing for complex biological problems through a radical upgrade and modification of the underlying algorithms and programming languages underpinning his software 'BEAST'. His research will result in a major advance in computational methods and tools for evolutionary analysis.

OTHER ROYAL SOCIETY OF NEW ZEALAND AWARDS

R.H.T. Bates Scholarship

Abi Thampi, a PhD student in the Department of Physics at the University of Auckland, was awarded the 2020 RHT Bates Scholarship for his research to develop classification models to measure the quality of meat non-invasively in real time and to detect different types of cancer cells in skin.

Raewyn Good Study Award for Māori and Pasifika Social Science Research

The 2019 Raewyn Good Study Award for Māori and Pasifika Social Science Research was awarded to **Jade Harvey** from the School of Hospitality, Tourism and Events at AUT to assist with her research project “Augmented reality aiding the development of indigenous place narratives and capturing te ao Māori for the use of Māori tourism development in Tāmaki Makaurau.”

Sir Hugh Kawharu Scholarship for Innovation in Science

The Sir Hugh Kawharu Scholarship for Innovation in Science for the 2020 academic year was awarded to Shannon Bentley (Ngāti Kahungunu ki Waipara, Mureti). Shannon is embarking on her thesis year as part of her MSc majoring in Ecology and Biodiversity, during which she will be measuring how microbial and plant diversity link to ecosystem function. Shannon also has a special interest in wetland and river restoration, in part reflecting her background growing up on her family farm.

Charles Fleming Senior Scientist Award

Professor Wendy Nelson FRSNZ, NIWA and University of Auckland, received funding towards her study of coralline algae. Her research will involve travel to European herbaria collections for repatriation and identification of New Zealand coralline algal type material.

Charles Fleming Publishing Award

Dr **Philip Simpson**, Director of the Project Janszoon Trust, was awarded funding to assist with the publication of a book entitled “*Remarkable Plants of Aotearoa New Zealand*” which will provide an accessible introduction to the distinctive plant life of New Zealand by introducing readers to 20-25 of our most remarkable plants.

Dr **Carl Wardhaugh**, SCION, was awarded funding to assist with the publication of a comprehensive photographic guide on New Zealand beetles, covering at least one species from every beetle family (85 in total) and subfamily (215) that occurs in New Zealand.

Dr Bridget Stocker, Victoria University of Wellington, was awarded funding to assist with the publication of a collection of fictional short stories based on fact called “*Radium—a love story*” focusing on women in science covering a variety of disciplines.

NATIONAL AWARDS AND APPOINTMENTS

Mary Boyd Prize

Professor **Charlotte Macdonald** FRSNZ was awarded the Mary Boyd Prize for best journal article 2018-2019 by the New Zealand Historical Association in November.

Inaugural Gold Medal Award for Cardiology

In June Professor **Harvey White** FRSNZ was presented with the ‘Inaugural Gold Medal Award’ at the annual scientific meeting of the Cardiac Society of New Zealand for outstanding contribution to cardiology.

Kennedy-Wunsch Lecturer

Professor **John Chen** FRSNZ was invited to present the IChemE-NZ flagship lecture, the Kennedy-Wunsch lecture, for 2019. This lecture series celebrates the work of two of New Zealand’s most distinguished

chemical engineers.

New Zealand Music Award

The CD of **Professor Terence Dennis** FRSNZ entitled 'Distant Beloved' with tenor Simon O'Neill won the NZ Music Awards Classical section in November 2019. The CD was released internationally on the Decca label in February 2019, and features German song-cycles and Lieder for voice and piano by Beethoven, Wagner, Richard Strauss and Schumann.

Science New Zealand National Award

Dr **Brent Clothier** FRSNZ was awarded the individual/Lifetime Award Achievement Award at the 2019 Science New Zealand National Awards in December for his outstanding contribution to advancing New Zealand's environmental and economic well-being.

Science and Technology Wellingtonian of the Year

Professor **Brett Delahunt** FRSNZ received the award of Science and Technology Wellingtonian of the Year for 2019 in November.

Research and Teaching Awards

In March **Professor John Creedy** FRSNZ was awarded a Victoria University of Wellington Research Excellence Award.

Dr **Nick Mortimer** FRSNZ was made an Honorary Research Professor, University of Otago, in December.

Professor **Barry Scott** FRSNZ was awarded the Massey University Research Medal for *Exceptional Citizenship Whaowhia Ngā Kete O Te Wānanga* in July.

Professor **Jason Tylianakis** FRSNZ received a University of Canterbury Research Medal in November.

Professor **Ian Reid** FRSNZ received a Career Achievement Award from the Australian and New Zealand Bone and Mineral Society in October.

Professors **Greg Cook, Sally Brooker, Philippa Howden-Chapman, Hamish Spencer, and Jacinta Ruru**, all Fellows, were made Inaugural Sesquicentennial Distinguished Professors (2020-2024) at the University of Otago in October.

Professor **Geoff Chase** FRSNZ was awarded a University of Canterbury Innovation Medal in November.

Professor **Marston Conder** FRSNZ was awarded a University of Auckland Research Excellence Medal in May.

Fellowships and Memberships

Dr **Nick Mortimer** FRSNZ was made an Honorary Life Member of the Geoscience Society of New Zealand in November.

Professor **Jillian Cornish** FRSNZ was made a Fellow of International Combined Orthopaedic Research

Societies (ICORS) in July 2019.

Royal New Zealand Institute of Horticulture Research Award

Professor **Helen Leach** FRSNZ received an Associate of Honour of the Royal New Zealand Institute of Horticulture in October. The citation and accompanying article was published in the *New Zealand Garden Journal (Journal of the Royal New Zealand Institute of Horticulture)* in the June 2019 issue (published in October).

New Zealand Women of Influence Awards

Distinguished Professor Jane Harding FRSNZ was the Winner of the Science, Health and Innovation category and Supreme Award at the Women of Influence Awards in November.

Professor **Anne-Marie Brady** FRSNZ was awarded the NZ Women of Influence Global Influence Prize in November.

Business awards

Professor **Margaret Brimble** FRSNZ was awarded the Kiwinet Research Commercialisation Award, BNZ Supreme Award and Baldwins Researcher Entrepreneur Award in August; and the Zonta NZ Woman of Achievement Award in November.

NZ Society for Oncology Translational Research Award

Professor **Parry Guilford** FRSNZ received the NZ Society for Oncology Translational Research Award in October.

Edward Kidson Medal

Professor **Kevin Trenberth** Hon FRSNZ received the Edward Kidson Medal from the Meteorological Society of New Zealand in November.

Professor **Susan Schenk** FRSNZ was awarded a Fulbright Senior Scholars Award which started in November.

INTERNATIONAL AWARDS AND APPOINTMENTS

Foreign Member of the Chinese Academy of Engineering

In January, Dr **Brent Clothier** FRSNZ had elected as an Academician (Foreign Member) of the Chinese Academy of Engineering (Agricultural Division), one of 29 elected in this 2019 biennial round and the first New Zealand member in the Chinese Academy of Engineering.

Distinguished Scholar at the National Center for Atmospheric Research (NCAR)

Professor **Kevin Trenberth** Hon FRSNZ was appointed a Distinguished Scholar at the National Center for Atmospheric Research (NCAR). The NCAR Distinguished Scholar program offers the highest honours that can be bestowed upon NCAR scientists who are either retired or in a part-time phased-retirement position.

American Chemical Society Medicinal Chemistry Division Hall of Fame

Professor Margaret Brimble FRSNZ was inducted into the American Chemical Society Medicinal Chemistry Division Hall of fame in September.

Elizabeth W Jones Award for Excellence in Education

Professor **Bruce Weir** Hon FRSNZ was awarded the 2019 Elizabeth W Jones Award for Excellence in Education from the Genetics Society of America.

Distinguished Achievement Award from the Australasian Sleep Association

Professor **Philippa Gandar** FRSNZ received the 2019 Distinguished Achievement Award from the Australasian Sleep Association.

Axford Medal

The Asia Oceania Geosciences Society awarded the 2019 Axford Medal to Professor **Andrew P. Roberts** Hon FRSNZ for “**ground-breaking contributions and leadership in rock, paleo-, and environmental magnetism, and for mentorship of emerging researchers in Asia, Oceania, Europe, and the Americas.**”

Ben Cullen Prize

Professor **Charles Higham** FRSNZ and his son Professor **Tom Higham** Hon FRSNZ were among the authors who were awarded the 2019 Ben Cullen Prize for the article: Castillo, C.C., **C.F.W. Higham**, K. Miller, N. Chang, K. Douka, **T.F.G. Higham** & D.Q. Fuller 2018. Social responses to climate change in Iron Age Northeast Thailand: new archaeobotanical evidence. *Antiquity* 92, 1274-91.

John H. Martin Award

The Association for the Sciences of Limnology and Oceanography presents the John H. Martin Award to one paper each year that has led to fundamental shifts in research focus and interpretation of a large body of previous observations. The 2019 John H. Martin Award for “**A mesoscale phytoplankton bloom in the polar Southern Ocean stimulated by iron fertilization**” was presented to lead author Professor **Philip Boyd** FRSNZ on behalf of several co-authors.

Ryoji Noyori ACES Award

Professor **Martin Banwell** Hon FRSNZ was the winner of the second Ryoji Noyori ACES Award. The award is the highest honour given by the Asian Chemical Editorial Society and recognises outstanding work in chemistry.

Neural networks accolades

Professor **Nikola Kasabov** FRSNZ was elected President of the Asia-Pacific Neural Network Society (APNNS) for 2019. He was also awarded the Best paper award for 2016 of the prestigious journal Neural Networks, Elsevier, announced July.

Matthew Flinders Medal

In May Professor **Dick Manchester** Hon FRSNZ was awarded the Matthew Flinders Medal and Lecture for 2019 at the Annual Meeting of the Australian Academy of Science. The Matthew Flinders Medal recognises lifetime achievement in the physical sciences and is awarded by the Academy every two years.

Fellowships, Memberships, Lectureships and Honorary Degrees

Professor **Michael Murphy** Hon FRSNZ was elected a Fellow of the Academy of Medical Sciences in May.

Dr **Nick Mortimer** FRSNZ was made an Honorary Associate, University of Sydney, in May.

Professor Dr **Digby Macdonald** Hon FRSNZ made a member of the EU Academy of Sciences in January.

Professor **Nik Kasbov** FRSNZ was elected a Fellow of the International Neural Network Society (INNS) College of Fellows in July.

Professor **William R. V. Clark** Hon FRSNZ was elected a Fellow of the American Association of Geographers in April.

Professor **Warwick Vincent** Hon FRSNZ was awarded the distinction of 'Helmholtz International Fellow' by the Helmholtz Association of Germany in October.

Professor **Valery Feigin** FRSNZ was elected a Foreign Fellow of the Russian Academy of Sciences in November.

Professor **Geoff Chase** FRSNZ was appointed Consulting Professor at the Dept of Astronautics, Northwest Polytechnical University (NPU), Xi'an, China in 2019.

Professor **Janet Holmes** FRSNZ received an Honorary degree (Doctor of Letters) from the University of Warwick in July.

Professor **John Windsor** FRSNZ was elected Ad Hominum Fellow of the Royal College of Surgeons, Edinburgh in July and British Journal of Surgery Lecturer, AUGIS, Liverpool in September.

Professor **Margaret Brimble** FRSNZ was the Sosnovsky Distinguished Lecturer (University Wisconsin, Milwaukee) in March; and delivered the Dewar Lectureship (Queen Mary University London) also in March.

Asian Pacific Society of Respiratory Medal

Professor **Richard Beasley** FRSNZ was awarded the Asian Pacific Society of Respiratory Medal in November.

Crampton Point, Antarctica

Professor **James Crampton** FRSNZ had a geographical feature in the Antarctic named after him in 2019. The citation states: "Crampton Point (62°34'00"S, 60°37'17"W); Promontory on the north coast of Livingston Island, South Shetland Islands, 3 km NE of Snow Peak and 10 km SE from Black Point. Named in association with other features named for British Antarctic Survey Geologists and Polar Guides who worked on Livingston Island.

ACADEMY ACTIVITIES

Fellowship

Six Fellowship Evaluation Panels were confirmed in 2019:

- Biological and Environmental Sciences;
- Health and Medical Sciences;
- Humanities
- Physical, Earth and Mathematical Sciences
- Social and Behavioural Sciences;
- Technology, Applied Sciences and Engineering.

In 2019 there were 154 nominations for Fellowship, including 58 women scientists, and 29 new nominations. There were three nominations for Honorary Fellowship.

The breakdown of nominations considered (Honorary Fellowship in brackets) in 2019 was:

• Biological and Environmental Sciences	21
• Health and Medical Sciences	33
• Humanities	26
• Physical, Earth and Mathematical Sciences	30 (3)
• Social and Behavioural Sciences	24
• Technology, Applied Sciences and Engineering	20

All six panels met by ZOOM videoconference calls and recommended candidates in both traditional and applied areas of research. The Academy Executive Panel assessed 52 nominations that had specific nature.

The Fellowship Selection Committee, which was an expanded Academy Executive Committee of 25 to ensure that all areas of science, technology and the humanities are appropriately represented, received information, via the online portal, on each candidate highly recommended by the 6 discipline-based Panels plus the Academy Executive Panel (a total of 48 highly recommended Fellowship nominations and two Honorary Fellowship nominations). Because of the large number of nominations to be assessed, the meeting carried over until the second day.

NEW FELLOWS 2019

Nineteen new Ngā Ahurei a Te Apārangi Fellows and Ngā Ahurei Honore a Te Apārangi Honorary Fellows have been elected to the Academy of the Royal Society Te Apārangi for their distinction in research and advancement of science, technology or the humanities.

The new Fellows are as follows:

Associate Professor Mark Sagar, CEO Soul Machines Ltd and Auckland Bioengineering Institute, University of Auckland

Mark Sagar is a pioneer in the computational modelling of the face. His early work simulating facial appearance and movement received two scientific and technical Academy Awards. His later research has gone deeper under the skin, simulating facial musculature, behavioural circuits, and the motivating cognitive processes. Mark is re-imagining how people interact with technology, humanising it in appearance and in the way it processes information.

Professor Valery Feigin, Auckland University of Technology

The research findings of Valery Feigin have had profound international impact, changing our understanding of stroke and traumatic brain injury prevention and epidemiology. His research has had significant implications for health care services, research planning and priority setting and significantly has resulted in changes in the World Health Organisation International Classification of Diseases 11th revision.

Professor Caroline Crowther, Liggins Institute, University of Auckland

Caroline Crowther is a maternal fetal medicine subspecialist recognised internationally for her landmark, large, multicentre clinical trials and translation of research findings into guidelines, practice and policy change, leading to improved maternal and perinatal health worldwide. Her work has changed care for women before preterm birth and for diabetes in pregnancy, and has led to substantially reduced death, disability and cerebral palsy in their newborn babies.

Professor Tim Mulgan, University of Auckland

Tim Mulgan is a significant international scholar in moral philosophy and philosophy of religion. He has made original contributions to discussions about the demands of morality, our obligations to future people, the moral significance of climate change, the purpose of the universe, and our place in the cosmos. Tim's work has influenced other scholars in philosophy, and also in related disciplines including theology, development studies, environmental studies, political theory, institutional design and public health.

Dr Philip Barnes, NIWA

Philip Barnes is an internationally recognised marine scientist who uses geophysical and geological methods to unlock the secrets of the Earth beneath the seabed. Over the past three decades, his expansive research into New Zealand's undersea environment has revolutionised our perspective of the fault lines and active tectonic processes that shape New Zealand and its surrounding seafloor. His insights underpin numerous discoveries regarding the dynamic nature of our tectonic plate boundary.

Professor Elaine Reese, University of Otago

Elaine Reese is a world-leading expert on autobiographical memory. She began her career with the ground-breaking discovery that the way in which mothers and young children talk about the past has long-lasting effects on a child's memory development. Over the years, she has expanded her research to include studies with older children and adolescents, tracing the role of maternal reminiscing practices in the development of children's narrative skill, self-concept, and wellbeing over significant periods of development. More recently, in work with Māori families, she has documented how cross-cultural differences in maternal reminiscing are reflected in children's emerging life stories.

Associate Professor Selina Tusitala Marsh, University of Auckland

Poet Laureate and scholar Selina Tusitala Marsh ONZM from the University of Auckland is renowned for her outstanding creative and scholarly contribution to Pacific literature and Pacific Literary Studies. Her poetry has appeared on the Top 5 NZ Best Seller List and NZ Listener's Best 100 Books, in Best New Zealand Poems, in the prestigious The Poetry Archive (UK), and on the renowned US Poetry Foundation website. She was appointed New Zealand Poet Laureate (2017-2019). A notable scholar and teacher, and hailing from the islands of Samoa and Tuvalu on her mother's side, Selina has produced a distinctive style of Pacific literary criticism, developed Pacific pedagogies for teaching literature, and mentors Māori and Pacific students.

Professor Ronald Fischer, Victoria University of Wellington

Ronald Fischer is one of the leading cross-cultural psychologists in the world. His work is interdisciplinary, focussing on the interplay between cultures and individuals, and his pioneering work has led to major advances in the study of norms and values, and the evolutionary functions of ritual.

Professor James Crampton, GNS Science and Victoria University of Wellington

James Crampton is the leading authority on New Zealand Cretaceous paleobiology, biostratigraphy and paleo-environments. His research informs us about life before the last great extinction. He is internationally recognised for his diverse research including systematic paleontology; morphometrics; physical drivers of evolution; dynamics of diversity; macroecology; biogeography; and biostratigraphy. His

work in leading international journals synthesises geological, ecological and macroevolutionary processes, and achieves an impressive level of quantitative and analytical rigour.

Professor Jillian Cornish, University of Auckland

Jillian Cornish is an international leader and educator in bone biology and its application to orthopaedic research. She has identified a series of key bone regulatory molecules, thus elucidating important pathways in normal bone biology such as the close relationship between fat cells and bone cells as well as providing bone growth factors for potential use in orthopaedics. Her current orthopaedic collaborations have the potential to alter clinical outcomes for patients with severe skeletal injuries and bone cancers.

Professor Brendan Hokowhitu, University of Waikato

Brendan Hokowhitu (Ngāti Pūkenga) is a pioneering Māori scholar who has helped define the globally nascent field of Indigenous Studies. His intellect, originality in thinking and depth of knowledge are demonstrated in his expansive publications creating the sub-fields of Indigenous Masculinities, and Indigenous Sport and Physical Education, and are significantly contributing to sub-fields of Indigenous Critical Theory, Indigenous Media, and Indigenous Wellbeing. Uniquely, he has become the Dean of two Indigenous Studies faculties in two different countries (Canada and New Zealand), which is a testament to his international peer recognition.

Dr Kelvin Berryman, GNS Science

Kelvin Berryman QSO is one of the foremost pioneers and international experts in active tectonics and seismic hazard assessment. His research has increased fundamental understanding of the processes and hazards to society associated with plate boundary zones and he has communicated this knowledge to the public, government agency staff and elected officials. He has played a pivotal role in the response and recovery from the Canterbury earthquakes, bringing research knowledge to the fore in decision-making.

Professor Merryn Gott, University of Auckland

Merryn Gott is internationally recognised for the critical social science lens she brings to addressing what the World Health Organisation describes as “one of the most significant public health challenges of the 21st century”, namely the need to reduce suffering at the end of life. Her evidence has informed practice and policy in Aotearoa New Zealand, the UK, the United States and Canada, ultimately leading to positive impact for patients and whānau. Her work has also led to theoretical and methodological advances in palliative care research internationally. She directs the only bicultural palliative care research group internationally, recognised as world-leading for its equity focus.

Professor Rewi Newnham, Victoria University of Wellington

Rewi Newnham (Ngāpuhi) is an outstanding researcher and educator in studying past and present environmental and climatic conditions and modern changes, primarily through analyses of pollen records (palynology). His wide-ranging work includes studies of New Zealand’s past climates and their controls and links to global climate change, using pollen analysis to determine human and volcanic impacts on the environment, and contemporary effects of pollen on human health. He draws on his roots in Ngāpuhi iwi to build links between science and mātauranga Māori and to help New Zealanders understand the factors that affect environmental change.

Professor Nicola Dalbeth, University of Auckland and Auckland District Health Board

Nicola Dalbeth is a rheumatologist and professor of medicine who leads a research programme in gout, an arthritis of major relevance to Aotearoa New Zealand. Her work has identified novel mechanisms of disease and defined treatment approaches for gout. In addition, she has led international initiatives to define central concepts of gout, including nomenclature of disease, disease staging, and outcome measures. Her research in both pharmacological and non-pharmacological treatments has been incorporated into international gout management guidelines.

Professor Philip Seddon, University of Otago

Philip Seddon is an outstanding conservation biologist and founding member of the expanding field of Reintroduction Biology. His work improves the practice, scientific underpinnings and success of species translocations globally. He has key leadership roles within specialist groups of the International Union for Conservation of Nature. His publications, including key papers in flagship journals such as *Nature Ecology & Evolution*, *Science*, *Conservation Biology*, and *Trends in Ecology and Evolution*, have shaped international conservation policy.

Professor Astrid an Huef, Victoria University of Wellington

Astrid an Huef is a highly regarded pure mathematician working in functional analysis, the type of analysis that deals with infinite-dimensional phenomena. Her focus ranges broadly from operator algebras associated with various dynamical systems, to operator algebras associated with combinatorial objects such as graphs and semigroups, and to purely algebraic analogues of the latter. The breadth, depth and quality of her research is illustrated by her international collaborations, peer esteem, the external funding she has received and the quality of the journals she publishes in.

Professor Anne-Marie Brady, University of Canterbury

The research of Anne-Marie Brady on Antarctic politics, China's polar interests, and the Chinese Communist Party's domestic and foreign policy, in particular, foreign interference activities, has been a catalyst contributing to policy adjustments by governments from the USA, to New Zealand, Australia, the UK, Canada, and the EU. Her research has been publicly praised by Hillary Clinton and Marco Rubio. Her testimony on Antarctica and China is recorded in Hansard in the Australian Parliament, as well as in several reports on Antarctica prepared for the Australian government. Her policy advice helped spark an inquiry into foreign interference in the New Zealand parliament. Her research on small states in the changing global order has assisted New Zealand and other small state governments with contestable policy advice.

NEW HONORARY FELLOW 2019

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

Distinguished Professor John Dudley, University of Bourgogne-Franche Comté France

John Dudley has made sustained and exceptional contributions to science through pioneering research in optical physics and global science advocacy. After attending high school in Mangere, South Auckland, he received his PhD from the University of Auckland in 1992, where he subsequently lectured from 1993 to 2000. He then moved to France where he is now Distinguished Professor at the University of Burgundy-Franche-Comté and the CNRS research institute FEMTO-ST. He has made groundbreaking discoveries in the science of ultrafast lasers, nonlinear optics and extreme waves, with highly cited publications (many of which are co-authored with New Zealand researchers), and numerous international awards and distinctions. He is equally committed to education, and has initiated major science communication initiatives with the United Nations and UNESCO that have reached hundreds of millions worldwide.

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 and pins were presented to Fellows newly elected in November 2018 at the Academy Centenary Dinner in February in 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; Membership of Vice Presidents' Advisory panels and ad hoc RSNZ committees; 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.

The Society acknowledges the help of the following Fellows and Honorary Fellows:

Expert advice

Cannabis: How it affects our health

- Professor Richard Beasley – contributor and reviewer

Fair futures

- Professor Philippa Howden-Chapman – Panel member

Gene editing

- Professor Alexei Drummond – Panel member
- Professor Gary Hawke – Panel member
- Professor Mark Henaghan – Panel member
- Professor Stephen Robertson – Panel member
- Professor Barry Scott – Panel Chair
- Professor Lisa Matisoo-Smith – Panel member

Plastics in the Environment

- Professor Debes Bhattacharyya – contributor and reviewer
- Dr John McKinnon – contributor and reviewer
- Professor Jadranka Travas-Sejdic – contributor and reviewer

The Effective and Ethical Development of Artificial Intelligence: An Opportunity to Improve Our Wellbeing /

The Age of Artificial Intelligence in Aotearoa

- Professor Mark Sagar – AI video material
- Professor Mengjie Zhang – contributor and reviewer

Parliamentary Speaker's Science Forum

- Associate Professor Mark Sagar - Artificial Intelligence and autonomous systems