



Australian Academy of Science

AUSTRALIAN ACADEMY OF SCIENCE ANNUAL REPORT 2013–14



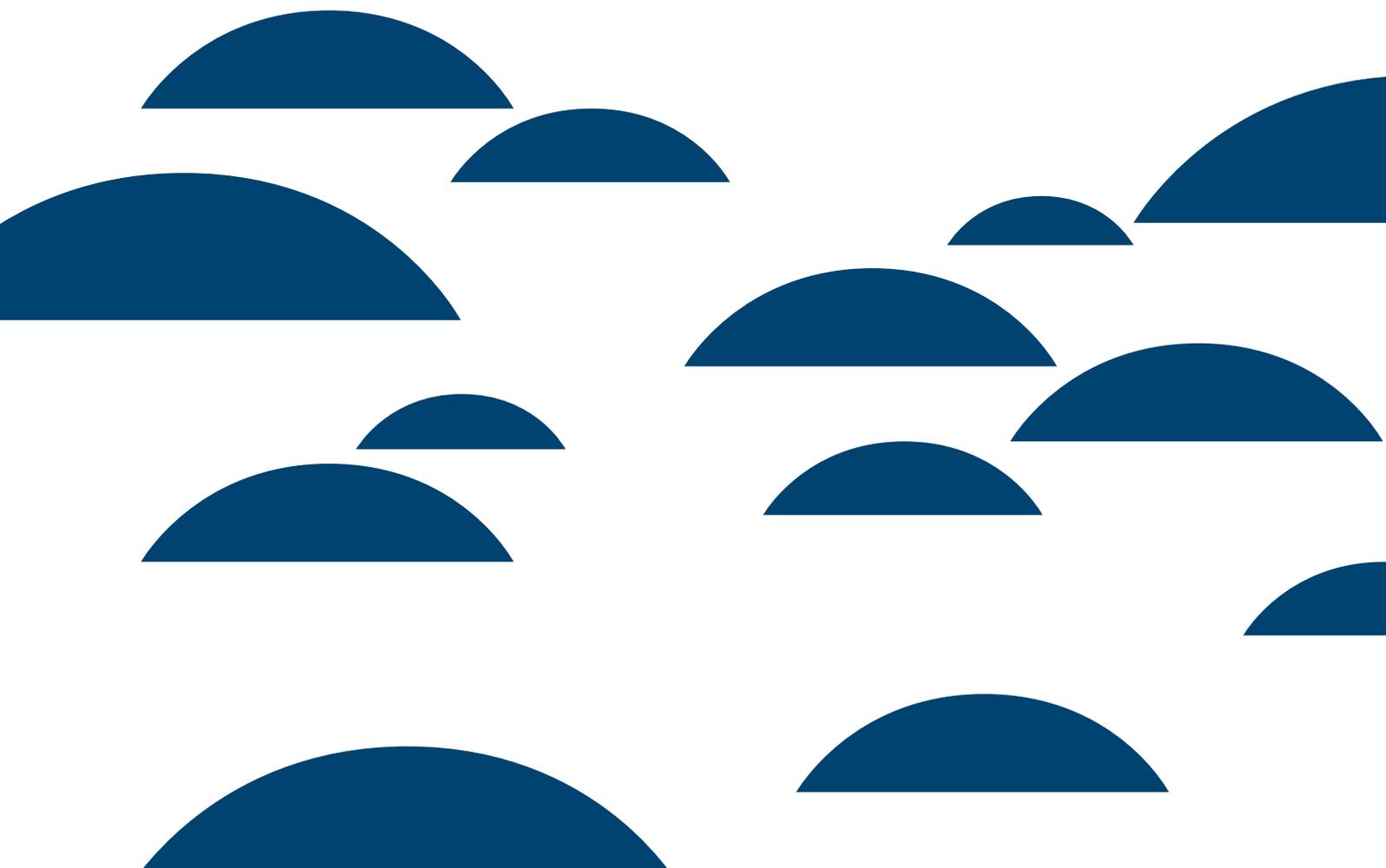
1 APRIL 2013 – 31 MARCH 2014



Australian Academy of Science

AUSTRALIAN ACADEMY OF SCIENCE ANNUAL REPORT 2013–14

1 APRIL 2013 – 31 MARCH 2014



OBJECTIVE A
**PROMOTE EXCELLENCE IN
SCIENTIFIC RESEARCH
NATIONALLY AND
INTERNATIONALLY**

OBJECTIVE B
**DEVELOP AND
SUSTAIN A NATIONAL
SCIENTIFIC CULTURE**

OBJECTIVE C
**PROVIDE VALUED
INDEPENDENT SCIENTIFIC
ADVICE TO ASSIST POLICY
DEVELOPMENT AND
PROGRAM DELIVERY**

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CONTENTS

President's foreword	1
Chief Executive's foreword	4
Council and administration	5
The Fellowship	7
Supporting the Academy	13
Strategic plan 2010–15	15
PROMOTING EXCELLENCE IN SCIENTIFIC RESEARCH	17
1. Identifying priorities for discipline development	18
2. Providing career development opportunities for young researchers	21
3. Promoting support for the best Australian scientific research	24
4. Promoting Australian science internationally	27
DEVELOPING AND SUSTAINING A NATIONAL SCIENTIFIC CULTURE	33
5. Recognising and awarding scientific excellence	34
6. Supporting the teaching of science	39
7. Fostering discussion and debate on significant scientific issues	46
PROVIDING VALUED INDEPENDENT ADVICE	59
8. Working with others to provide expertise on scientific matters	60
9. Providing authoritative advice to inform policy and decision-making	62
10. Monitoring and communicating scientific developments	66
ACADEMY INFRASTRUCTURE	69
APPENDICES	73
1. Reports from Regional Groups	74
2. Australian voting delegates for international meetings	75
3. Australian executive committee members of international organisations	76
4. Proposed expanded National Committee links to international organisations	76
5. Printed and digital publications	78
6. Editors-in-chief of Academy–CSIRO Australian Journals of Science	80
7. Impact of Academy submissions to consultations, reviews and inquiries	80
8. Support for Academy activities	82
ABBREVIATIONS	84
ACADEMY CONTACTS	86

PRESIDENT'S FOREWORD

Often in the busy-ness of the day to day, as we focus on the detail of the urgent task in front of us, we can lose sight of the full picture. This *Annual Report* provides a summary of that bigger picture, and for the first time it is being presented in the context of the objectives and strategies of the Academy's Strategic Plan. I believe the new format better represents the relevance and effectiveness of the work of the Academy and I commend the report to you.

60 YEARS

This year marks the 60th anniversary of the founding of the Academy — an organisation of which I am immensely proud to be a part. In February 1954, at a private ceremony at Government House in Canberra, Her Majesty Queen Elizabeth II presented the founding Fellows with the Royal Charter that established the Academy. Our foundation Fellowship numbered just 23, but what a 23 they were! The likes of Mawson, Martyn, Rivett, Oliphant, Eccles, Burnet and Pawsey — and their peers — graced the first page of the new Charter book with their signatures. Today's fellowship is 20 times that size, but the calibre of scientists who make up its number is no less great than that of those founding fathers. The diversity of our modern-day Fellowship and the breadth of our activities and reach would be unrecognisable to Professors Oliphant and Martyn — who first conceived of an Australian Academy — but its spirit and achievements match their ambition.

I wonder if the foundation Fellows knew quite how the Academy and its work would grow and evolve. We've been advising governments and fostering international scientific relations for 60 years, holding research conferences and symposia for 59 years, publishing educational resources and contributing to the professional development of teachers for 50 years, and staging public lectures for nearly 30 years. In each of these areas — and many others — we have continued to broaden our scope and



reach. Our volume of work has expanded considerably, but the work we do today is, like science itself, built upon the work of those who have gone before us.

THE FELLOWSHIP

Science today is very different from 60 years ago and it is appropriate — indeed essential — that our Fellowship better reflects the diversity of the modern scientific workforce. In particular, we must ensure that we have a higher representation of women and younger researchers and that we recognise achievement in new disciplines and across traditional discipline boundaries. Accordingly, we worked hard this year to refine and further improve our processes for election and honorific awards.

We also implemented the recommendations arising from the review of the National Committees for Science — this major undertaking will result in a committee structure that better reflects and responds to the needs of science in Australia.

EARLY- AND MID-CAREER RESEARCHERS

An important part of our work to build and sustain a strong, diverse scientific workforce is our encouragement for scientists who are in the first half of their career. Thus the Academy is proud to support and nurture the Australian Early- and Mid-Career Forum, which has gone from strength to strength in its short life, and is now providing policy submissions to agencies, holding professional development activities and advising the Academy on career issues for young researchers. I shall watch with interest as the Forum continues to flourish and expands its national reach.

INFLUENCING OUTCOMES FOR SCIENCE

Some of the most important work of the Academy is difficult to quantify and takes place against an ever-shifting background. I refer, of course, to our representations to government and the influence these have on policy outcomes.

This year the Academy has provided eight formal submissions and expert reports to government reviews and inquiries, in a range of strategic areas, from the National Commission of Audit to the future of computer science.

A great deal of our advocacy work occurred not through formal submissions or public statements, but through many private meetings and conversations with our elected representatives, their staff and departmental officials. As 2013 was a federal election year, it was particularly important to advocate for science. To launch our pre-election statement, I gave a televised address at the National Press Club — during which the Academy became a nationally trending topic on Twitter for the first time. The Secretary for Science Policy also received extensive media coverage as he outlined our priorities for science using the platform of a popular survey of science literacy in Australian adults.

This year the Academy was also instrumental in establishing the Research Alliance, a grouping of lead organisations representing hundreds of thousands of researchers across business and industry, universities and medical research institutes from around Australia. Formed to give a united voice to issues of common concern, the Alliance called for a strategic national research policy to build a stronger, smarter nation in the lead up to and post the election.

SCIENCE EDUCATION

Our school science education programs have achieved some significant milestones this year. In May 2013 *Primary Connections: Linking science with literacy* completed the full suite of units needed to implement the national science curriculum in primary schools. I am pleased to report that 70% of all Australian primary schools have now purchased at least one *Primary Connections* curriculum unit. I would like to see that grow, to see every primary teacher in the nation trained to use *Primary Connections* as a critical adjunct to their teaching. In November 2013 we officially launched the first tranche of *Science by Doing* units and secured the funding needed to complete all the units required for junior secondary school science. Already 8946 teachers and students have registered to access the portal and are providing enthusiastic feedback.

INTERNATIONAL

Despite the absence of a formal government program to support international research collaboration, the Academy has administered a number of bilateral exchange programs and organised workshops to identify opportunities for joint research activities. A particular highlight was the China–Australia symposium on astronomy and astrophysics in Nanjing, which marked the 10th in this annual series and, impressively, 50 years since the beginning of the Academy's relationship with the Chinese Academy of Sciences, a relationship that preceded formal ties between our nations.

COMMUNICATING THE WORK OF THE ACADEMY

The Academy should be, and be seen to be, the most significant voice for science in the nation. Accordingly, we have enhanced our efforts towards better informing the wider community and the Fellowship about our activities — our website is refreshed daily with news of our activities and the achievements of our Fellows; Academy news is also disseminated daily through our Facebook and Twitter accounts; our talks and events are broadcast through YouTube; our ideas and achievements feature regularly in the news media; and the quarterly newsletter has transformed into an interactive electronic newsletter. Additionally, Fellows receive email notification of events, media announcements, awards and elections, and the passing of peers.

VALE

It is with sadness that I report we have lost six of our esteemed peers this year. To the family and friends of these Fellows (see page 12), I offer my sincere condolences. They will certainly be missed.

OUR CHALLENGE

As I reflect not just on this year, but on the duration of my four-year term as President, I feel immense pride in the work of the Academy. Ours is a vital mission: to champion Australian scientific excellence, to promote and disseminate scientific knowledge, and to provide independent scientific advice for the benefit of Australia and the world. In striving to fulfil this mission, we reach out to the governments, scientists, students and the Australian community every day, in many ways. Our activities and programs

are comprehensive and professional. They are brought to fruition by a highly talented and dedicated Secretariat, by the Executive Committee and Council, and by individual Fellows who give generously of their time and expertise. It has been a privilege to work alongside you.

In handing over the baton, I urge all of you to become fully informed about our work and to serve as ambassadors for the Australian Academy of Science. I also encourage more of you to become actively engaged in Academy activities, both at the state and national level. I wish the incoming President, Professor Andrew Holmes, great success in carrying forward our mission — I am confident he will lead with wisdom, energy and distinction.

Suzanne Cory AC PresAA FRS

CHIEF EXECUTIVE'S FOREWORD

The first object of the Royal Charter that established the Academy 60 years ago on 16 February 1954 reads:

... to promote, declare and disseminate scientific knowledge; to establish and maintain standards of scientific endeavour and achievements in the natural sciences in Australia; and to recognise outstanding contributions to the advancement of science.

The Academy's 2012–2015 Strategic Plan incorporates three objectives that provide a contemporary context for the Academy's pursuit of the objects and purposes of the Charter:

- Promote excellence in scientific research nationally and internationally
- Develop and sustain a national scientific culture
- Provide valued independent scientific advice to assist policy development and program delivery

Under the direction of Council and the Executive Committee the Secretariat works with the Fellows to meet these objectives, and has four major program areas, supported by finance and administration functions: recognition of outstanding contributions to science; education and public awareness; science policy; and international relations.

Previous annual reports have highlighted the Academy's achievements across the different program areas. However, this year it has been aligned with the Strategic Plan and the Secretariat's reporting structure has been adjusted accordingly. This provides a range of benefits including improved oversight by Council, increased staff awareness of their contributions to the Academy's goals, integration of reporting requirements, and better communication of not just what has been done, but why it was done.

Following the election of a new Australian Government in September 2013, ministerial and departmental responsibilities for science and research were redistributed. The full implications of some of these changes are likely to become clearer after the 2014 Budget. However, one known



difference is that responsibility for administering the government grant in aid to the Learned Academies and the Australian Council of Learned Academies under the *Higher Education Support Act 2003* — *Higher Education Research Promotion* (HESA-HERP) program has reverted to the Department of Education. The bi-annual reporting process established following the 2012 HESA-HERP review remains in place and we look forward to continuing to interact with both the Department of Education and the Department of Industry.

This year marked the retirement of the Academy's longest-serving staff member, Rosanne Walker, after an extraordinary 29 years of service as the Academy Librarian. We planted a tree in the refurbished Marcus Clarke Street side gardens to commemorate the occasion.

The Secretariat's commitment to the work of the Academy is evident in this report and I take this opportunity to acknowledge my deep appreciation of their enthusiasm and professionalism.

Sue Meek AO FTSE

COUNCIL AND ADMINISTRATION

The Australian Academy of Science's affairs are conducted by a Council of 17 Fellows, which met four times between 1 April 2013 and 31 March 2014. To ensure Academy business was managed effectively between Council meetings, the Executive Committee, under delegated authority, met nine times, and the Finance Committee met twice.

EXECUTIVE COMMITTEE (FROM 31 MAY 2013)

Professor Suzanne Cory AC PresAA FRS — President
Vice-Chancellor's Professorial Fellow, The University of Melbourne and Honorary Distinguished Professorial Fellow, Walter and Eliza Hall Institute of Medical Research

Professor Chennupati Jagadish FAA FTSE — Vice President and Secretary for Physical Sciences
Australian Laureate Fellow and Distinguished Professor, Department of Electronic Materials Engineering, Research School of Physics and Engineering, Australian National University

Professor Marilyn Renfree AO FAA — Vice President and Secretary for Biological Sciences
Laureate Professor of The University of Melbourne and Ian Potter Chair of Zoology, The University of Melbourne

Professor Leslie Field AM FAA — Secretary for Science Policy
Vice-President and Deputy Vice-Chancellor (Research) and Professor of Organic Chemistry, University of New South Wales

Professor Andrew Holmes AM FAA FRS FTSE — Foreign Secretary
Laureate Professor, School of Chemistry, Bio21 Institute, The University of Melbourne and CSIRO Fellow, CSIRO Division of Materials Science and Engineering

Professor Jennifer Graves AO FAA — Secretary for Education and Public Awareness
Distinguished Professor, La Trobe Institute for Molecular Science, La Trobe University

Dr Oliver Mayo FAA FTSE — Treasurer
Honorary Research Fellow, CSIRO Livestock Industries, and Adjunct Professor of Biometry, The University of Adelaide

COUNCIL MEMBERS (FROM 31 MAY 2013)

Physical sciences

Professor Nalini Joshi FAA — Professor of Applied Mathematics and Associate Head, School of Mathematics and Statistics, The University of Sydney

Professor Michael Raupach FAA FTSE — Director, Climate Change Institute, Australian National University

Professor Brian Schmidt AC FAA FRS Nobel Laureate — Research School of Astronomy and Astrophysics, Australian National University

Professor Robert Vincent FAA — Professor, Department of Physics, The University of Adelaide

Professor Jim Williams AM FAA FTSE — Professor, Research School of Physics and Engineering, Australian National University

Biological sciences

Professor Ian Frazer AC FAA FRS FTSE — CEO and Director of Research, Translational Research Institute Pty Ltd, Queensland

Dr TJ Higgins FAA FTSE — Honorary Fellow, Plant Industry, CSIRO

Professor Peter Koopman FAA FRS — Senior Principal Research Fellow and Professor of Developmental Biology, The University of Queensland

Professor Rick Shine AM FAA — ARC Laureate Fellow and Professor in Evolutionary Biology (Personal Chair), School of Biological Sciences, The University of Sydney

Professor Steve Simpson FAA — ARC Laureate Fellow and Professor, School of Biological Sciences, The University of Sydney

FINANCE COMMITTEE MEMBERS

The Academy's Finance Committee is established under Chapter III 13a of the Standing Orders and states that 'Council shall appoint a Finance Committee, consisting of the Officers, and three other members, one of whom shall be a Fellow'. In July 2012 Council amended the Finance Committee Charter to require 'at least' three other members.

In addition to the Executive Committee members, the Finance Committee comprised Fellows'

representative Professor Michael Barber (from 25 September 2013) and external members Mr Mark Waldron, Mr Allan Thompson (acting Audit Committee Chair to 24 September) and Mr David Holmesby (Audit Committee Chair from 25 September). The Finance Committee met twice during the year on 17 April 2013 and 25 September 2013.

THE FELLOWSHIP

At 31 March 2014 the Academy Fellowship comprised 481 of Australia's leading research scientists elected for their personal contributions to science. Fellows occupy senior positions in universities, medical research institutes, government research agencies, industry, business and media.

The Fellowship is listed at www.science.org.au/fellows/fellowship-list.html

2014 NEW FELLOWS

The following Fellows were elected to the Fellowship on 26 March 2014:

Professor Rose Amal FAA FTSE, School of Chemical Engineering, University of New South Wales

Elected for her outstanding contributions to photocatalysis and leadership in harnessing solar energy to purify water and generate hydrogen 2.

Professor Hans Bacher AM FAA, Australian National University, Chair of the Academy's National Committee for Physics

Elected for his pioneering work in quantum optics, which has opened new paths for quantum computing and quantum optical communication technologies.

Professor John Bowman FAA, School of Biological Studies, Monash University

Elected for his highly original discoveries that have revealed the genetic basis of three fundamental processes in plant development.



Rose Amal



Hans Bacher



John Bowman



Alan Carey

Professor Alan Carey FAA, Mathematical Sciences Institute, Australian National University

Elected for his original research in several distinct areas of pure mathematics, particularly in infinite dimensional groups and their application to quantum field theory.

Professor Georgia Chenevix-Trench FAA, Cancer Genetics, QIMR Berghofer Medical Research Institute

Elected for her work on the genetics of breast, ovarian and other cancers, including showing that mutations in the ATM gene confer moderate risks for breast cancer.

Professor Michelle Coote FAA, Research School of Chemistry, Australian National University

Elected for developing and applying accurate computational chemistry for modelling radical polymerisation processes.

Professor Matthew England FAA, Climate Change Research Centre, University of New South Wales

Elected for his work on modelling the Southern Ocean and deep ocean ventilation, and its application to climate models.

Dr Elizabeth Jean Finnegan FAA, CSIRO Plant Industry, CSIRO

Elected for her world leading research on plant gene expression, including cloning the first plant DNA methyltransferase and the demonstration that DNA methylation is essential for normal plant development.



Georgia Chenevix-Trench



Michelle Coote



Matthew England



Jean Finnegan



Peter Gill



Barbara Howlett



Lisa Kewley



Hanna Kokko

Professor Peter Gill FAA, Research School of Chemistry, Australian National University

Elected for his fundamental and applied research in quantum chemistry, the discipline in which the laws of quantum mechanics are applied to understand and predict molecular behaviour.

Professor Barbara Howlett FAA, School of Botany, The University of Melbourne

Elected for her research in fungal plant pathology, which has improved understanding of disease resistance and had a major impact on the Australian canola industry.

Professor Lisa Kewley FAA, Research School of Astronomy and Astrophysics, Australian National University

Elected for her fundamental advances in understanding of the history of the universe, particularly star and galaxy formation.

Professor Hanna Kokko FAA, Research School of Biology, Australian National University

Elected for her significant contributions to ecology and evolutionary biology using novel mathematic methods.

Ms Catherine Livingstone AO FAA FTSE, Chair, Telstra

Elected for championing science and technology and the critical role they play in the future

development of Australia, and for services to the Australian Academy of Science.

Professor Angel Lopez FAA, Centre for Cancer Biology, SA Pathology, Institute of Medical & Veterinary Science

Elected for his work on growth factors, which has paved the way for the development of drugs for the treatment of some inflammatory diseases and certain types of leukaemia.

Professor Ivan Marusic FAA, Department of Mechanical Engineering, The University of Melbourne

Elected for his contributions to fluid mechanics, most notably advancing our understanding of wall-bounded turbulent flows.

Professor John Miners FAA, Clinical Pharmacology, Flinders University and Flinders Medical Centre

Elected for his pioneering work to establish drug metabolism as a predictive science that underpins both preclinical drug development and the clinical use of drugs.

Professor Craig Moritz FAA, Research School of Biology, Australian National University

Elected for his work to improve our understanding of evolutionary biology, particularly how new species arise and develop in different contexts.



Catherine Livingstone



Angel Lopez



Ivan Marusic



John Miners



Craig Moritz



Margaret Reid



Jamie Rossjohn



Ingrid Scheffer



George Willis



Phillip Cohen

Professor Margaret Reid FAA, CAOUS Centre, Swinburne University of Technology

Elected for her pioneering work in new fundamental tests of quantum theory, including teleportation and cryptography.

Professor Jamie Rossjohn FAA, School of Biomedical Sciences, Monash University

Elected for his research into the structural basis for T cell recognition of foreign antigens, which has had a profound impact on our understanding of immune recognition, particularly in autoimmunity and drug and food hypersensitivities.

Professor Ingrid Scheffer FAA, The University of Melbourne and Florey Institute of Neuroscience and Mental Health

Elected for her ground-breaking research into the genetic causes of epilepsy and related disorders, which has led to better prevention for these disorders and significant advances in diagnosis and therapy.

Professor George Willis FAA, School of Mathematical and Physical Sciences, University of Newcastle

Elected for his innovation in diverse fields of mathematics, including insights into locally compact groups and fundamental concepts such as the scale function and flatness.

2014 NEW CORRESPONDING MEMBERS

Professor Sir Phillip Cohen FAA FRS

HONOURS AWARDED TO FELLOWS

Honours awarded to Fellows during the year 2013–14

Election to international Academies

The Royal Society

Professor Martin Green FAA FRS FTSE elected as a Fellow in recognition of his work in the field of photovoltaics (converting solar energy into direct current electricity), semiconductors, micro-electronics and solar cells

Professor Stephen Simpson FAA FRS elected as a Fellow in recognition of his work studying locust swarms to establish a model for nutrition called the 'geometric framework'

Professor Terry Speed FAA FRS elected as a Fellow in recognition of his work in bioinformatics, which



Martin Green



Chennupati Jagadish



Ken Freeman



Alan Cowman

PHOTO: WEHI

uses mathematical and statistical strategies to make sense of huge volumes of genomic data, aiding the understanding of gene function and disease

National Academy of Sciences

Professor Chris Goodnow FAA FRS elected as a Member of the US National Academy of Sciences

Professor Graham Farquhar AO FAA FRS, **Professor Peter Hall** AO FAA FRS elected as Foreign Associates of the US National Academy of Sciences

Indian Academy of Science

Professor Brian Schmidt AC FAA FRS Nobel Laureate admitted as an Honorary Fellow of the Indian Academy of Sciences

World Academy of Sciences

Professor Chennupati Jagadish FAA FTSE elected as Associate Fellow for his outstanding contributions to the advancement of science in developing countries

Election to national Academies and Societies

Royal Society of South Australia

Professor Mathai Varghese FAA elected as a Fellow for accomplishments to the advancement of science

International awards

2014 Canada Gairdner Award

Professor Sir Marc Feldmann FAA FRS for the discovery of anti-TNF therapy for the treatment of rheumatoid arthritis and other inflammatory diseases

2013 Grote Reber Medal

Professor Ron Ekers FAA FRS for innovative and significant contributions to radio astronomy

2013 Henry Norris Russell Lectureship

Professor Ken Freeman FAA FRS awarded by American Astronomical Society in recognition of a lifetime of eminence in astronomical research

2013 Lasker Awards

Professor Graeme Clark AC FAA FRS FTSE awarded the Lasker-DeBakey Clinical Medical Research Award for the development of the modern cochlear implant

2013 Mahathir Science Award

Professor Alan Cowman FAA awarded for outstanding contributions to understanding and defeating malaria

2013 Ramaciotti Medal for Excellence in Biomedical Research

Professor Doug Hilton FAA awarded for outstanding contributions to clinical or biomedical research

2014 Rank Prize in Human and Animal Nutrition and Crop Husbandry

Professor Graham Farquhar AO FAA FRS, **Dr Richard Richards** FAA FTSE for research into more water efficient wheat and bringing these significant Australian scientific findings to world attention

2013 Royal Medal

Professor Rodney Baxter FAA FRS awarded by the Royal Society in recognition of his contributions to the field of statistical mechanics

2013 Wollaston Medal

Professor Kurt Lambeck AO FAA FRS awarded by the Geological Society of London for his significant achievements in geophysics, geodesy and geology



Kurt Lambeck

PHOTO: MICHAEL JOHN HOOD



David Celermajer



Tanya Monro



James McCluskey

NATIONAL AWARDS AND RECOGNITION

Order of Australia awards

2013 Queen's Birthday Honours

OFFICER OF THE ORDER IN THE GENERAL DIVISION OF THE ORDER OF AUSTRALIA (AO)

Professor Graham Farquhar AO FAA FRS for distinguished service to science in the areas of plant physiology and climate change as a leading researcher, academic and author

2014 Australia Day Honours

COMPANION OF THE ORDER IN THE GENERAL DIVISION OF THE ORDER OF AUSTRALIA (AC)

Professor Sam Berkovic AC FAA FRS for eminent service to biomedical research in the field of epilepsy genetics as a leading academic and clinician, to the study of neurology on a national and international level, and as an ambassador for Australian medical science education

Professor Bruce McKellar AC FAA for eminent service to science, particularly the study of theoretical physics, as an academic, educator and researcher, through seminal contributions to scientific development organisations, and as an author and mentor

OFFICER OF THE ORDER IN THE GENERAL DIVISION OF THE ORDER OF AUSTRALIA (AO)

Professor David Celermajer AO FAA for distinguished service to medicine in the field of cardiology, as a clinician and researcher, to improved medical diagnostic methods, and to the promotion of heart health, particularly in children and young adults

MEDAL OF THE ORDER OF AUSTRALIA (OAM)

Professor Ruth Hall OAM FAA for service to science in the field of microbiology

2013 Prime Minister's Prize for Science

Professor Terry Speed FAA FRS for his work as a statistician and mathematician that has helped farmers, miners and criminologists

2013 ARC Australian Laureate Fellowships

Professor Trevor Lithgow FAA
Professor Hugh O'Neill FAA
Professor Hugh Possingham FAA
Professor Michelle Simmons FAA
Professor Xu-Jia Wang FAA

Georgina Sweet Australian Laureate Fellowship

Professor Tanya Monro FAA FTSE

2013 NSW Scientist of the Year

Professor Graeme Jameson AO FAA FTSE

Ministerial Award for Cardiovascular Research Excellence (awarded by the NSW Cardiovascular Research Network)

Professor Richard Harvey FAA

2013 Australian Museum Eureka Prizes

Australian Infectious Diseases Research Centre Eureka Prize for Infectious Diseases Research

Professor Scott O'Neill FAA, Professor Ary Hoffman FAA, Professor Brian Kay AM FAA were part of a team awarded this prize

CSIRO Eureka Prize for Leadership in Science

Professor Frank Caruso FAA University of New South Wales

Eureka Prize for Scientific Research

Professor James McCluskey FAA was part of the team awarded this prize

*University of Technology Sydney Eureka Prize
for Outstanding Mentor of Young Researchers*

Professor Rick Shine AO FAA

*2013 Victoria Prize for Science and
Innovation — Life Sciences*

Professor Alan Cowman FAA in recognition of his
outstanding contributions in the quest to eradicate
malaria

DEATHS OF FELLOWS SINCE 1 APRIL 2013

Fellows

Professor Robert (Bob) Street AO FAA
4 July 2013

Professor (Norman) Alan Walker FAA
26 October 2013

Professor David James Kemp OAM FAA
22 November 2013

Dr Shirley Winifred Jeffrey AM FAA
4 January 2014

Professor Raymond John Stalker AO FAA FTSE
9 February 2014

Professor Bruce Godfrey Hyde FAA
16 February 2014

Corresponding Members

Sir John Warcup Cornforth AC CBE FAA FRS
Nobel Laureate
8 December 2013

Dr Frederick Sanger OM CH CBE FAA FRS
Nobel Laureate
20 November 2013

SUPPORTING THE ACADEMY

THE ENLIGHTENING CAMPAIGN

Philanthropy has played a pivotal role in the life of the Australian Academy of Science. The Academy's home — the Shine Dome — was built entirely from private and corporate donations, through a campaign led by founding President Sir Mark Oliphant AC KBE FAA FRS FTSE. The Academy recruited a number of eminent industrialists to its cause and received its first cheque (for £25 000) from BHP. Originally known as Becker House, the building, an internationally renowned example of architectural accomplishment, was renamed the Shine Dome in honour of a \$1 million gift in 2000 from Professor John Shine AO FAA, which significantly helped to fund major restoration work.

This year the Academy continued its philanthropic endeavour through *The Enlightening* — a capital fundraising campaign with a focus not on bricks and mortar, but on elevating science in public debate, ensuring quality science education at all levels, and invigorating scientific understanding, inquiry and enthusiasm nationwide. The Academy aims to drive a transformational improvement in science literacy, in our schools and in our community.

To that end, it has appointed an in-house Philanthropy Manager — Ms Bea Brickhill — to manage this major philanthropic endeavour and support the dedicated and hardworking Fellows who are advocates for the campaign.

AUSTRALIAN FUTURES SCIENCE FUND

In addition to *The Enlightening* campaign, the Academy has established a new Endowment Fund: the Australian Futures Science Fund. The seeds planted through donations and bequests to this fund will help underpin the breadth of the Academy's work in Australia and internationally, for many years to come.

The Academy thanks all Fellows who have given their support to our bequest campaign — an important step towards securing the Academy's future. Support for this program from the Fellowship, as ambassadors and leaders of the Academy, is invaluable. They include:

Professor Marilyn Anderson FAA FTSE
Professor Mark Burgman FAA
Professor Martin Bennett FAA FRS
Professors Suzanne Cory AC PresAA FRS and Jerry Adams FAA FRS
Professor Alan Cowman FAA
Professor Mahananda Dasgupta FAA
Dr Peter Dodds FAA
Professor Mike Dopita AM FAA
Professor Chris Easton FAA
Professor Tony Guttmann FAA FTSE
Professor Peter Hall AO FAA FRS
Professor Adrienne Hardham FAA
Professor Stephen Hyde FAA
Professor Pauline Ladiges AO FAA
Professor Trevor Lithgow FAA
Professor Charles Mackay FAA
Professor James McCluskey FAA
Professor William Moran FAA
Professor Michael Parker FAA
Professor Steven Prawer FAA
Professor David Smyth FAA
Professor Greg Stuart FAA
Professor Raymond Volkas FAA
Professor Xu-jia Wang FAA

See over for the 2013 Donor Honour Roll.

2013 DONOR HONOUR ROLL

The Australian Academy of Science acknowledges the support of donors who have given generously between 1 April 2013 and 31 March 2014. Their support plays a critical role in helping the Australian Academy of Science to achieve its mission.

ACADEMY PILLARS \$500 000 PLUS

Estate of JG Russell

PRESIDENT'S CIRCLE \$100 000 – \$499 000

SCIENCE CIRCLE \$20 0000 – \$99 000

Anonymous (2)

Professor James Angus AO FAA

Dr Eldon Ball

Professor Marilyn Ball FAA

Professor Suzanne Cory AC PresAA FRS

Dr Jenny Gordon

Dr Margaret M Middleton

Mrs Jean M Moran

Sir Gus Nossal AC CBE FAA FRS FTSE

Selby Scientific Foundation

Professor Terry Speed FAA FRS and
Freda Elizabeth Speed

ACADEMY SUPPORTERS UP TO \$20 000

Anonymous (7)

Ms Cynthia Anderson

Australian Wildlife Management Society

Professor Tony Bacic FAA

BodyCare Injury Management

Ms Bea Brickhill

Professor Ian Clark

Professor David de Kretser AC FAA FTSE

Dr Elizabeth Dennis

Professor Mike Dopita AM FAA

gemaker Pty Ltd

Professor Andrew Gleadow FAA and

Dr Roslyn Gleadow

Professor Min Gu FAA FTSE

Dr John Jake Jacobsen FAA

Professor Yuri Kivshar FAA

Professor Frank Larkins AM FAA FTSE

Professor John Lovering AO FAA FTSE

Professor John McKenzie AM FAA

Dr Sue Meek AO FTSE

Professor Don Metcalf AC FAA FRS

Mrs Margaret Morris

Dr Rana Munns FAA

New Zealand Crown Research Institute
Manaaki Whenua

Professor Nicos Nicola AO FAA

Professor Jim Peacock AC FAA FRS FTSE

Dr Anna Rickards

Professor Frances Separovic FAA

Professor FA Smith FAA

Professor Tam Sridhar FAA FTSE

Professor Richard Limon Stanton AO FAA FRSN

Professor John Swan AO FAA FTSE

Dr Colin Ward FAA FTSE

Dr John Zillman AO FAA FTSE

College of Engineering and Computer Science,
Australian National University

Faculty of Engineering, Architecture
and Information Technology,
The University of Queensland

Faculty of Engineering and Built Environment,
University of Newcastle

Faculty of Engineering, Computing and
Mathematical Science, University of Adelaide

Faculty of Engineering,
Computing and Mathematics,
The University of Western Australia

Faculty of Engineering,
University of Wollongong

Faculty of Engineering,
University of New South Wales

Faculty of Engineering,
The University of Melbourne

Faculty of Engineering,
The University of Sydney

Faculty of Information Technology,
Monash University

For more information about the Academy's fundraising or bequest campaigns please contact Philanthropy Manager Ms Bea Brickhill on

bea.brickhill@science.org.au or 02 6201 9471.
www.science.org.au/support-us

STRATEGIC PLAN 2010–2015

This annual report describes the activities of the Academy from 1 April 2013 to 31 March 2014 to meet the objectives and strategies contained in the 2010–15 strategic plan. The sections of this report reflect the objectives below and report the outcomes delivered, as well as highlights, for each strategy.

VISION

Excellence in Australian science

MISSION

The Academy's mission is:

To champion Australian scientific excellence, promote and disseminate scientific knowledge, and provide independent scientific advice for the benefit of Australia and the world

OBJECTIVES AND STRATEGIES



A. Promote excellence in scientific research nationally and internationally, by:

Strategy 1. Identifying priority areas of research, training and infrastructure support for discipline development, in conjunction with the National Committees for Science.

Strategy 2. Providing career development and network building opportunities for young researchers.

Strategy 3. Promoting support for the best Australian scientific research, including facilitating access to international scientific organisations and programs.

Strategy 4. Promoting Australian science capabilities internationally and contributing expertise and leadership in regional and global collaborative networks.

B. Develop and sustain a national scientific culture, by:

Strategy 5. Ensuring that the Academy and the Fellowship are fully representative of the best scientists in Australia and promoting community recognition of the contributions of high quality science to health, well-being and national prosperity.

Strategy 6. Supporting the teaching of science at all levels (primary, secondary and tertiary), elevating national standards, enhancing teacher competencies and encouraging student consideration of science and technology based careers.

Strategy 7. Providing forums for discussion and debate, publications and balanced, expert information on scientific issues of national significance and/or community concern.

C. Provide valued independent scientific advice to assist policy development and program delivery, by:

Strategy 8. Developing networks and alliances with relevant stakeholders to provide conduits for input of insights and expertise on scientific matters.

Strategy 9. Providing authoritative advice to inform policy development on matters of research support, education and training, and science application.

Strategy 10. Monitoring scientific developments in Australia and overseas to anticipate and communicate potential impediments and opportunities.

OBJECTIVE A
PROMOTE EXCELLENCE IN
SCIENTIFIC RESEARCH
NATIONALLY AND
INTERNATIONALLY

OBJECTIVE B
DEVELOP AND
SUSTAIN A NATIONAL
SCIENTIFIC CULTURE

OBJECTIVE C
PROVIDE VALUED
INDEPENDENT SCIENTIFIC
ADVICE TO ASSIST POLICY
DEVELOPMENT AND
PROGRAM DELIVERY

1

IDENTIFYING PRIORITY AREAS OF RESEARCH, TRAINING AND INFRASTRUCTURE SUPPORT FOR DISCIPLINE DEVELOPMENT IN CONJUNCTION WITH THE NATIONAL COMMITTEES FOR SCIENCE

The Academy fosters the advancement of the natural sciences in Australia and, with its National Committees for Science (NCs), proactively provides expert advice to help develop scientific disciplines, particularly through effective targeting of funding and support.

NATIONAL COMMITTEES REVIEW RECOMMENDATIONS ENDORSED

In May 2013 Council accepted the *Report on Review of National Committees for Science*, chaired by Professor Bruce McKellar AC FAA. The review was conducted over a 12-month period. Its terms of reference were wide-ranging with two priorities:

- Examine the efficiency, effectiveness and economy of the NCs as a mechanism for linking the Australian Academy of Science with science and scientists in Australia

- Enhance the global influence of Australian science and make recommendations for improvements as required (see Strategy 4).

The review consulted extensively with the NCs and surveyed Academy Fellows and Australian scientific societies. It found that while many NCs were working well, many respondents, particularly in the life and applied sciences, felt they had no links to the committee system, or that those links that did exist were not effectively used.

Council also endorsed the report's recommendations (see below) to: keep the number of NCs constant while representing more Australian science; increase NC activity and enhance links with the research community; involve more Fellows in NCs' work; and expand memberships of key international science organisations.

RECOMMENDATIONS OF THE REVIEW OF NATIONAL COMMITTEES

- Retain the same number of committees but diversify the range of disciplines covered, ensuring a more balanced representation of the physical and biological sciences (see Table 1)
- Enhance representation and interaction with relevant national scientific societies, and establish co-funding arrangements where appropriate
- Establish common terms of reference for all committees, tailored for individual committees via consultation between the committee chairs and the Secretaries and Executive Committee
- Encourage committees to conduct discipline reviews and produce decadal plans in consultation with the broader science community, and provide for the preparation of discipline specific advice, following Executive Committee endorsement
- Replace the NC for ICSU with a new Advisory Committee on International Matters (see Strategy 4)
- Retain membership of the 31 ICSU organisations subscribed to, and provide for another 24 international scientific organisations (six ICSU and 16 others) on a cost-neutral basis (see Appendix 4)
- Establish a rolling review cycle for the NCs.

The Secretaries for Physical and Biological Sciences have led a review implementation program supported by a new Academy projects unit, which is jointly managed by the Directors of Science Policy and

International Programs. To see an Executive Summary of the report go to www.science.org.au/report-review-national-committees-science-executive-summary

Table 1: Revisions to the National Committees structure in 2013			
	Unchanged	New/merged/expanded	Discontinued/absorbed
Agriculture, Fisheries and Food		✓	
Antarctic Research	✓		
Astronomy	✓		
Biomedical Sciences	✓		
Brain and Mind	✓		
Cellular and Developmental Biology		✓	
Chemistry	✓		
Crystallography	✓		
Data in Science	✓		
Earth Sciences		✓	
Earth System Science	✓		
Ecology, Evolution and Conservation		✓	
Geographical Sciences	✓		
History and Philosophy of Science	✓		
Information and Communication Sciences		✓	
Materials Science		✓	
Mathematical Sciences	✓		
Mechanical and Engineering Sciences		✓	
Medicine and Public Health		✓	
Nutrition	✓		
Physics	✓		
Plant and Animal Science			✓
Quaternary Research			✓
Space and Radio Science		✓	
Spectroscopy			✓
ICSU			✓

NATIONAL COMMITTEE ACTIVITIES

The NCs held 39 face-to-face and virtual meetings and 44 workshops and consultative meetings regarding the implementation of the NCs review recommendations and a range of other activities relating to their areas of science:

- Assisting with selection of early career researchers to participate in the Lindau Nobel Laureates meeting and the Japan Society for the Promotion of Science HOPE meeting (see Strategy 2)
- Identifying researchers to represent Australia in activities of the International Council for Science (see Strategy 4)

- Organising workshops and symposia (see Strategy 7)
- Establishing new early- and mid-career awards for engineering science (see Strategy 5).

The committees also provided expert advice to other science organisations on topics including priorities for Antarctic research, access to and support for major research facilities, and nutrition education.

The NCs review emphasised the importance of the committees contributing to future planning for their disciplines. The NCs for Mathematical Sciences (see page 20), Astronomy and Chemistry



National Committee for
Mathematical Sciences Chair,
Nalini Joshi

MATHEMATICAL SCIENCES DECADAL PLAN

The decadal plan will include three broad components:

- Assessment of the current state of the mathematical sciences in Australia
- Description and prioritisation of opportunities for the future (2015–25)
- Outline of strategies to achieve these priorities.

Developing the plan includes widespread consultation with the mathematical community and other stakeholders and is focusing on a longer-term strategic view. The committee

also held nine road show presentations and one full-day workshop, and there have been 68 online submissions to the plan's website, www.mathscidecadalplan.org.au. Outcomes will include recommendations to organisations that fund mathematics research and education; and setting future policies with government departments, education providers and industry. The NC raised \$144 000 from national organisations and university departments to support the development of the new plan, due to be launched in late 2014.

are preparing decadal plans; and the National Committee for Ecology, Evolution and Conservation, in partnership with the Terrestrial Ecosystem Network and Ecological Society of Australia, is also engaged in long-term planning for its disciplines.

These plans involve extensive consultation through activities such as meetings, public submissions, presentations around the country, and workshops at discipline conferences.

2

PROVIDING CAREER DEVELOPMENT AND NETWORK BUILDING OPPORTUNITIES FOR YOUNG RESEARCHERS

The Academy offers a range of opportunities for early- and mid-career researchers (EMCRs) to develop skills and national and international networks to further their careers.

Through the Theo Murphy High Flyers Think Tanks (reported in Strategy 7), EMCRs learn about the application of science for policy. Additionally, the Academy supports the EMCR Forum, providing a vital connection between current and potential Australian science leaders, and identifying and addressing critical issues facing younger researchers.

INTERNATIONAL NETWORKING

Nobel Laureates inspire in Lindau

The 63rd Meeting of Nobel Laureates in Lindau, dedicated to chemistry, brought together 625 undergraduate and postgraduate students from 78 countries and 34 Nobel Laureates. The Lindau meetings are globally recognised for scientific and cultural exchange and for providing inspirational role models to younger researchers.

The National Committee for Chemistry helped the Academy to assess applications for this highly competitive award. The Australian delegation of eight doctoral students and postdoctoral fellows (see page 22) was supported for the first time by the Science and Industry Endowment Fund (SIEF). Under an agreement signed in 2011, until 2020 SIEF will support up to 10 Australians for the annual meetings, and up to 15 for the multidisciplinary meeting held every four years.

The delegation was led by Academy Council member Professor Mark von Itzstein FAA, with help from Foreign Secretary, Professor Andrew Holmes AM FAA FRS FTSE, who also negotiated a further four-year agreement with the Lindau Council to continue the program, which started in 2004.

ANU student blogs maths in Heidelberg

SIEF also supported a PhD candidate from the Australian National University, Mr Adrian Dudek, to attend the inaugural Heidelberg Laureate Forum (HLF), from 22–27 September 2013. Modelled on Lindau, the HLF allows young researchers in mathematical and computer sciences to meet and be inspired by winners of the Abel Prize and Fields Medal (mathematics) and the Turing Award and Nevanlinna Prize (computer science).

Mr Dudek's proactive approach to communicating his passion for mathematics earned him the role of official blogger at the Forum, which was attended by 200 young researchers. The Academy was invited to submit nominations through its membership of the International Mathematical Union.

'THERE WAS CERTAINLY NO DENYING THE EXCITEMENT IN THE AIR, FOR THE WEEK WAS ARGUABLY THE LARGEST GATHERING OF LEADING MATHEMATICIANS AND COMPUTER SCIENTISTS TO HAVE EVER TAKEN PLACE'

ADRIAN DUDEK, HEIDELBERG LAUREATE FORUM DELEGATE

Six young scientists attend HOPE meeting in Tokyo

The 6th HOPE meeting, organised by the Japan Society for the Promotion of Science, was held 11–15 March in Tokyo, in physics, chemistry, physiology/medicine and related fields. Six young Australian PhD students and postdoctoral researchers were identified by relevant National Committees for Science and nominated by the Academy to attend the meeting. Academy Council member Professor Brian Schmidt AC FAA FRS was one

LINDAU 2013 — ‘AN AMAZING COMMUNITY’

The 2013 delegation to the Meeting of Nobel Laureates in Lindau included:

- Vipul Agarwal, The University of Western Australia
- Aditya Chopra, Australian National University
- Lena Daumann, The University of Queensland
- Nicholas Green, Australian National University
- Anwen Krause-Heuer, ANSTO
- Hei Man Leung, The University of Adelaide
- Lara Malins, The University of Sydney
- Dr Paul Stevenson, Deakin University

What will remain from this week? What will I take with me? It is not only the impressions, exchanged business cards, snapshots, or new ideas. But mainly the feeling of being part of an amazing community and having established important contacts and friends, in beautiful Lindau — Lena Daumann, The University of Queensland.

Above all, the meeting in Lindau reaffirmed, in my mind, the importance of a global community of scientists speaking openly the language of science, regardless of our native tongues, in order to ensure a prosperous future — Lara Malins, The University of Sydney

Table 2: EMCR Workshops at 2013 *Science at the Shine Dome*

Workshop no	Title	Presenter(s)
1	Media and communicating science	Dr Paul Willis Director, RiAus
2	Grant writing and how to find funding opportunities	Dr Aurore Delaigle ARC Queen Elizabeth II Fellow Department of Mathematics and Statistics, The University of Melbourne <i>2013 Moran Medal for research in statistics</i> Dr Ulrike Mathesius ARC Future Fellow Research School of Biology, Australian National University <i>2013 Fenner Medal for research in biology (excluding the biomedical sciences)</i>
3	Successful scientific collaborations	Associate Professor Christopher Adam Blake Centre for Astrophysics and Supercomputing Swinburne University of Technology <i>2013 Pawsey Medal for research in physics</i> Dr Benjamin Kile Cancer and Haematology Division Walter and Eliza Hall Institute of Medical Research <i>2013 Gottschalk Medal for research in the medical sciences</i>

of five Nobel Laureates to present at the 2014 meeting. See www.jsps.go.jp/english/e-hope/outline6.html.

EMCRS ATTEND SCIENCE AT THE SHINE DOME

During the Academy's annual celebration *Science at the Shine Dome* in 2013, 65 EMCRs participated in workshops on science communication, grant writing and successful collaborations. Nine were supported by the Academy as part of their Lindau and Heidelberg Nobel Laureate meeting participation.

The workshops (see Table 2 for details) were very successful, with the response to an evaluation

survey completed by more than a third of attendees indicating three-quarters had an excellent experience, while the remainder said it was good. EMCRs said they found the new Fellows seminars 'inspirational' and 'very enjoyable'. Nearly 80% felt there were adequate opportunities to interact with the Fellows; some commented that the interaction between speakers and the EMCRs was an 'amazing' experience for them.

EMCR FORUM

Since its establishment in 2011, the Academy's Early- and Mid-Career Researcher (EMCR) Forum has been advocating effectively on issues of importance

to young Australian scientists. Membership of the Forum is open to researchers under 15 years post-PhD (or other research higher degree, with allowance made for career interruptions; see www.science.org.au/emcr-forum).

The EMCR Forum's second national meeting, *Science pathways 2013: engaging with industry and innovation*, was held in Melbourne on 17–18 October. The event was opened by the Chief Scientist for Australia, Professor Ian Chubb AC, Monash University Chancellor and President of the Academy of Technological Sciences and Engineering, Dr Alan Finkel AM FTSE, delivered the Ben Chuwen Keynote Address. This year's meeting looked at how EMCRs can more effectively engage with industry and be more innovative in their research. The logos of *Science pathways 2013* supporters are below. For more information go to www.science.org.au/science-pathways-2013-engaging-industry-and-innovation

The level of enthusiasm for the Forum's role and respect for its leadership was illustrated by its committee elections in November, when a new Chair, Dr Krystal Evans, and two Deputy Chairs, Drs Andrew Siebel and Sharath Sriram were elected unopposed from the existing committee, and 140 expressions of interest and 46 applications were received for the three resulting vacancies.

At the *Science Pathways* meeting in October, a survey of EMCRs was launched, together with a policy paper 'Best practices for postdoctoral progress' (www.science.org.au/sites/default/files/user-content/postdoc-trainingbestpractice.pdf).

The survey, which received 953 responses, is seeking examples of best practice for career progression, and the policy paper investigates the changing role of postdoctoral fellows, including how to improve postdoctoral research positions. The paper focuses on four key areas: networking and integration, technical training, communicating research, and applying for funding. It also aims to identify best practice support for postdoctoral fellows, and what more can be done to support them.

Registrations on the Academy's EMCR database, established in 2010, grew to 3190 by 31 March 2014. The database is used to send out information on career, training and funding opportunities, to promote events and initiatives relevant to EMCRs, and to distribute *Early Days*, the EMCR quarterly newsletter (see www.science.org.au/early-days-newsletter).



Science pathways 2013 supporters

3

PROMOTING SUPPORT FOR THE BEST AUSTRALIAN SCIENTIFIC RESEARCH, INCLUDING FACILITATING ACCESS TO INTERNATIONAL SCIENTIFIC ORGANISATIONS AND PROGRAMS

Recognising that scientific endeavour is global, and the importance of profiling Australian research and researchers internationally, the Academy works with other science organisations to coordinate bilateral and multilateral workshops and exchange programs, with the goal of creating collaborative research opportunities, facilitating access to research facilities and promoting network development.

INTERNATIONAL WORKSHOPS

More than 150 senior researchers from Australia, China, the European Union and Japan presented their science and discussed areas of mutual interest at four bilateral workshops. Additionally, 39 young Australian scientists were supported to build professional networks that will help underpin their future careers.

- An Australia-China workshop on astronomy and astrophysics, held in Nanjing from 11–13 November 2013, was a great success, cementing and advancing existing partnerships between astronomers from both countries and forging new collaborations. As well as celebrating a decade of bilateral cooperation, the event marked 50 years since Professor Chris Christiansen FAA visited China for the first time in 1963 and began the bilateral relationship (see page 25).
- A statement committing both countries to developing a program for future collaborative research into tropical and sub-tropical marine science was released following a *Japan–Australia marine science workshop*, held in Tokyo 11–12 July 2013. Thirty-five Australian and Japanese scientists, including five EMCRs, attended. The event was funded by the former Department of Industry,

Innovation, Climate Change, Science, Research and Tertiary Education (DIICCSRTE) and the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT). The Academy organised the workshop together with the Australian Institute of Marine Science and the Japan Agency for Marine-Earth Science and Technology. See www.science.org.au/australia-japan-symposium

- A proposal to establish funding for collaboration and researcher exchanges between Australian and Japanese facilities was developed at the *Australia–Japan neutron science workshop: sharing science with neutrons*, 5–6 November 2013. Fifty-one Australian and Japanese experts, and 12 EMCRs, attended the event in Sydney, which was funded by DIICCSRTE and MEXT. The workshop was organised by the Academy, the Australian Nuclear Science and Technology Organisation and the Japan Proton Accelerator Research Complex. See www.science.org.au/australia-japan-neutron-science-workshop-sharing-science-neutron
- Seventy Australian and European experts attended the *Third European Union–Australia workshop on research infrastructure* in Canberra on 5–6 November 2013. The infrastructure workshop focused on the areas of healthy ageing, clean energy, and sustainable cities. A range of initiatives were identified for discussion at the *Second International Conference on Research Infrastructure* in Athens, held in April 2014. A follow-on workshop *New partnerships for big and complex research data* was held in Melbourne on 7 November. Participants also visited the Australian Synchrotron and the Centre for Nanofabrication and New Horizons. Funding for the event was received from the Department



Participants in the 10th annual China–Australia Symposium on astronomy and astrophysics

AN ASTRONOMICAL RELATIONSHIP FOR 50 YEARS

In 1963, Professor Chris Christiansen FAA visited China for the first time, and ultimately visited more than a dozen times, bringing valuable astronomical information and guidance to his Chinese colleagues.

So it was fitting that 50 years on, the 10th annual China–Australia symposium was held on the topic of astronomy and astrophysics. The symposium was organised by the Academy, the Australian Academy of Technological Sciences and Engineering (ATSE), with funding from the Australian Government Department of Industry, and the Chinese Academy of Sciences (CAS).

Fifty-two senior experts from both countries presented on Antarctic astronomy, radio

astronomy, dark energy, cosmology and detection of dark matter, galactic structure, and big data. The Australian Co-convenors were Professor Brian Boyle FAA and Professor John O’Sullivan FAA FTSE, and 10 EMCRs were privileged to attend this milestone event.

The symposium was opened and attended by Professor Jinghai Li, Vice-President of CAS, Academy President Professor Suzanne Cory AC PresAA FRS, President of ATSE, Dr Alan Finkel AM FTSE, and Deputy Secretary of the Australian Government Department of Industry, Ms Patricia Kelly PSM. For more information see www.science.org.au/china-australia-symposium-astronomy-and-astrophysics

of Education and the European Commission. See www.science.org.au/third-european-union-australia-workshop-research-infrastructure

International exchanges expand horizons

Grants were administered by the Academy to enable 27 senior Australian researchers and 39 EMCRs to visit and undertake research in 2014 in France, Germany, Japan and the US. The funding decisions were made by panels of Fellows with relevant expertise (see Table 3 overleaf for details).

In addition, 20 outstanding US graduate students will be funded to visit Australia in 2014 with the support of the US National Science Foundation and the Australian Government Department of Industry. The report of the 2013 East Asia and Pacific Summer Institutes (EAPSI) program (see www.science.org.au/east-asia-and-pacific-summer-institutes-eapsi-program-us-graduate-students) highlights the



2013 participants in the East Asia and Pacific Summer Institutes (EAPSI) program

substantial benefits of such international exchanges for both participants and host institutions. All 20 EAPSI participants said in their follow-up reports that they would like to conduct further research in Australia, and two have already made enquiries into the grants and scholarships available to them.

Table 3: Exchange programs administered since April 2013

Date awarded	Program	Funding organisation/s	Recipients
May 2013	2013 France–Australia Science Innovation Collaboration www.science.org.au/sites/default/files/user-content/participantlistsforfasic.pdf	Department of Industry (then DIICCSRTE)	10 EMCRs
May 2013	Rod Rickards Fellowships 2013 www.science.org.au/sites/default/files/user-content/rod_rickards_fellowships_participants.pdf	AAS	2 EMCRs
July 2013	Japan Society for the Promotion of Science (JSPS) Invitation and Postdoctoral Fellowships 2013–14 www.science.org.au/grants-asia	Department of Industry (then DICCRSTE) and JSPS	9 senior scientists and 15 EMCRs
September 2013	Adam J Berry Memorial Fund 2014 www.science.org.au/sites/default/files/user-content/adam_berry_fund_participants.pdf	Berry Family / US National Institutes of Health	1 ECR
November 2013	German–Australian Mobility Call for collaboration in science and technology in biodiversity and preventative health 2013 www.science.org.au/sites/default/files/user-content/german-australianmobilitycall2013-14participants_0.pdf	Department of Industry (then DIICCSRTE) and the International Bureau of the Federal Government Ministry for Education and Research (BMBF)	8 senior scientists and 5 EMCRs
January 2014	6th HOPE Meeting with Nobel Laureates www.jsp.go.jp/english/e-hope/outline6.html	Department of Industry and JSPS	6 EMCRs
February 2014	Australia–Japan Bilateral Exchange Program 2014–15 www.science.org.au/sites/default/files/user-content/aust-japan_bilateral_exchange_program_2014-2015-participant_list_0.pdf	Department of Industry (then DIICCSRTE) and JSPS	10 senior scientists

FRANCE VISIT ASSISTS RESEARCH ON CONTAMINATED ENVIRONMENTS

Dr Trang Huynh visited the École Nationale des Travaux Publics de l'État (ENTPE) and the University Joseph Fourier (UJF) in France to collaborate on developing tools to predict and assess bioavailability and bio-toxicity in aquatic ecosystems. The visit was supported by a 2013 France–Australia Science Innovation Collaboration program early career fellowship.

Dr Huynh is from the Centre for Mined Land Rehabilitation at The University of Queensland and she valued the opportunity to gain the necessary experience to further her research into contaminated environments associated with mining activities, noting that she was inspired by the hands-on experience and interaction with ENTPE and UJF researchers.

This collaboration is expected to produce a high-quality publication and there is interest



from the French scientists in developing an exchange and collaborative research program at the PhD level.

4

PROMOTING AUSTRALIAN SCIENCE CAPABILITIES INTERNATIONALLY AND CONTRIBUTING EXPERTISE AND LEADERSHIP IN REGIONAL AND GLOBAL COLLABORATIVE NETWORKS

The Academy interacts widely with scientists and officials from research organisations and governments in many countries to increase awareness of Australia's capabilities in science and technology and to create opportunities to influence and contribute to international research agendas and policy development activities.

INTERNATIONAL SCIENCE ORGANISATION PARTICIPATION

The International Council for Science (ICSU) is a non-government organisation with a global membership of 48 international scientific unions (ISUs) and interdisciplinary science bodies, and 120 national scientific bodies representing 140 countries. These organisations bring together scientists within and across disciplines to coordinate research and address issues of global significance. The Academy is Australia's adhering body for ICSU and 31 ICSU organisations (20 ISUs and 11 interdisciplinary bodies).

Since September 2013, ICSU has been undertaking an external review of its activities, overseen by an eminent international panel chaired by Sir Peter Knight FRS (see Table 4, on page 28). Foreign Secretary Professor Andrew Holmes AM FAA FRS FTSE is a member of the panel, which will present its recommendations at the ICSU General Assembly in New Zealand in August 2014.

McKellar Review recommends increased international memberships

The McKellar Review of the National Committees for Science (see Strategy 1) included detailed consideration of the benefits and relevance of international memberships to Australian science.

The Academy Council endorsed the review's recommendation to increase memberships to 55 (six additional ICSU scientific unions and 18 other science bodies). It is expected that this can be done on a cost-neutral basis, given that other Australian scientific societies already pay, or indicated they would be willing to help fund, subscriptions (and in some cases no subscriptions are required). Appendix 4 illustrates the linkages that would operate between the new National Committees (NCs) structure and the proposed international science organisation memberships.

Council also implemented a review recommendation to replace the NC for ICSU Coordination with an Advisory Committee on International Matters, which will provide advice for all international science organisations with which the Academy is affiliated.

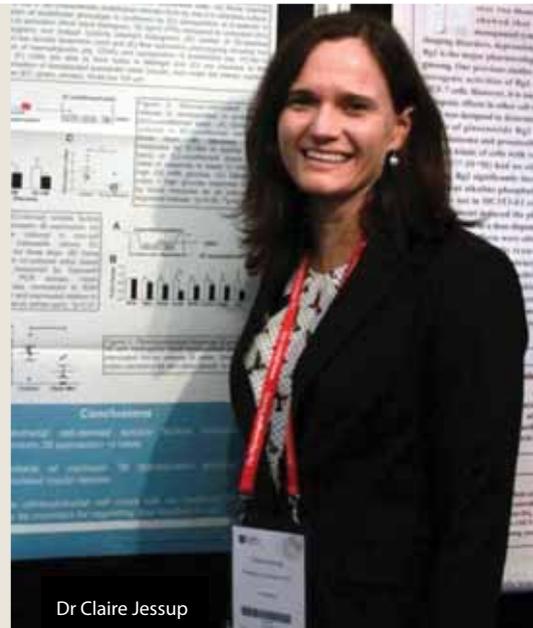
Enhancing Australia's influence through representation

With the help of the National Committees for Science, the Academy meets responsibilities and obligations arising from ICSU memberships. These include nomination of Australian candidates for executive committee positions and appointment of voting delegates to general assemblies. Thirteen voting delegates were appointed to six meetings (see Appendix 2). In addition, two early- and mid-career researchers (EMCRs) were supported to attend the 37th Congress of the International Union for Physiological Sciences (see page 29).

In 2013, three secretary-generals (including the Secretary General of ICSU); five incoming, current or outgoing presidents; and six vice presidents were among 24 Australian executive committee officeholders helping to enhance Australia's global science credibility and influence (see Appendix 3).

Two outstanding early- and mid-career researchers, Dr Amanda Craig (University of New South Wales) and Dr Claire Jessup (Flinders University), were awarded travel grants from the Academy's 29th International Congress of Physiological Sciences Fund to attend the Union's 37th Congress in Birmingham, UK, from 21–26 July 2013.

Dr Jessup presented a poster 'Connexin 36 signalling during intercellular communication within pancreatic islets'. The meeting gave Drs Jessup and Craig invaluable experience in learning from and interacting with world leaders in various fields of cellular physiology. They were nominated by the National Committee for Biomedical Sciences, with assistance from the Australian Physiological Society.



Dr Claire Jessup

Table 4: Appointments to ICSU review and advisory groups

Date	Group	Appointee
April 2013	ICSU External Review Panel	Professor Andrew Holmes AM FAA FRS FTSE, Foreign Secretary
June 2013	ICSU Future Earth Scientific Committee	Dr Mark Stafford Smith (Chair) and Professor Xuemei Bai (member)
July 2013	Nominating Committee for Officers and Ordinary Members of the ICSU Executive Board	Dr John Zilman AO FAA FTSE
August 2013	Review panel for the Regional Office for Africa and/or the Regional Office for Latin America and the Caribbean	Professor Bruce McKellar AC FAA
December 2013	National Outreach Contact for the International Astronomical Union's new Global Network for Astronomy Outreach	Dr Peter Wheeler
December 2013	Co-chair of the international science steering committee for the XXXIII Scientific Committee on Antarctic Research (SCAR) Biennial Meeting and Open Science Conference	Dr Dana Bergstrom, Chair of NC for Antarctic Research

Each ICSU organisation also has substructures of committees and groups providing about 370 Australian scientists opportunities to contribute to international strategic planning and priority setting, and to establish research collaborations.

Australian scientists were also appointed to several ICSU review and advisory groups (see Table 4). As well as Professor Andrew Holmes's appointment to the ICSU review panel, the appointment of Dr Mark Stafford Smith to Chair ICSU's ambitious Future Earth initiative is of particular note. In addition, at the International Union of Nutritional Sciences (IUNS) General Assembly in Granada, Spain, in September 2013, the Australian delegation successfully nominated Professor Basil Hetzel AC as a 'Living Legend'. The delegation also obtained

agreement, with the support of the New Zealand Royal Society's delegation, to the formation of an Oceania regional group of the IUNS.

Successful bids for international meetings

The NCs also advise the Academy regarding invitations to host General Assemblies and participation in related events in Australia, and are actively engaged when bids are successful:

- An invitation recommended by the NC for Earth Sciences in 2004 led to the 10th Asia and Oceania Geosciences Society (AOGS) annual meeting being held in Brisbane in June 2013. See www.asiaoceania.org/aogs2013/public.asp?page=home.htm

- In April 2013 the NC for Quaternary Research, along with the Australian Quaternary Association, mounted a successful bid to hold the inaugural International Union for Quaternary Research (INQUA) *Early career researcher inter-congress meeting* in Wollongong 2-6 December 2013. See www.inqua.org/ecrMeetings.html
- The NC for Data in Science, together with the Executive Director of the ICSU World Data System International Programme Office, Dr Mustapha Mokrane, presented a panel discussion to encourage coordination of international developments in data for science, at the *eResearch Australasia* conference in Brisbane in October (see conference.eresearch.edu.au).

LIAISON WITH SISTER ACADEMIES AND EQUIVALENT ORGANISATIONS



Suzanne Cory, Greg Moriarty and Sangkot Marzuki at the signing of a new MOU with the Indonesian Academy

In June, the Australian Ambassador to Indonesia, Mr Greg Moriarty, hosted a reception at the Australian Embassy in Jakarta, where Academy President Professor Cory and the President of the Indonesian Academy, Professor Sangkot Marzuki, signed a new memorandum of understanding. This expands the areas of potential cooperation between the two academies, identified in an earlier 1995 agreement, to include science education and science diplomacy.

In July, Foreign Secretary Professor Andrew Holmes AM FAA FRS FTSE met with the National Science Council of Taiwan, and in October was invited to represent the Academy at the 10th *Science and technology in society* forum in Kyoto, Japan. At the forum, 1100 global leaders in science and technology, policy, business and media from approximately 100 countries, regions and international organisations,

'WE WOULD LIKE TO EXPRESS OUR GRATITUDE FOR THE EXCELLENT ORGANISATION OF THE IAP EXECUTIVE COMMITTEE IN CANBERRA'

IAP CO-CHAIRS PROFESSOR MOHAMAD HASSAN AND PROFESSOR VOLKER TER MEULEN

reflected on how to expand the 'lights' and control the 'shadows' of science and technology, and also discussed innovation and sustainability (see www.stsforum.org/?language=english&this_page=annual-meeting-2013).

INTER-ACADEMY ACTIVITIES

IAP Executive Committee meets in Canberra

The IAP: the global network of science academies (previously known as the InterAcademy Panel) was launched in 1993 and includes 105 academies. Its main goal is to help academies work together to advise citizens and public officials about scientific aspects of critical global issues.

The Academy's representation on the IAP Executive Committee ended in 2012 after two consecutive three-year terms (the maximum allowable), beginning in 2006. However, in October 2013, the Academy hosted the IAP Executive Committee following a successful bid by Foreign Secretary Professor Holmes at its meeting in October 2012. Twenty-nine participants from 21 national science academies and other international science organisations attended. Professor Holmes represented the UK Royal Society and past President Professor Kurt Lambeck AO FAA FRS represented the Association of Academies and Societies of Sciences in Asia. The event program included a school visit to see the Academy's *Primary Connections* program in action (see photo page 30) and, with the support of the Department of Industry, attending the 2013 Prime Minister's Science Prizes award ceremony. Feedback from the delegates was very positive.

In May 2013, Secretary Education and Public Awareness Professor Jenny Graves AO FAA participated in an IAP Science Education Program meeting in Kuala Lumpur, Malaysia, which focused on the *Grand challenge on global scientific literacy*. This arose from discussion promoted by the Academy at the IAP General Assembly's conference



The IAP Executive Committee visited Fadden Primary School in Canberra to see *Primary Connections* in action

Grand challenges and integrated innovations: science for poverty eradication and sustainable development held in Rio de Janeiro, Brazil, in February 2013.

Australia to remain on IAC board

The InterAcademy Council (IAC) was established by the IAP in 2000 to produce reports on scientific, technological and health issues related to the great global challenges of our time, providing knowledge and expert advice to international organisations such as the United Nations.

Its governing body includes 15 academies of science and equivalent organisations from developed and developing countries, and representatives from the IAP, the International Council for Science, the International Council of Academies of Engineering and Technological Sciences, the InterAcademy Medical Panel (IAMP) and the Academy of Sciences for the Developing World.

The Australian Academy was elected to the IAC Board in 2009 to serve the first of two consecutive four-year terms. At a board meeting in Amsterdam in June, where the Academy was represented by past President Professor Kurt Lambeck AO FAA FRS, strong endorsement was received for the Academy's re-election for a further four-year term.

The Academy endorsed the following statements from the IAP, and is working with the US National Academy of Sciences to draft a proposed statement on science education and science literacy:

Table 5: IAP statements endorsed

Date	Statement
August	<i>Response to the Report of high level persons on the post-2015 development agenda — a new Global Partnership</i> www.interacademycouncil.net/24770/28579.aspx
November	<i>Antimicrobial resistance — a call for action</i> www.interacademies.net/News/PressReleases/22792.aspx

Association of Academies and Societies of Sciences in Asia

At the request of the IAP, the Academy facilitated the formation of the Association of Academies and Societies of Science in Asia (AASSA) to tackle long-term challenges requiring science based advice. Past President Professor Kurt Lambeck AO FAA FRS and Secretary Education and Public Awareness Professor Jenny Graves AO FAA are Immediate Past President and Member-at-Large respectively.

In September, Professor Graves participated in an AASSA workshop on women in science, hosted by the Indian National Science Academy (INSA) in New Delhi, and attended a concurrent summit of the South Asian Science Academy as an observer. This was the second of a series of activities for the advancement of women in science organised by AASSA. The workshop participants identified common themes and action plans to help advance women in science, including establishing a special committee on women in science and engineering, to which Professor Graves was appointed.

In October, Professor Graves attended the first AASSA Executive Board meeting in Manila, Philippines, and presented at an associated *International symposium on emerging technologies for a greener Earth*. Recommendations from the symposium included that AASSA and member academies launch major collaborative research projects among Asian researchers in the area of green technologies for sustainable development.

INTERNATIONAL AWARENESS OF AUSTRALIA'S SCIENCE AND RESEARCH CAPABILITIES

The Academy undertook a number of activities to promote Australia's science capabilities internationally and identify opportunities for collaborative partnerships including:

- Organising briefings and visits for senior representatives and delegations seeking to develop understanding of Australia's science capabilities and research system from India, Korea, the US and Vietnam; and international research funding institutions and foundations from the European Union, Japan and Germany
- Facilitating a meeting between the President of the Indonesian Academy of Science and the CEO of the National Health and Medical Research Council about collaborations, including the possibility of a workshop on maternal health in 2014 in Indonesia
- Facilitating a visiting lecture series by 10 senior Australian researchers to visit 50 research institutions in India, supported by the then DICCSRTE (see media coverage below)
- Facilitating a visiting lecture series by three senior Australian researchers to visit 15 research institutions in Indonesia, supported by the Australian Embassy in Jakarta
- Continuing to liaise closely with other countries' embassies in Canberra, including briefings for incoming science specialists for the embassies of China, France, the UK and the US
- Responding to requests for assistance from Australian embassies, e.g. identifying experts in nanotechnology and renewable energy to participate in Thailand's National Science and Technology Fair in September, and identifying experts in health, technology, energy and agriculture for the OzFest event hosted by Indonesia, February – May 2014.

The Academy has consistently promoted the potential for scientific collaborations that address common problems and build constructive international partnerships, to contribute positively to Australia's diplomatic efforts¹. So it was pleasing to be invited to participate in pre-departure briefings for eight new Education and Science Counsellors, arranged by the then DICCSRTE, and contribute to Department of Foreign Affairs and Trade briefings to raise awareness of science diplomacy in overseas staff taking up new postings.



Ten senior Australian researchers visited India to talk about science

¹ Australian science in a changing world: innovation requires global engagement www.science.org.au/publications/australian-science-changing-world-innovation-requires-global-engagement

**OBJECTIVE A
PROMOTE EXCELLENCE IN
SCIENTIFIC RESEARCH
NATIONALLY AND
INTERNATIONALLY**

**OBJECTIVE B
DEVELOP AND
SUSTAIN A NATIONAL
SCIENTIFIC CULTURE**

**OBJECTIVE C
PROVIDE VALUED
INDEPENDENT SCIENTIFIC
ADVICE TO ASSIST POLICY
DEVELOPMENT AND
PROGRAM DELIVERY**

5

ENSURING THAT THE ACADEMY AND THE FELLOWSHIP ARE FULLY REPRESENTATIVE OF THE BEST SCIENTISTS IN AUSTRALIA, AND PROMOTING COMMUNITY RECOGNITION OF THE CONTRIBUTIONS OF HIGH QUALITY SCIENCE TO HEALTH, WELL-BEING AND NATIONAL PROSPERITY

The Academy's rigorous election process creates a Fellowship that includes Australia's most eminent researchers and science advocates, representing a powerhouse of intellect, passionate about ensuring science's capacity to contribute to the future of the nation, and available as an independent source of knowledge and expertise to inform evidence based decision making and policy formulation.

Through the generosity of Fellows, their families and colleagues, and like-minded individuals and organisations, the Academy presents a range of honorific awards, research grants and travelling fellowships each year. These awards celebrate both the achievements of the person after whom they are named, and create awareness and contribute towards the advancement of science in many fields of research.

COMPOSITION OF THE FELLOWSHIP

At 31 March 2014, the Fellowship comprised 481 of Australia's leading researchers, elected on the basis of their personal contributions to science. The Academy elects up to 20 new Fellows each year and the successful candidates for 2014 are listed on pages 7–9.

The high quality of the scientists elected to the Fellowship continues to be confirmed by international and national awards recognising achievement, elections to other prestigious academies, significant representation in the highest categories of research awards, and awards for service to the community (see pages 9–12).

The Council was concerned and disappointed that no women were elected in 2013 and, following

discussion at the Annual General Meeting of the Fellowship in May 2013, implemented a range of actions to ensure that eligible female scientists were nominated for the 2014 election round. These changes resulted in an overall increase of new nominations, about half of which were for women.

For future election rounds, Council has established Discipline Nominating Groups (DNGs) corresponding to each Sectional Committee (SC), comprising former SC and Council members. The DNGs' mandate is to identify and arrange nominations for electable candidates, including from under-represented groups in the Fellowship, while maintaining scientific excellence as the key criterion for election. The diversity categories currently include women, younger scientists, cross-disciplinary scientists and researchers from emerging disciplines. The DNGs will also identify suitable nominees and nominators for the Academy's honorific and other awards (see below) and for invited external awards.

ACADEMY MEDALS AND LECTURES

The Academy's 2013 honorific awards to career researchers for distinguished lifetime contributions, and for outstanding achievements by early- and mid-career researchers (EMCRs), were presented at the Academy's annual celebratory event *Science at the Shine Dome* in May 2013 (see Strategy 7).

The Secretaries undertook a comprehensive review of the current honorific awards during the year, examining their sustainability into the future and

the balance of disciplines, as well as refreshing the composition of award committees and the formal membership renewal process. To encourage the submission of nominations, the awards timetable was also changed to separate the closing date for nominations from that for new Fellows, and the award committee, nominator and referee guidelines were updated to conform with recent changes to the Fellowship election guidance mentioned above.

Academy Medal

The Australian Academy of Science Medal was established in 1990 to 'recognise outstanding contributions to science, by means other than the conduct of scientific research, by a person outside the Fellowship.' Only seven people have received this prestigious award to date.

In June 2013 the Academy Council decided to award the Academy Medal to philanthropist, business leader and 2011 Australian of the Year, Mr Simon McKeon AO FAICD.

In March 2014 the Academy Council decided to award a second medal to Professor Harry Messel AC CBE, in recognition of his 'conspicuous and enduring service' to the cause of science in Australia.

The medals will be presented at *Science at the Shine Dome* 2014.

Career awards

The 2014 honorific career awards for scientific excellence were awarded to the following researchers for their contributions to science:

- **Matthew Flinders Medal and Lecture:** Professor Kurt Lambeck AO FAA FRS, Research School of Earth Sciences, Australian National University
- **David Craig Medal for research in chemistry:** Professor Curt Wentrup FAA, School of Chemistry and Molecular Biosciences, The University of Queensland
- **Haddon Forrester King Medal in Earth and related sciences:** Dr Neil Williams PSM FTSE, formerly of Geoscience Australia
- **Mawson Medal and Lecture for Earth sciences in Australia:** Dr Gavin Young, College of Physical and Mathematical Sciences, Australian National University
- **Ian Wark Medal and Lecture for contribution to the prosperity of Australia through scientific research:** Professor Min Gu FAA FTSE, Centre for Micro-Photonics, Swinburne University of Technology.

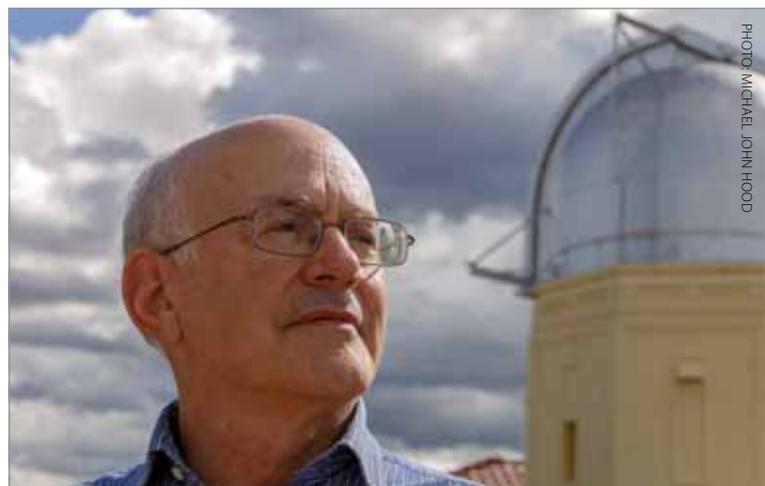


PHOTO: MICHAEL JOHN HOOD

The 2013 Matthew Flinders Medal and Lecture was awarded to Professor Ken Freeman FAA FRS, from the Australian National University. Professor Freeman presented a lecture on 'Dark matter in galaxies' during *Science at the Shine Dome* in May 2013. He was awarded the Matthew Flinders Medal in recognition of his work in shaping our current understanding of the dynamics and structure of galaxies. Professor Freeman was the first to identify the necessity for dark matter in galaxies and has co-established the field of galactic archaeology, in which fossil records of stars are used to trace the formation of the Milky Way. His ideas have helped launch the one billion dollar European satellite Global Astrometric Interferometer for Astrophysics, which will work with a purpose-built instrument on the Anglo-Australian Telescope to fossick for stars that will chronicle the history of the galaxy since its birth more than 13 billion years ago.

Early career awards

The Academy Council has approved changes to the Standing Orders for Junior Career Awards that will apply to nominations from 2014 onwards. They will now be formally known as the Early- and Mid-Career (EMCR) Awards and the eligibility criterion has been changed to provide alignment with the EMCR Forum (see Strategy 2) and Theo Murphy events (see Strategy 7). Rather than the age-defined 'no more than 40 years of age in the calendar year of nomination' the limit will now be the more flexible 'up to 15 years post-PhD', retaining Council's capacity to allow for significant career interruptions.



The inaugural Nancy Millis Medal was awarded to Emma Johnston

The 2014 honorific early career awards for scientific excellence were awarded to the researchers in Table 6 below, who were required to be no more than 40 years old when they were nominated.

Council also approved the establishment of two EMCR medals for younger scientists:

- **Nancy Millis medal** for EMCR women researchers in all natural sciences, available for the first time in 2014 (proposed by the Academy Council). The inaugural medal was awarded to **Professor Emma Johnston**, from the University of New South Wales School of Biological, Earth and Environmental Sciences and inaugural Director of the Sydney Harbour Research Program at the Sydney Institute of Marine Science

- **John Booker medal** for EMCRs in engineering science, available for the first time in 2015 (proposed by the National Committee for Mechanical and Engineering Sciences and supported by the Deans of Engineering Science).

RESEARCH AWARDS

The Academy administers funds from individuals wishing to support younger scientists to conduct research on a range of topics in Australia (for more information see www.science.org.au/awards/research-award.html):

2013 Margaret Middleton Fund for endangered Australian native vertebrate animals

This fund provides support for conservation-based research of Australian ecosystems that will ultimately lead to tangible outcomes for management.

The following researchers were awarded grants in 2013:

- **Mr Laurence Berry**, Australian National University: 'Fine-scale post-fire landscape ecology of the mountain brushtail possum, *Trichosurus cunninghamii*' — \$7183
- **Mr Christopher Henderson**, Griffith University: 'How effective are marine protected areas (MPAs) at protecting mobile predatory fish species?' — \$12 000

Table 6: Early career awards

Award	Awardee
Fenner Medal for research in biology (excluding the biomedical sciences)	Professor Katherine Belov , Faculty of Veterinary Science, The University of Sydney
Anton Hales Medal for research in Earth sciences	Dr Julie Arblaster , Australian Bureau of Meteorology
Christopher Heyde Medal for mathematical sciences	Associate Professor David Warton , Department of Statistics, University of New South Wales
Dorothy Hill Award for female researchers in the Earth sciences including reef science, ocean drilling, marine science and taxonomy in marine systems	Dr Maria Seton , School of Geosciences, The University of Sydney
Gottschalk Medal for research in the medical sciences	Dr Kieran Harvey , Peter MacCallum Cancer Centre
Le Fèvre Memorial Prize for research in basic chemistry	Associate Professor Richard Payne , School of Chemistry, The University of Sydney
Pawsey Medal for research in physics	Professor Geoffrey Pryde , School of Information and Communication Technology, Griffith University
Frederick White Prize for scientific achievements contributing to the understanding of natural phenomena	Professor Chris Turney , Climate Change Research Centre, University of New South Wales



NORTHERN CORROBOREE FROG DISEASE DYNAMICS AND RECOVERY

Margaret Middleton fund awardee Ben Scheele's PhD research is based on understanding why some corroboree frog populations have survived despite the presence of the disease *chytridiomycosis*, while other populations have rapidly become extinct. The emergence of the wildlife disease *chytridiomycosis* has resulted in amphibian declines and extinctions globally. In sub-alpine regions of southern Australia *chytridiomycosis* is the major threatening process for the critically endangered corroboree frog.

The award funded the analysis of disease diagnostic samples collected from different populations of both species of frogs in the wild. Mr Scheele confirmed his hypothesis that

populations that co-occur with high numbers of the common eastern froglet are more likely to decline because this species carries *chytridiomycosis* without experiencing mortality, thus its presence increases the frequency of disease in corroboree frogs. Where corroboree frog populations occurred by themselves disease was uncommon, providing a positive outlook for these populations. This knowledge is currently being used to inform the development of conservation strategies for the corroboree frog.

'Without the [fund's] support it would not have been possible to conduct this study because disease diagnostics are relatively expensive,' Mr Scheele said.

- **Ms Stephanie Hing**, Murdoch University: 'Stress and disease in the decline of the critically endangered woylies *Bettongia penicillata*' — \$10 000
- **Ms Wendy Neilan**, Australian National University: 'The effect of matrix heterogeneity on avian diversity in commodity production landscapes of temperate and subtropical Australia' — \$15 000.

In addition, a report was received on the research results from the **2012 Margaret Middleton Fund** recipient, Mr Ben Scheele, from the Fenner School of Environment and Society, Australian National University (see above).

2014 Douglas and Lola Douglas Scholarship in Medical Science

This scholarship is offered as a 'top up' scholarship to a high-ranked PhD candidate awarded a National Health and Medical Research Council training scholarship in one of the areas of Indigenous or primary health care, with preference given by the Academy to the area of Indigenous health research.

- **Ms Emma Grant**, The University of Melbourne: 'Understanding the immune response to influenza in the Indigenous and non-Indigenous populations' — \$7000 per year for up to three years.

2014 Moran Award for the History of Science Research

The Moran Award is aimed at postgraduate students and other independent researchers with expertise in the history of Australian science. Its purpose is to encourage use of the Basser Library (see Strategy 7) collections, especially by younger researchers, and it can be used towards travel and accommodation costs.

The following researchers were awarded grants in 2014:

- **Mrs Deirdre Slattery**, La Trobe University: to consult the Fenner collection in preparation for the publication of a revised edition of her 1998 book, *Australia's Alpine National Park, Kosciusko, Alpine and Namadgi* — \$1680.

- **Dr Danielle Clode**, School of Humanities, Flinders University: to research the papers of Edith Coleman and other naturalist writers of the 19th century in preparation for her proposed book on the topic — \$1250.

2014 Travelling Fellowships

The Academy administers funding that enables distinguished researchers to interact with Australian researchers and, through public lectures, with the broader community (see Table 7).

2013/14 Oxford Nuffield Fellowship

Dr Thomas Edwards was awarded the 2013/14 Oxford Nuffield Medical Fellowship on the recommendation of the Australian Academy of Science, valued at \$75 000.

Dr Edwards, a recently qualified ophthalmologist from the Royal Victorian Eye and Ear Hospital, Melbourne, aims to develop expertise and understanding in electronic retinal implant surgery and retinal gene therapy. His research attachment is offered by Professor Robert Maclaren from the Nuffield Laboratory of Ophthalmology, University of Oxford.

New research fund

Through the generosity of the late Thomas Davies, the Academy Council has established a fund to offer research grants in the fields of marine, soil and plant biology in perpetuity from 2015, in accordance with the conditions of Mr Davies' will. For more information see www.sciencearchive.org.au/awards/awards/davies.html

Table 7: 2013–2014 Travelling Fellowships				
Awardee	Institution	Funded by	Award	Purpose
Graeme Caughley Travelling Fellowship in ecological science				
Dr Rodney van der Ree	Royal Botanic Gardens, Melbourne	CSIRO Division of Wildlife and Ecology, the Australasian Wildlife Management Society, the New Zealand Crown Research Institute Manaaki Whenua-Landcare Research and friends and colleagues of the late Dr GJ Caughley FAA	\$7000	Travel to China, India, Singapore, Brazil and South Africa in 2014 to promote the science of road ecology in developing countries to minimise impacts on wildlife
AK Head Travelling Scholarship for Mathematical Scientists				
Dr Huy The Nguyen	The University of Queensland	The Gwenneth Nancy Head Foundation	\$14 258	Travel to Switzerland, Canada, UK and Germany
Lloyd Rees Lecture in chemical physics				
Dr Catherine Foley PSM FTSE	CSIRO Materials Science and Engineering	Friends and colleagues of the late Dr Lloyd Rees CBE FAA	Return airfare to Melbourne for awardee and one night's accommodation	A lecture in chemical physics that recognises the contributions of the late Dr ALG Rees FAA.
Selby Travelling Fellowship for excellence in science				
Professor Ullrich Steiner	University of Cambridge	The trustees of the Selby Scientific Foundation	\$12 950	A lecture tour in 2014 entitled 'How nature makes materials'
Geoffrey Frew Fellowship				
Professor Otto Rainer Blatt	Institute of Experimental Physics, University of Innsbruck	Mr Geoffrey SV Frew and funds from the former National Committee for Spectroscopy	\$6050	To participate in the Australia and New Zealand Conference on Optics and Photonics (ANZCOP) held in Perth 8–12 December 2013

For more information see www.sciencearchive.org.au/awards/travelling-fellowships.html

6

SUPPORTING THE TEACHING OF SCIENCE AT ALL LEVELS (PRIMARY, SECONDARY, TERTIARY), ELEVATING NATIONAL STANDARDS, ENHANCING TEACHER COMPETENCIES AND ENCOURAGING STUDENT CONSIDERATION OF SCIENCE AND TECHNOLOGY BASED CAREERS

The Academy is committed to promoting science education as a contribution to informed citizenship and to encourage young people to prepare for careers based on science and technology. In close consultation with the federal, state and territory education sectors, the Academy is actively involved in the implementation of the national science curriculum through the development of teaching resources and professional learning to improve teacher quality, and inquiry-based curriculum resources that stimulate student interest and enhance learning.

SCHOOL SCIENCE PROGRAMS SUPPORT TEACHERS AND STUDENTS

The Academy has two award-winning programs that support the effective teaching of science in primary and early secondary schools: *Primary Connections: Linking science with literacy* and *Science by Doing*. The Government, both during and after the 2013 federal election, indicated its intention to continue to fund the programs, which were first funded under the previous Coalition government.

PRIMARY CONNECTIONS: LINKING SCIENCE WITH LITERACY

Primary Connections was launched by the Academy in 2004 to help boost the confidence of primary school teachers (who often have no formal training in science) and encourage young students' natural interest in science and develop their mathematical, communication and documentation skills. The program has been funded by the Government through five funding agreements totalling \$11.2 million between 2004 and March 2014.

'WE'LL MAINTAIN FUNDING OF TWO HIGHLY SUCCESSFUL SCIENCE EDUCATION PROGRAMMES — PRIMARY CONNECTIONS AND SCIENCE BY DOING — THAT WERE THREATENED WITH CUTS UNDER THE PREVIOUS GOVERNMENT'

MINISTER FOR EDUCATION, THE HON CHRISTOPHER PYNE, SPEECH TO NATIONAL CONFERENCE OF THE INDEPENDENT UNION OF AUSTRALIA, CANBERRA, 3 OCTOBER 2013

Primary Connections marked a major milestone in May 2013 with the launch of the final three curriculum units to complete the set of 31 units required to implement the national science curriculum from foundation to year 6 (see page 40). The units will be available to all Australian schools in html and PDF through Scootle, the Education Services Australia portal. See www.primaryconnections.org.au.

The Academy's School Science Education Advisory Board, which was established by Council to support the transition of *Primary Connections* to a self-sustaining not-for-profit entity within the Academy, met four times during the year. In May 2013, Council accepted a recommendation from the Advisory Board to form two divisions. The former Director of *Primary Connections*, Ms Shelley Peers, assumed the role of Director — *Primary Connections* Development, with responsibility for new funded projects and international development of the program. Mr David Kellock was appointed in August 2013 as Director — *Primary Connections* Operations to lead operational activities, including product development, editorial, production, sales and marketing, and professional learning.



Brian Schmidt, Shelley Peers, David Atkins from the Department of Education, and Jenny Graves at the *Primary Connections* launch

PRIMARY CONNECTIONS SUITE COMPLETED

Nobel Laureate Professor Brian Schmidt AC FAA FRS, Secretary Education and Public Awareness Professor Jenny Graves AO FAA and Director *Primary Connections* Development, Ms Shelley Peers AM, announced the completion of the full suite of *Primary Connections: Linking science with literacy* curriculum units, on 10 May 2013 at the Shine Dome.

The release of the final three titles completed the full suite of 31 units, culminating more than eight years of work, funded by the Australian Government.

The launch gave the audience the opportunity to hear more about the Academy's world leading program and its impact on Australian primary school education and scientific literacy.

Primary Connections is making a significant contribution to high quality science education across Australia. Attendance at the launch by many Academy Fellows and members of the education community was testament to the high regard in which the program is held. Professor Schmidt spoke about his passion for education and Professor Graves thanked all those who had contributed to its development.

Primary Connections Operations

Teaching and learning

A package of assessment advice and student work samples for each *Primary Connections* unit was developed with Australian Government funding and released on the website in early 2014. These offer further support for teachers using *Primary Connections* by providing clear work samples and assessment guidelines.

Development of *Primary Connections'* first truly digital resources began in 2014. The new resources will provide interactive versions of unit materials, allowing teachers to work on electronic whiteboards to further enhance learning and teaching.

Professional learning

A key aim of *Primary Connections* is to train science leaders in every primary school in Australia through its Curriculum Leader program. Other courses are also provided including introductory workshops, ongoing development support for teachers, and workshops for tertiary pre-service educators. Table 8 summarises these activities.

The professional learning workshops were well subscribed throughout the year. Almost 1000 teachers from more than 500 schools attended 30 workshops, offered at different levels, and more than 100 teacher trainers from 65 university campuses across Australia attended three pre-service educator workshops. Participants gave very positive feedback for all types of training (see page 41).

Table 8: Professional learning activities April 2013 – March 2014

Type of training	Number of workshops	Number of schools/campuses	Number of participants
Introductory workshop for teachers	15	59	334
Curriculum leader training for school based leaders	9	182	246
Professional learning facilitator training for Victorian Science Specialist Initiative	1	31	53
Continuing professional development workshop for educators familiar with <i>Primary Connections</i>	5	236	328
Pre-service workshops for educators in the tertiary sector	3	65	103

'RICH WITH SCIENTIFIC LITERACY'

'I highly value the units and the training. It has made me a much more confident teacher of science.

I love the way PC is rich with scientific literacy and very user friendly for generalist teachers'

— teacher, South Australia

'They're excellent resources, much valued by all teachers I've ever spoken to about them'

— teacher, Tasmania

'It allows teachers who are not confident with science to increase their knowledge on a variety of topics'

— teacher, Western Australia

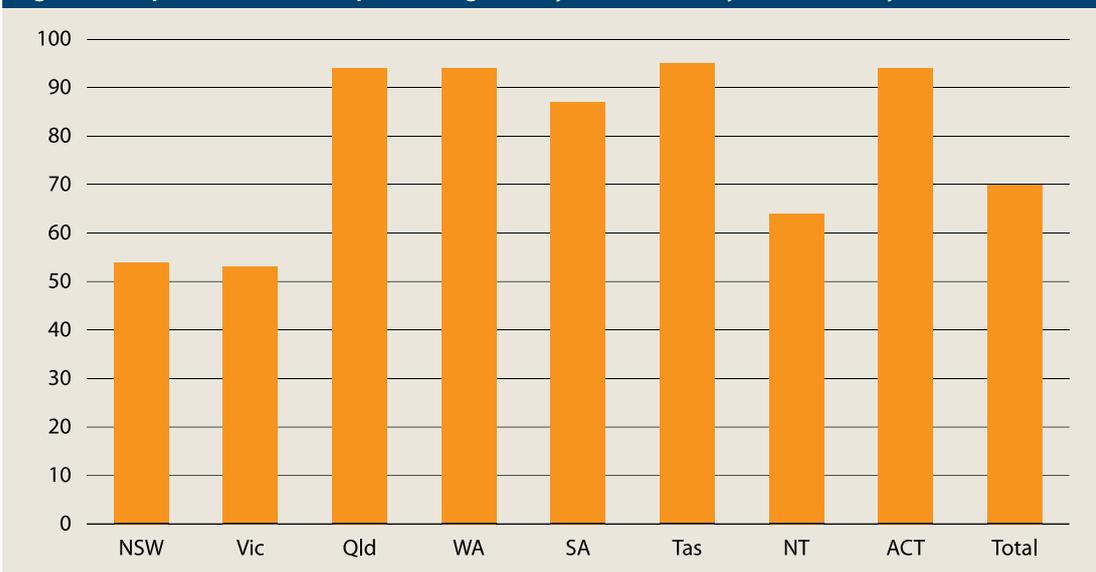
Distribution

Purchases of *Primary Connections* units grew steadily, increasing by 30%. Contributing factors were the continuing implementation of the *Australian Curriculum: Science* and improved marketing reach. Since the program began in February 2006, almost 40 000 units have been purchased by more than 5000 schools, representing 70% of the primary and

combined primary/secondary schools in Australia. Abacus Educational Suppliers in Perth continues to oversee the ordering and distribution of *Primary Connections* units and supplementary resources.

Figure 1 shows the proportion of primary and combined primary/secondary schools purchasing *Primary Connections* units, by state and territory, February 2006 to December 2013.

Figure 1: Proportion of schools purchasing *Primary Connections* by state/territory



Primary Connections updated and enhanced its website www.primaryconnections.org.au, which went live at the end of February 2014. Key features include:

- Ability to view all resources in detail and generate an order form
- Interactive professional learning calendar and the capacity to register and pay online
- Membership section to provide more support for teachers and create a stronger network of *Primary Connections* teachers.

The new website will significantly improve customer service and purchasing capabilities by making it easier to communicate with customers and for them to find information about *Primary Connections* resources, including professional learning.

Website

In addition to sending newsletters to educators and emailing updates to users, *Primary Connections* finalised a major upgrade of its website (see above).

Primary Connections Development

The *Primary Connections* Development division designs and manages projects that support the program's approach in Australian schools and internationally. In Australia, the focus is particularly on rural and remote communities including those with a significant Indigenous population. It will seek government, philanthropic, grant and sponsorship funding for these activities, including through *The Enlightening* campaign (see page 13).

Promotional activities

The Director — *Primary Connections* Development, Ms Shelley Peers, undertook a range of activities to increase awareness and understanding of the program:

NATIONAL

- Conference of the Western Australian Primary Principals Association, Perth, June 2013 — presentation on 'Expectations and results: effective science and literacy teaching using *Primary Connections*'
- Joined with Abacus for a combined promotional visit to the Northern Territory in August, visiting schools in Darwin, Palmerston and Katherine

and attending a Principals' Association meeting in Darwin. A key message was that *Primary Connections* was very effective for Aboriginal and Torres Strait Islander students because it included Indigenous Perspectives.

- STEM (science, technology, engineering and mathematics) symposium, 23 November, hosted by the Australian Government Department of Education and the Victorian Department of Education and Early Childhood Development (DEECD) at the John Monash Science School, on the occasion of a visit from the New York Academy of Sciences
- Victorian DEECD, STEM Roundtable 2, 28 November — presentation on what has been learned from developments in improving primary science teaching and from the extensive research and evaluation of the *Primary Connections* program
- Australian Government Department of Industry feature *Primary Connections* in its *e-Bulletin* in December 2013: www.ausindustry.gov.au/programs/innovation-rd/RD-TaxIncentive/Guidance-and-Information/RandDTaxIncentive-InformationBulletin/December2013/Pages/InnovationChampions-ShelleyPeers.aspx
- Major sponsor of 2013 National Science Week in August — *Primary Connections* announced a special offer in the National Science Week schools pack. More than 80 schools took advantage of the opportunity to purchase the entire suite of units at a discounted rate during the week. Almost half had not purchased *Primary Connections* previously.

INTERNATIONAL

- Inquiry Based Science Education (IBSE) Round Table — held by UNESCO's International Science, Technology Innovation Centre for South-South Cooperation in Jakarta, Indonesia, July 2013
- 7th International IBSE Conference — *Science learning assessment: trends and challenges* in Mexico City, November 2013 (see page 43)

While in Mexico, Ms Peers also facilitated a half-day pre-conference workshop with 35 regional primary science teacher leaders.

Primary Connections is also providing practical and mentoring support for development of a new national curriculum and resource materials for Timor Leste following a visit by Professor Brian Schmidt AC FAA FRS Nobel Laureate in May 2013.

PRIMARY CONNECTIONS — ON SHOW IN MEXICO

In November, 540 delegates attended the 7th international inquiry-based science education conference in Mexico City, *Science learning assessment: trends and challenges* where the Director — *Primary Connections* Development Ms Shelley Peers AM presented on 'Assessing science learning in *Primary Connections* — an Australian case study,' and was a panelist on the topic 'Educational policy and inquiry-based science education learning assessment'. Ms Peers described the extensive evaluation of the *Primary Connections* 5Es teaching and learning model (see www.primaryconnections.org.au/about/history/research-and-evaluation).

The conference was organised by Innovation in Science Education, The United States–Mexico Foundation for Science, and the Mexican Ministry of Education. Conference delegates were mainly pedagogical leaders from regional science education programs and lecturers from teacher training universities as well as education department policy makers.



Shelley Peers at the science education conference in Mexico

Corporate and philanthropic partnerships

In December 2012 *Primary Connections* entered into a partnership agreement with Schools Connect Australia (a Victorian Government initiative), and CSL Limited for each to provide \$60 000 over three years to promote uptake of *Primary Connections* in Victorian schools. The partnership has resulted in increased purchases of curriculum units, increased rates of attendance at professional learning events and improved engagement with the tertiary sector.

SCIENCE BY DOING

Science by Doing recognises that teachers of science in secondary schools usually have a specialisation in science. It focuses on establishing and maintaining mutually supportive learning communities in and between schools to provide ongoing teacher development. The program employs leading-edge digital technology to deliver free, online, fully interactive curriculum resources, carefully designed to effectively engage adolescent students in years seven to 10. *Science by Doing* was selected as a finalist in the education category of the 2013 The Australian Innovation Challenge.

'THESE RESOURCES TRULY ARE AMAZING. AS A SCHOOL WE WERE LOOKING AT OPTIONS FOR TEXTBOOKS AND RESOURCES FOR THE AUSTRALIAN CURRICULUM... I HAVE NEVER SEEN SOMETHING OF SUCH HIGH QUALITY MADE AVAILABLE FREE OF CHARGE. FANTASTIC!'

SOUTH AUSTRALIAN HEAD OF SCIENCE

Stage 2 of *Science by Doing* was completed, supported by a \$1.6 million allocation by Education Services Australia (ESA), and the program's website went live in July 2013. Teachers and students can register through the website to freely access the eight curriculum units (see Table 9, on page 44).

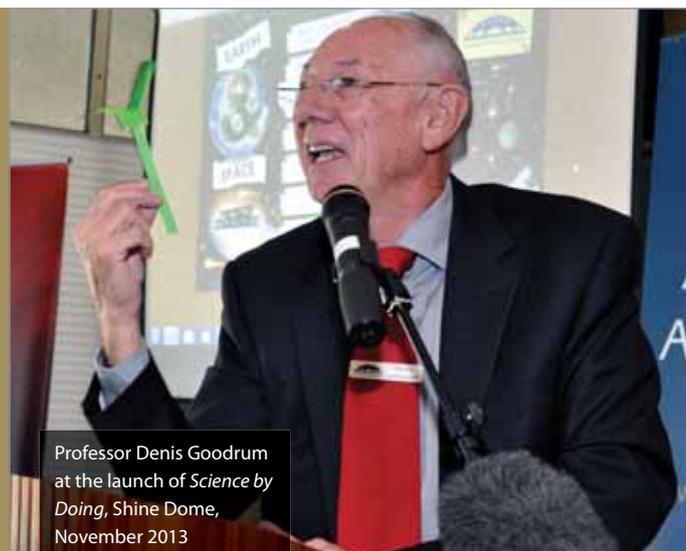
The units were formally launched in November 2013 (see page 44) at a breakfast at the Shine Dome in honour of the 2013 winners of the Prime Minister's Prizes for Science. By 31 March 2014, 3261 teachers and more than 5685 students had registered to use the units (see www.science.org.au/science-by-doing).

The development of the curriculum units in 2013 involved trialling nationwide with 13 schools across five states and territories, from the Catholic, independent and state school sectors. As well as online student and teacher feedback collated throughout the trial, staff from *Science by Doing* provided phone consultations and hosted or visited science teachers from trial schools, for professional learning and unit evaluation purposes.

Feedback from these schools also provided valuable input for development of more *Science by Doing* units and identified areas for further professional learning and resource development, such as e-notebooks to support the program's units.

SCIENCE STARS HELP LAUNCH NEW SECONDARY RESOURCES

National and international luminaries of science gathered at the Shine Dome in November to formally launch the Academy's junior secondary school science education program, *Science by Doing*. Executive Director Professor Denis Goodrum led the group in a short hands-on activity — making a helicopter out of a strip of paper — before the program was officially launched by Nobel Laureate Professor Brian Schmidt. Guests were also treated to live demonstrations by eight students who had used the units in their schools in NSW, the ACT, South Australia and the Northern Territory.



Professor Denis Goodrum at the launch of *Science by Doing*, Shine Dome, November 2013

Table 9: Suite of *Science by Doing* units available for years 7 to 10

year 7	The circle of life	Enough water fit for drinking	The science of toys	Earth and space
year 8	From little things big things grow	Rock, paper, scissors	Energy (available June 2014)	Rock your world (available February 2015)
year 9	Ecosystems and change	Chemical reactions (available August 2014)	Light, sound, actions (available August 2014)	Plate tectonics (available May 2015)
year 10	Evolution and heredity (available May 2015)	Chemical patterns (available February 2015)	Motion and energy transfer (available November 2014)	Systems on the big scale

'THANKS HEAPS TO THE SCIENCE BY DOING TEAM FOR THE DEVELOPMENT OF THESE RESOURCES. THEY HAVE RESULTED IN A HUGE SIGH OF RELIEF FROM MY TEACHERS. THE UNITS WILL CERTAINLY INCREASE THE ENGAGEMENT LEVEL OF STUDENTS!'

NSW HEAD OF SCIENCE



Science by Doing's online interactive content

Each curriculum unit includes a student guide, student digital component and teacher guide. The student guide, downloadable as a PDF, provides an overview of the unit plus instructions for each hands-on activity. The student digital component

is a web-based resource for students, containing animations, film clips, games, quizzes, online inquiry activities and focused questions for 'notebooking'. The teacher guide is a collection of lesson notes and assessment information.

A contract for Stage 3 of *Science by Doing* was finalised with the Australian Government in May 2013 for \$3.5 million over three years, and work began in August 2013 on the final eight curriculum units required to complete the full suite of 16 units for years 7 to 10 (see Table 9).

Promotional activities

National

Science by Doing staff conducted a variety of presentations and workshops to help familiarise the education community with the program (see Table 10 opposite).

International

The Promoting Real Australian–Indonesian Science Education (PRAISE) project drew upon the expertise developed by *Science by Doing* to undertake a pilot

Table 10: Science by Doing presentations and workshops

Date	Location	Conference/workshop	Title
April	Sydney	Science Teachers Association NSW biology conference at UNSW	Inquiry based teaching
April	Queanbeyan	Workshop for science teachers	Teaching inquiry science
May	Sydney	<i>Oxford Education Conference</i>	<i>Science by Doing</i>
August	Sydney	<i>Sustainability Education Conference</i>	Implementing the Australian Curriculum
August	Darwin	Workshop for NT science teachers	<i>Science by Doing</i>
October	Canberra	Workshop for national CSIRO education staff	<i>Australian Curriculum: Science</i>
November	Sydney	Workshop for teachers, South Sydney region	The 5E model and <i>Science by Doing</i>
November	Melbourne	STEM Roundtable meeting, Victorian Department of Education	<i>Science by Doing</i>
December	Gold Coast	<i>Cutting Edge Science Education Conference</i> , Griffith University	Science education and the future
December	Adelaide	Australian Association of Research into Education	Implementation of Australian science curriculum using SbD
February	Wollongong	Workshop for science teachers	<i>Science by Doing</i>

PRAISE PROJECT TRIALS CURRICULUM UNIT IN INDONESIA

In September Professor Denis Goodrum, Dr Kerrie Wilde and Mr Jef Byrne visited Bandung, Indonesia, to assist in an initial workshop with 50 Indonesian teachers trialling the chemistry curriculum unit 'Lebih dekat dengan zat' (get closer to matter). At the end of the trial in November, Dr Wilde and Mr Byrne returned to Bandung for a successful final reflection and evaluation workshop. Assuming further funding can be obtained, it is anticipated the PRAISE program will be extended to further curriculum units that will be implemented across Indonesia.



project to produce a chemistry curriculum unit for Indonesian high school students. PRAISE was funded by the Australian Government via AusAid (\$100 000) and Questacon (\$25 000) and implemented by the Southeast Asian Ministers of Education Organization (SEAMEO) for Quality Improvement of Teachers and Education Personnel (QITEP), located in Bandung, Indonesia. During the project Indonesian writers travelled to Canberra to work with the SbD team and held frequent teleconferences. This was followed by two highly successful workshops in Bandung (see above).

'THE KIDS REALLY LOVE IT, AND I LOVE THE NEW IDEAS AND WAY OF TEACHING. IT IS SO ENGAGING!'

QUEENSLAND ACADEMIC COORDINATOR, SCIENCE

After the September workshop, Professor Goodrum was a keynote speaker at a SEAMEO international conference in Jakarta, speaking about the future of science education. In July, Professor Goodrum also gave a multimedia presentation about *Science by Doing* at a SEAMEO centre directors' meeting in Bangkok.

7

PROVIDING FORUMS FOR DISCUSSION AND DEBATE, PUBLICATIONS AND BALANCED, EXPERT INFORMATION ON SCIENTIFIC ISSUES OF NATIONAL SIGNIFICANCE AND/OR COMMUNITY CONCERN

The Academy supports a wide range of activities to promote understanding, advancement and informed consideration of key areas of science issues in government, industry, the media, academia and the community. These include public presentations, conferences and workshops, and a range of publications.

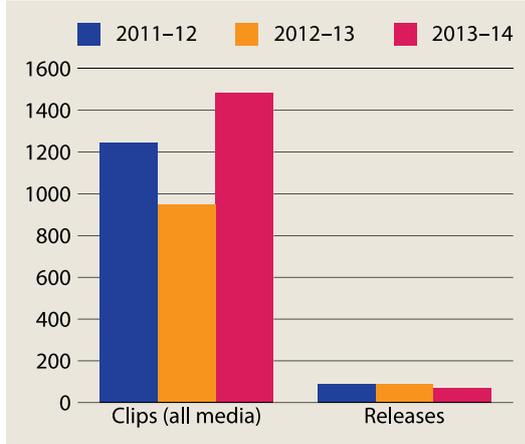
RAISING AWARENESS OF THE ACADEMY'S WORK

The Academy engaged in public discussions about science and science policy in a range of ways, including newsletters, reports, flyers, programs, brochures and booklets. It generated and responded to selected news and opinion pieces in the mainstream and online media; and initiated and participated in conversations through various social media tools and a range of digital channels, using rich content such as graphics, video and audio.

Academy in the media

By being proactive and responding in a timely fashion to science and science policy news, the Academy has continued to raise its profile as an authoritative source of balanced, expert information in the national and international news media. The Academy's federal election priorities for science, promoted through the President's National Press Club address (see page 47) and the launch of a national science literacy survey (see page 67), generated more than 600 news articles across print, broadcast and online media. Other issues that generated high levels of attention included the launch of the recommendations of the 2013 Theo

Figure 2: Our reach in the news media



Murphy (Australia) Think Tank, *Inspiring smarter brain research* (see page 52), and the announcement of the 2014 new Fellows (see pages 7–9), as well as the Academy's submission to the Victorian Government regarding the plan to graze cattle in national parks.

Social media channels Twitter, Facebook and YouTube target the under-45 demographic to promote the Academy's programs, statements and events, and to generate interest in and engagement with science. The Academy's presence and influence on social media grew considerably (see Table 11), with more than 5000 direct followers on Twitter and a collective reach of hundreds of thousands of accounts for a handful of individual tweets. YouTube enables the Academy to bring its events and talks to a much broader audience than could ever fit into a lecture theatre. Clips such as public lectures and symposium addresses, *Interviews with Australian scientists* and profiles

ACADEMY TRENDS NATIONALLY ON TWITTER

In a nationally televised address to the National Press Club on 3 July 2013, Academy President Professor Suzanne Cory emphasised the integral nature of science to everyday life: through technology, transport, food production, energy production, crime fighting, manufacturing, communications, healthcare, and more.

She stressed that a national strategy for science was crucial if Australia was to remain resilient,

responsive and relevant. Australia must invest more in research and development: to protect its economic competitiveness, social wellbeing and quality of life, to build resilience and to protect future productivity. The message resonated with television viewers and live audience members, whose enthusiastic tweeting drove the address and the Academy itself to become nationally trending topics on Twitter.

of Academy awardees attracted more than 17 000 individual views.

Social media

Table 11: Trends in Academy social media channels

	2011–12	2012–13	2013–14
Twitter (followers)	1 100	2 447	5 070
Facebook* (likes)	N/A	718	1 440
YouTube** (views)	N/A	297	17 452

*The Academy Facebook account was established in July 2012

**The Academy YouTube account was established in March 2013

Academy website

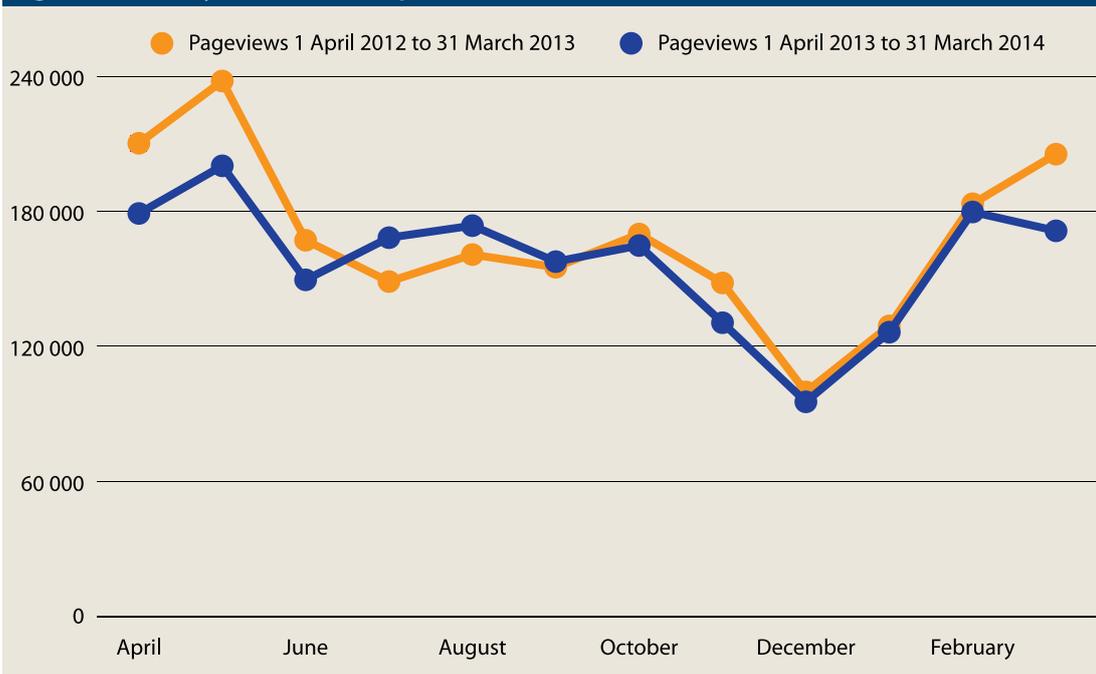
The Academy's website is its primary interface with the world, and thus critical to communicating its

activities and achievements — both now and as a historical record. The news and announcements section of the website is constantly updated with stories about the achievements of Fellows and the Academy. In March 2014 the Academy launched its new web presence, with a fresh new look and improved user experience. The new site is designed to be simpler and easier to use, and — crucially — links with the Academy's database of Fellows and committee members. It offers private areas for discussion between Fellows and committee members and links seamlessly with the new-look electronic newsletter.

Newsletter

This year the Academy's *Newsletter* was redeveloped to become fully web-based and distributed in an

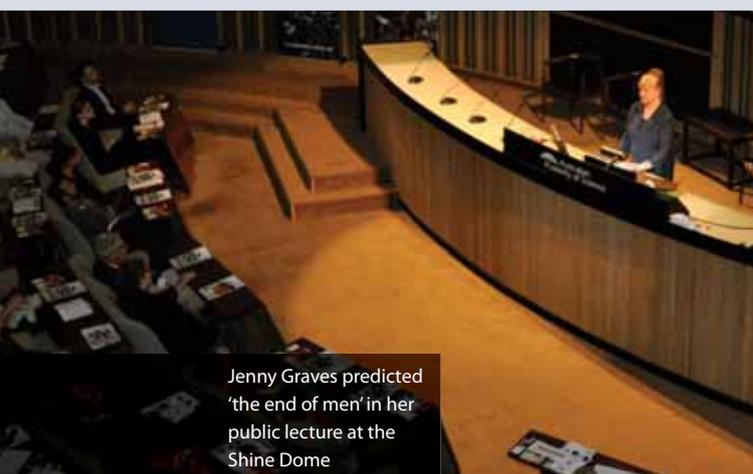
Figure 3: Academy website traffic April 2013 – March 2014



'END OF MEN' TALK GARNERS INTERNATIONAL FOLLOWING

The attention-grabbing *Weird mammal genomes, sex and the future of men* was the title for Professor Jenny Graves' talk in the Academy's *Australian Science: Global Impact* 2013 public lecture series, in which she predicted that the human male would disappear within 5 million years.

Professor Graves' talk not only attracted a full audience to the Shine Dome, but also quickly gathered an international following on YouTube and through the news media. To date, the talk has been viewed online more than 8700 times, and reported by hundreds of media outlets around the world, from morning television talk shows in the United States to national newspapers in India and religious press in the Middle East.



Jenny Graves predicted 'the end of men' in her public lecture at the Shine Dome

electronic direct mail (EDM) format to subscribers, with links to articles on the Academy's new website. The first electronic *Newsletter* was sent in March 2014 to a readership of Fellows and subscribers. To view all copies of the *Newsletter* go to www.science.org.au/academy-newsletter

Annual speaker series

Through its annual speaker series, the Academy proudly showcases great Australian science and educates the public on scientific issues of national importance. These well-attended lectures are held monthly (except for January and May) at the Shine Dome in Canberra, simultaneously broadcast via the internet for live viewing, and made available as downloads on the Academy's website and through its YouTube and iTunes channels.



Andrew Holmes demonstrating luminescence during his public lecture

2013: Australian science: global impact

The 2013 series, highlighting some of Australia's top scientists and their world-changing breakthroughs, was designed to complement Centenary of Canberra celebrations. It was chaired by Nobel Laureate Professor Brian Schmidt AC FAA FRS and attracted sponsorship from a range of science and research-related organisations (see Appendix 5 for sponsor details).

In addition to Professor Schmidt speaking on his discoveries on the accelerating expansion of the Universe, the series featured other world-class Australian scientists including those behind the invention of the bionic ear, the cervical cancer vaccine, wi-fi, and the chemistry of turning waste into environmentally friendly bio-oil.

The final lecture on 3 December, titled *Seeing the light with polymers — printed solar cells as a commercial reality*, by Academy Foreign Secretary Professor Andrew Holmes AM FAA FRS FTSE, provided an illuminating demonstration of chemistry in action.

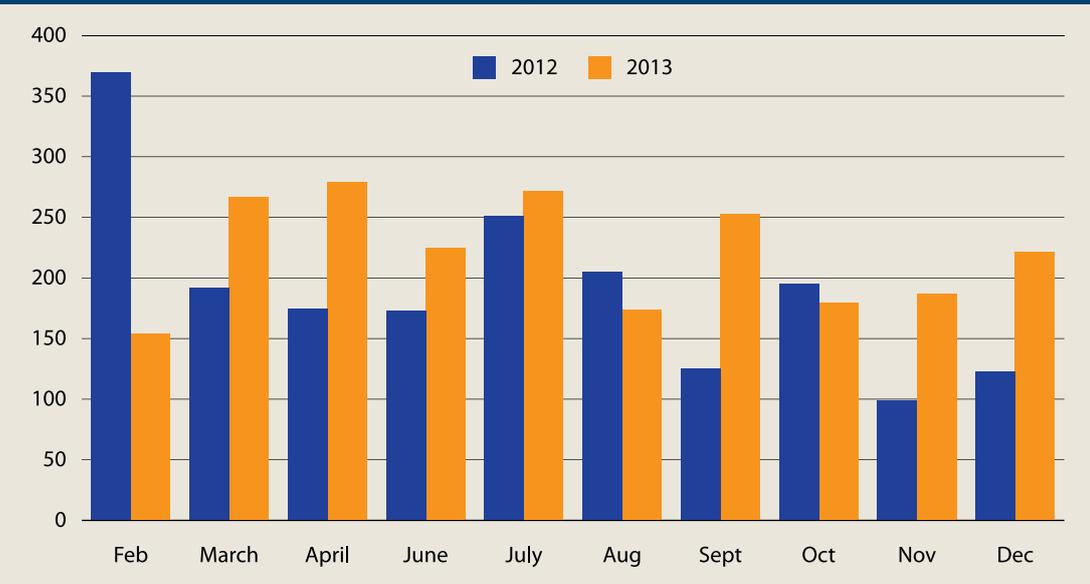
Lectures in the series attracted an average of 210 attendees with around a dozen watching live online (see Figure 4 opposite). YouTube viewing was usually around 100 in the month after posting, except for the lecture titled *Weird mammal genomes, sex and the future of men* by Professor Jenny Graves AO FAA, which attracted views from around the world (see left). Approximately 80% of respondents to the feedback survey rated the lectures as 'excellent' (excluding a lecture unfortunately marred by a technical malfunction). To view the lectures, visit www.science.org.au/public-speaker-series

SCIENCE BEHIND THE HEADLINES

In August 2013 the Academy and RiAus collaborated to present *Science behind the headlines* — a simulcast event held jointly at the Shine Dome in Canberra and the Science Exchange in Adelaide, to examine why science and innovation is one of the critical issues facing Australia in the next five years, and what Australia

requires to ensure it remains the ‘clever country’. The event featured panels in both cities, which interacted with one another and the audiences in each location. The discussion was also broadcast live, and can be viewed here www.youtube.com/watch?v=n_hE0w9nTCI

Figure 4: Attendance at 2012 and 2013 Academy public lecture series (including online)*



*Public lectures were not held in January or May

Table 12: Occasional presentations and lectures in 2013–14

Date	Event	Presenter(s)	Location
April 2013	Inaugural Lawrie Shears Public Lecture <i>Quality in education</i>	Professor Suzanne Cory AC PresAA FRS	Melbourne
June 2013	<i>Science in the media</i>	The Hon Jim Spigelman AC QC, ABC Chair	Shine Dome, Canberra
July 2013	<i>D/evolving Australia</i> — National Press Club Address	Professor Suzanne Cory AC PresAA FRS	Canberra
August 2013	<i>Science behind the headlines</i>	Professor Les Field AM FAA, Dr Catriona Jackson, Science & Technology Australia Chief Executive Officer, Ashley Wells, Federal Chamber of Automotive Industries, Ben Stapley, Plastics and Chemicals Industries Association	Adelaide and Canberra
February 2014	<i>The storytelling of science</i>	Professor Tim Flannery FAA, Secretary Education and Public Awareness Professor Jenny Graves AO FAA, Professor Peter Adams, University of Queensland, Lynne Malcolm, ABC Radio, Dr Jesse Shaw, Australian Science Communicators, and Dr Andrew Stephenson, The University of Queensland	Brisbane
February – March 2014	<i>How nature makes materials</i>	Professor Ullrich Steiner, 2013 Selby Travelling Fellow	Sydney, Brisbane, Melbourne, Adelaide and Perth

2014: Science stars of tomorrow

In the Academy's 60th anniversary year, the 2014 speaker series showcases young Australian scientists whose work offers new insights into outer space, inner space and the world around us. It is chaired by three prominent public friends of science, broadcaster Professor Robyn Williams AM FAA, former Climate Commissioner and author Professor Tim Flannery FAA, and long-time ABC journalist Ms Louise Maher. See www.science.org.au/public-speaker-series

Other presentations and events

The Academy also staged other presentations and public events in Canberra and other Australian capital cities (see Table 12, page 49) throughout the year, often taking advantage of visits by international scientists. More information can be found at www.science.org.au/events

Science development and application

The Academy organises and participates in a range of events designed to enhance scientific knowledge, explain science to the broader community, and explore ways in which science can be used for the benefit of the economy and society.

2013 Science at the Shine Dome

The Academy's flagship annual event to celebrate science is held in association with the Academy's Annual General Meeting (AGM) for Fellows. It incorporates the formal admission of new Fellows, the presentation of career and early- and mid-career

honorific awards (see Strategy 5), the annual dinner and a symposium, and programs for early career researchers and science teachers.

At *Science at the Shine Dome* in May 2013, the Academy admitted 21 new Fellows and presented 10 honorific awards. Each new Fellow and awardee spoke briefly about their research, providing fascinating insights into Australian scientific achievements and applications across a diverse range of disciplines. For more information and to view the presentations go to: www.science.org.au/events/science-shine-dome-2013

Sixty viewers watched presentations live online, and there were more than 3900 views of *Science at the Shine Dome* presentations on the Academy's YouTube channel in the year following the meeting.

The Academy's annual black-tie dinner was held at the National Gallery of Australia's Gandel Hall. The 2013 Career Awardees medals were presented, and guest speaker Sir David King FRS FAA, the UK former Chief Scientific Adviser, entertained and informed the audience with anecdotes about his time serving under Prime Minister Tony Blair.

Sir David also gave the keynote address for the 2013 symposium *Power to the people: the science behind the debate*, was convened by Professor Thomas Maschmeyer FAA FTSE. The symposium featured a line-up of some of the nation's finest researchers and leaders in the energy sector who gave a compelling, sometimes daunting, overview of the sector, including the future of fossil fuels, effects of climate change, the potential of new



Science at the Shine Dome, 2013 sponsors

low-carbon emission technologies, and the environmental, social and political consequences of projected energy shortages.

Sixty-five early-career researchers and 16 teacher delegates attended all public sessions. During the AGM, the early-career researchers attended targeted professional development sessions (see Strategy 2), and teacher delegates engaged in hands-on science activities at working laboratories, and were introduced to the Academy's education initiatives.

Delegate feedback on the conference was very positive. Of 71 respondents, 63% rated the event as excellent and 35% as very good. Around 800 tweets mentioning the hashtag #ShineDome2013 were sent during the event, reaching more than 100 000 Twitter accounts. The event generated 39 clips in the news media across print, broadcast and online news services.

Research conferences

Through the generosity of donors the Academy provides seed funding for three annual research conferences (see also www.sciencearchive.org.au/awards/research-conferences.html)

The National Committees for Science are also involved in organising annual or biennial conferences, usually in conjunction with relevant professional societies, to provide opportunities for researchers in their discipline area to showcase advances, and to identify research and training priorities.



Sir David King gave the keynote address at the 2013 *Science at the Shine Dome* symposium.

Theo Murphy High Flyers Think Tanks

The Academy's annual Think Tank brings together early- and mid-career researchers (EMCRs) from a broad range of disciplines to consider a topic of national significance. Participants apply fresh thinking about novel applications of existing science and technology, and identify gaps in knowledge that might be addressed by applying science (including social science) and technology.

The Academy receives support for the Think Tanks from the UK Royal Society's Theo Murphy (Australia)

Date	Event	National Committee/Partners	Attendees
8–12 July, Melbourne	2013 Elizabeth and Frederick White Conference, <i>Mathematics of Planet Earth, Melbourne</i> mathsofplanetearth.org.au/events/2013/	Australian Mathematical Sciences Institute; Australian Research Council Centre of Excellence for Mathematics and Statistics of Complex Systems	150
13 September – 2 October, Sydney	13th Australian Space Science Conference www.nssa.com.au/ocs/index.php?cf=15	National Committee for Space Science	160
10–11 October, Shine Dome, Canberra	2013 Fenner Conference on the Environment, <i>Population, resources and climate change: implications for Australia's near future</i> www.sciencearchive.org.au/awards/awards/fenner.html	Sustainable Population Australia; Dick and Pip Smith Foundation; and Professor Ian Clark	192
10–13 November, Sydney	2013 Boden Research Conference, <i>Life on a sun-drenched planet</i> www.sciencearchive.org.au/awards/awards/boden.html	Bupa Health Insurance; NSW Government; Olay in Australia; Lastek Pty Ltd; John Morris technology	160



Suzanne Cory at the opening of the Oliphant Auditorium at the National Centre for Synchrotron Science

2013 THINK TANK HARNESSES THE BEST OF NEUROSCIENCE

Inspiring smarter brain research in Australia was held at the Melbourne Brain Centre on 24–26 July 2013. Keynote speaker Professor Steve Furber CBE FRS from The University of Manchester gave a captivating opening address about his BBC Micro, which introduced computing into most UK schools, and the ARM microprocessor, which today powers most of the world's consumer electronics. Professor Terrie Inder, Director of the Washington University Neonatal Development Research (WUNDER) team, and recently appointed first female Chair of Child Health at Harvard University presented some fascinating findings about the impacts of pre-term birth and neonatal stress on the structure and function of the brain; and leading ethicist Professor Julian Savulescu, from Oxford University, presented on 'The neuroscience of moral judgement'.

The Think Tank dinner was held at the Australian Synchrotron. Attendees were welcomed by Professor Andrew Peele, Director of the Synchrotron, and given a fascinating tour of the facilities. Dinner was held at the newly

built National Centre for Synchrotron Science 400-seat auditorium, named after the Academy's founding President Sir Mark Oliphant AC KBE FAA FRS FTSE at a ceremony earlier in the day attended by Academy President Professor Suzanne Cory AC PresAA FRS and Sir Mark's daughter-in-law Ms Monica Oliphant.

There were 540 tweets during the event, generating exposure to approximately 150 000 accounts; 75% of participants responded to the feedback survey and 98% rated the event excellent or good.

The outcomes from the Think Tank deliberations were included in a report launched by the Minister for Health, The Hon Peter Dutton MP, at Parliament House in February 2014, and covered in national media. Its recommendations aim to guide future policy development and research prioritisation to ensure Australia provides a good platform to harness neuroscience's explosive growth. The report and event program are available at: www.sciencearchive.org.au/events/thinktank/thinktank2013/index.html#sthash.aJm4tATC.dbps

Fund. They provide a unique opportunity for career development and network creation for participants, and generate reports and recommendations to governments that have been well received and instrumental in influencing policy development.

2013 THINK TANK

The 11th annual Think Tank was officially opened by Adam Bandt MP, federal member for Melbourne, and included 60 early- and mid-career researchers

(EMCRs) from across Australia and neighbouring countries (one each from New Zealand, Malaysia and Sri Lanka). The event examined how to bring the disparate fields of neuroscience together and make Australia a world leader in brain research. The program included presentations from renowned Australian and international scientists (see above). Group discussions were guided by four topics: cognition, intelligence and executive function;

Federal Parliamentary Secretary for Industry, the Hon Bob Baldwin MP, opened the inaugural UNCOVER summit, which brought together exploration industry leaders, academics, and government agencies.

More than 180 delegates discussed how Australia can reach the mineral resources beneath the 80% of our continent that is 'covered' by highly weathered rock (known as regolith) and sedimentary basins. This portion of Australia, deep under the surface, remains largely unmapped and unexplored.

The summit will culminate in a report to be presented to relevant federal and state ministers, the Chief Scientist, the Australian Research Council, relevant federal and state geological surveys, universities and other stakeholders.

For more detail see www.science.org.au/publications/searching-deep-earth-vision-exploration-geoscience-australia

neurogenetics: inherited diseases and developmental biology; artificial intelligence, maths and modelling; and ageing, dementia, Alzheimer's disease and end-of-life issues.

2010 THINK TANK IMPLEMENTATION

The UNCOVER Implementation Committee — which was established following the 2010 Theo Murphy Think Tank *Searching the deep Earth: the future of Australian resource discovery and utilisation* brings together industry, government, researchers and other stakeholders and works to find ways to explore beneath the 80% of Australia that is potentially well-endowed with minerals but has thus far remained unexplored.

On 28 January 2014 committee members Geoscience Australia and the Deep Exploration Cooperative Research Centre announced an agreement to collaborate on regional drilling to reveal the hidden mineral potential of Australia's buried but prospective geology, describing it as a 'great example of different organisations collaborating under the 'UNCOVER' mineral exploration strategy of the Australian Academy of Science'.

The inaugural UNCOVER summit was held in Adelaide from 31 March to 1 April 2014 (see above).



Preparing to launch balloon 'rockets' at the launch of National Science Week

A report from the summit will be published on the Academy's website and sent to the relevant federal and state ministers. For more detail see www.science.org.au/policy/uncover.html

Working with others to promote science

The Academy continued to participate actively in broader outreach activities including the former Department of Industry, Innovation, Science, Research and Tertiary Education's *Inspiring Australia* initiative, and National Science Week. On behalf of the Academy, Director Communications and Outreach Kylie Walker chaired National Science Week in the ACT and sat on the federal coordinating committee for National Science Week 2013. Ms Walker also presented on Academy public awareness activities at the Australian Science Communicators annual conference in Brisbane in February 2014 and participated in a public event.

As in previous years, the Shine Dome was made available for part of the National Youth Science Forum in January 2014. The program exposes year 11 students who are thinking about a career in science, engineering and related disciplines to major scientific institutions and researchers. The Chief Executive and Director Communications and Outreach made presentations on the history and activities of the Academy.

In a Centenary of Canberra celebration, the Academy collaborated with CSIRO, the Australian National University and Geoscience Australia, to stage *Faces of Science*, a photographic exhibition featuring 100 scientists who have worked in and around Canberra, including 46 Fellows of the



PHOTOS: MICHAEL JOHN HOOD

Canberra scientists Hal Hatch FAA, Neil Trudinger FAA and Marion Burgess featured in the *Faces of Science* exhibition

Academy. The exhibition was launched at CSIRO Discovery Centre in Canberra and will spend 2014 touring regional Australia.

Expert information about science

The Academy produces and maintains two high quality and popular science education resources suitable for a broad audience, which also contain additional materials designed to support the teaching of science in the classroom.

Nova: science in the news

The *Nova* program has been in maintenance mode pending the Academy's fundraising activities (see Supporting the Academy, page 13). Accordingly, *Nova* attracted fewer visitors than the previous year (see Figure 5). During 2013 a new promotional document was produced, aimed at attracting sponsors for new *Nova* topics.

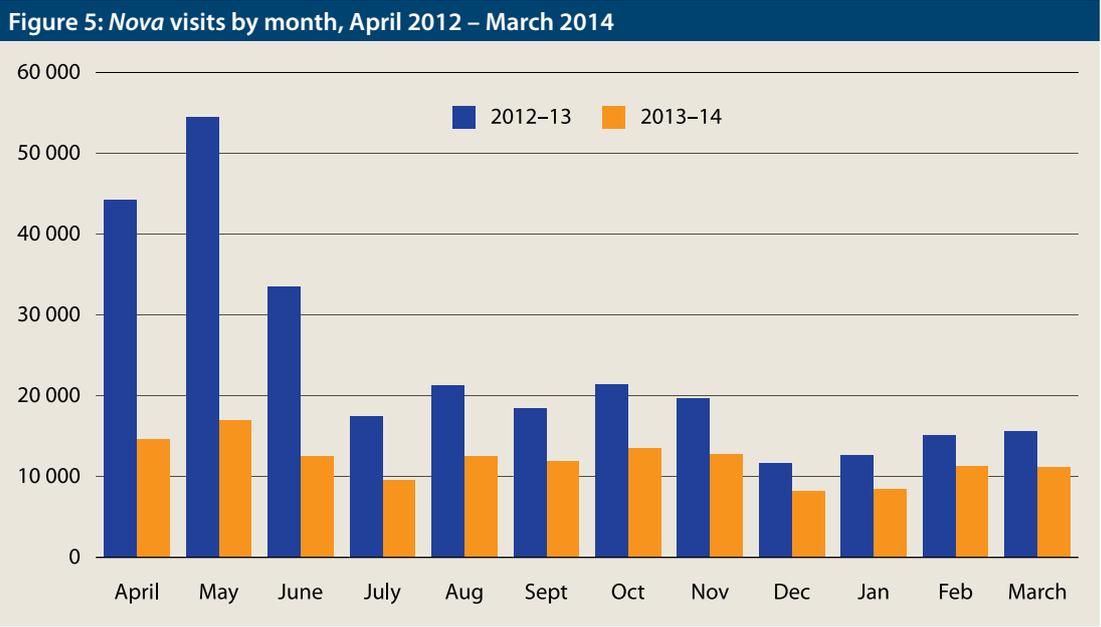
There are now 125 *Nova* topics; two new topics were added during 2013:

- *Feeding a hot, hungry world — agriculture in the face of climate change*
- *One more piece in the puzzle of the universe — a Higgs-shaped one.*



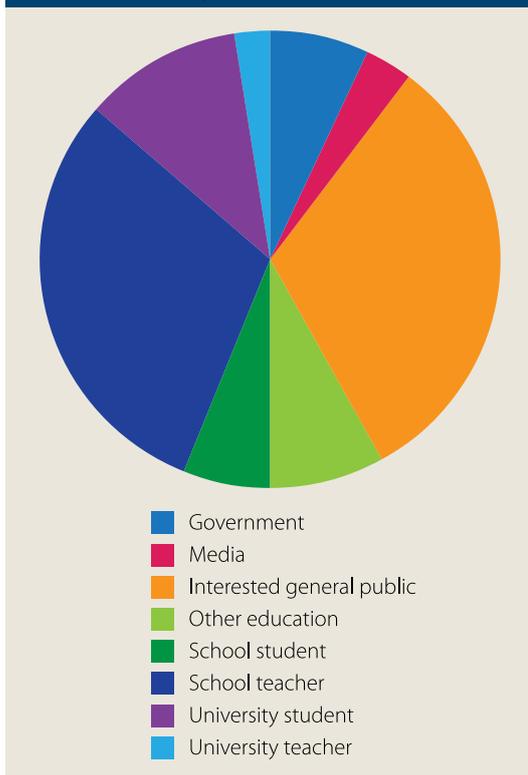
PHOTO: CERN

The ATLAS detector in Switzerland, which played a pivotal role in the discovery of the Higgs boson



STRATEGY 7

Figure 6: Occupation of *Nova: science in the news* subscribers, 2013



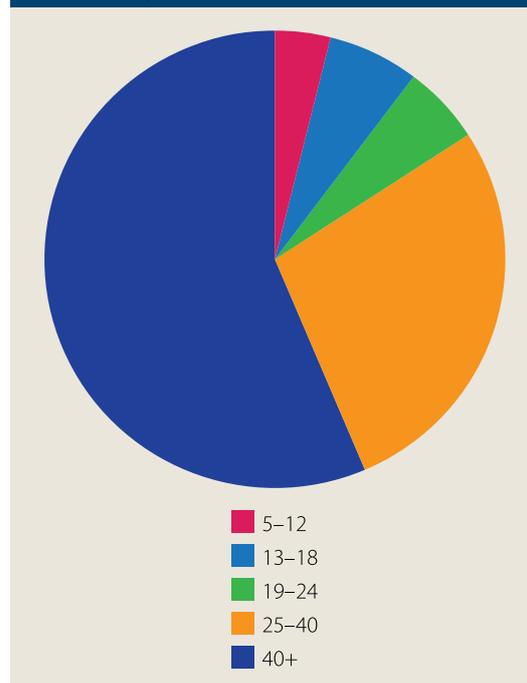
In addition to these new topics, several existing topics were updated:

- *Can we count on your vote?*
- *Making packaging greener — biodegradable plastics*
- *Who will win the drugs race?*
- *Getting the buzz on the value of bees*
- *The enhanced greenhouse effect — a hot international topic.*

The most popular *Nova* topics during the 2013–14 were:

- *The enhanced greenhouse effect — a hot international topic*
- *Putting on a good face — the chemistry of cosmetics*
- *Putting it together — the science and technology of composite materials*
- *Coral bleaching — will global warming kill the reefs?*
- *Making packaging greener — biodegradable plastics*
- *Impact of global warming on biodiversity*
- *Kissing the Epstein-Barr virus goodbye?*
- *The Human Genome project — discovering the human blueprint*
- *Fatal impact — the physics of speeding cars*
- *Monitoring the white death — soil salinity*

Figure 7: Age of *Nova: science in the news* subscribers, 2013



NOVA SUBSCRIBERS

Of 125 new subscribers who signed up to receive *Nova* updates during the 2013–14 period, 32% were general public, 30% school teachers, 17% either school or university students, with the remainder being from government (7%) other education (7%) media (3%) or university teachers (2%) (see Figure 6). 57% were in the 40+ age bracket, 27% in the 25–40 age bracket. The 13–18 and 19–24 age brackets each accounted for 6% of the new subscribers, and the 5–12 age bracket 4% (see Figure 7).

Interviews with Australian scientists

The Academy's oral history program, *Interviews with Australian scientists*, provides a record of the lives of outstanding Australian scientists and serves as an excellent science teaching resource for supporting the teaching of the 'science as a human endeavour' strand in the *Australian Curriculum: Science*. It is also a source of inspiration for future and early career scientists. Four new transcripts with accompanying teachers' notes and focus questions were posted:

Table 14: New Interviews with Australian scientists

2013	
June	Dr Cyril Appleby FAA
August	Professor Geoffrey Burnstock FAA FRS
November	Lord Robert May AC OM FAA FRS
2014	
March	Professor Bob Crompton AM FAA

Academic science publications

Historical Records of Australian Science

Historical Records of Australian Science (HRAS), jointly edited by Professors Rod Home AM FAHA and Libby Robin, is published biannually (June and December) on behalf of the Academy, in print and online, by CSIRO Publishing. HRAS publishes peer-reviewed articles and book reviews on the history of science, both pure and applied, in Australia and the southwest Pacific, and an annual bibliography of the history of science in Australia and the region. It also includes biographical memoirs of deceased Fellows of the Academy, commissioned by the Chair of the journal's Editorial Board, Dr John Passioura FAA, which are made available on the Academy website after publication at www.science.org.au/deceased-fellows-and-memoirs. The journal is available for online subscriptions at www.publish.csiro.au/?nid=108.

All Fellows of the Academy receive a print copy and it is also purchased, predominantly online, by about 90 institutional subscribers. The journal is ranked 45 out of 58 journals listed in the Thomson Reuters 'History & Philosophy of Science' category.

Australian journals of scientific research

The Academy of Science and CSIRO jointly publish 13 Australian journals of scientific research (see Appendix 6 for the full list of journals and Editors-in-Chief).

The journals have an international readership, with subscribers in 90 countries (in China one consortia subscription = 480 universities; in India

one consortia subscription = 123 universities and research institutions). They can also be accessed for free by scientists in more than 100 developing nations through the United Nations' Research4Life program. About half of the published papers originate outside Australia: in 2013 submissions from researchers came from between 40 and 48 countries, depending on the journal. Editorial policy is determined by a Board of Standards, which is jointly chaired by CSIRO and the Academy. The Academy's Foreign Secretary Professor Andrew Holmes AM FAA FRS FTSE is the Academy's co-chair of the board. Details of these and other journals published by CSIRO are available at www.publish.csiro.au/%20nid/50.htm?nid=17

Basser Library and Fenner Archives

The Basser Library and Fenner Archives are located in the Shine Dome and collect published and unpublished material documenting the history of science in Australia. The archival manuscript collections have grown to 233 with the addition of a new collection of photographs, correspondence and publications by meteorologist Professor Charles Henry Brian Priestley AO FAA FRS, as well as a transcript of a conversation with neuroscientist Professor Archie McIntyre FAA. Twelve researchers accessed 15 collections (see Table 15).

Staffing and use

Librarian Rosanne Walker retired in November 2013 after 29 years' of service to the Academy (see page 57), and librarian Lisa Conti Phillipps stepped into the role in January 2014.

Table 15: Research requests to the library

Researcher	Subject of request
Dr Anton Igersheim, Department of Botany of the Natural History Museum in Vienna	Dr Franz Wilhelm Sieber and Mr Allan Cunningham
Mr Jean-Baptiste Grodwohl, University of Bahia	Patrick Moran FAA FRS
Ms Francesca Beddie, National Centre for Vocational Education Research	Ian Wark Kt CMG CBE FAA
Dr Ian Howie-Willis, historian	Sir Neil Haminton Fairley KBE CSJ FRS
Dr Evgeni B Starikov, Chalmers University of Technology, Gothenburg	Dr Hans Adolph Buchdahl FAA
Dr Leon Foster, Centre for Sports Engineering Research	1958 article by Professor Leon B Lucy
Mr Gordon Dadswell, The University of Melbourne	Dr Isaac Boas FAA
Mr Patrick J Costello, researcher	Photo of Patrick Moran FAA FRS
Mr Howard Philpott, Australian Animal Health Laboratory, CSIRO	Dr John Anderson Gilruth
Dr Stephen Ames, The University of Melbourne	Dr Geoffrey Duffield, Ron Giovanelli FAA, David Martyn FAA FRS, and Joe Pawsey FAA FRS
Dr John Carmody, The University of Sydney	Sir John Eccles AC Kt FAA FRS Nobel Laureate
Mr Hermann Wehner, Mt Stromlo Observatory	1950 Stromlo Report



ACADEMY FAREWELLS LONG-SERVING STAFF MEMBER

The Academy farewelled much-loved staff member, Rosanne Walker, who retired after 29 years' service as librarian and archivist. A verbena bush was planted in the Academy garden in her honour, and a high tea was held at Ian Potter House, attended by Academy staff and a number of Fellows including Chair of the Academy's Library Committee, Dr Hugh Tyndale-Biscoe FAA. Chief Executive Dr Sue Meek AO FTSE and Academy Foreign Secretary Professor Andrew Holmes AM FAA FRS FTSE, warmly thanked Ms Walker for her years of valuable service and dedication to the Academy.

**OBJECTIVE A
PROMOTE EXCELLENCE IN
SCIENTIFIC RESEARCH
NATIONALLY AND
INTERNATIONALLY**

**OBJECTIVE B
DEVELOP AND
SUSTAIN A NATIONAL
SCIENTIFIC CULTURE**

**OBJECTIVE C
PROVIDE VALUED
INDEPENDENT SCIENTIFIC
ADVICE TO ASSIST POLICY
DEVELOPMENT AND
PROGRAM DELIVERY**

8

WORKING WITH OTHERS TO PROVIDE EXPERTISE ON SCIENTIFIC MATTERS

The Academy seeks to inform and engage with parliamentarians and relevant government officials, and liaises with other organisations in the research sector to increase awareness of Academy Fellows as an expert resource, and to raise awareness of key science issues and important achievements.

NETWORKING WITH GOVERNMENT

The 2013 federal election was a major focus of science policy activity. A pre-election priorities document was prepared in consultation with Fellows and a broad range of stakeholders (see Strategy 9). Before the 23 August election, Academy representatives met with government and opposition Ministers with portfolio and shadow portfolio responsibilities related to science and technology to advocate for their inclusion in debate during the election campaign. Fellows were also encouraged to discuss the pre-election statement with their local federal MPs.

Following the election, an incoming government brief was circulated to relevant new ministers, as well as departmental secretaries and other senior officials, highlighting the Academy's areas of expertise and capabilities in providing independent advice and contributing to evidence based policy formulation.

The election resulted in the departure of five MPs, and arrival of two new MPs with a science background, so at 31 March there were 18 MPs in the current Parliament with a background in science (defined broadly as science, medicine, technology, engineering or mathematics). In state and territory governments there are about 75 MPs with such backgrounds. The Academy compiled and distributed three editions of its newsletter, *Science for Parliaments*, to provide these and other MPs, advisers and departmental officers with

information about the Academy's activities, latest developments in science policy in Australia and elsewhere, and links to important new reports (see www.science.org.au/science-parliaments).

ALLIANCES WITH STAKEHOLDERS

Research Alliance

The Academy, in conjunction with Science & Technology Australia, and with substantial input from Universities Australia and the Association of Australian Medical Research Institutes, convened a research sector summit at the Shine Dome in Canberra on 17 June 2013. Australian research bodies and professional organisations, representing thousands of Australian scientists, came together for the first time to urge non-partisan support for science and all forms of research.

The group decided to establish the Research Alliance, and a joint statement (available at www.science.org.au/research-alliance-invest-research-and-translation) calling for action in line with six fundamental principles (see Table 16) was signed at Parliament House and reported in the news media. Following the event the then Leader of the Opposition, The Hon Tony Abbott MP, issued a statement reiterating the Coalition's support for a number of programs (see www.liberal.org.au/our-plan).

The Academy convened the second meeting of the Research Alliance on 18 September 2013, which issued a call to policy makers for a strategic and stable plan for science and research that will stop Australia falling behind in its region and in the world, in order to build a stronger, smarter Australia (see www.science.org.au/node/34994#U3BaECgd2Sp). The alliance membership now comprises 14 member organisations including the peak

Table 16: Six fundamental principles of the Research Summit's call for action	
Investing strategically and sustainably	Governments must support planned, stable and appropriate investment in research over the long term, which is essential if we are to tackle large, complex problems and opportunities facing Australia. This will yield better results and ensure the best use of every dollar spent.
Building our research workforce — getting and keeping the best	To ensure we attract and retain the best researchers we must offer appropriate conditions. Many of the nation's world class researchers are stuck in a cycle of one- to three-year grants for their salaries and research materials. This career uncertainty means many leave research or leave Australia to seek a stable future. The nation is the loser every time uncertainty impedes discovery, prevents planning and inhibits fruitful partnerships.
Building a productive system and getting the most out of it	Governments must set a stable and sustainable funding framework for infrastructure (buildings, equipment and the technical experts to keep them operating), especially for national facilities without which critical work cannot continue or even begin. This must be backed with resources that keep valuable facilities running once they are built. A central research infrastructure investment framework, such as National Research Investment Plan (NRIP), is essential.
Being among and working with the world's best	Global collaboration is more necessary than ever with the rise of international research, commerce, communication and other systems that transform our lives and opportunities. Our best researchers must be able to work with the best globally, building on the credibility Australian researchers already have across a wide array of disciplines. This will require a strategic investment that can facilitate international engagement at a government to government level, as well as support for collaboration on specific research projects.
Bringing industry and academia together	When industry and researchers work together effectively we innovate and multiply our strengths. We must ensure there are clear and reliable policy incentives that facilitate deep and sustained collaboration between industry, public sector, university and research institutes. This not only ensures that the benefits from basic research are translated into practice in Australia, but also harnesses national talent and creates knowledge, opportunity and new jobs.
Expanding industry research	Governments need to create an environment which encourages industry to invest more in research and which makes Australia an attractive place for international companies to undertake research. Improving industrial productivity has become critical to ensuring strong growth and innovation underpinned by research and development and investment plays a key part in meeting this objective.
Investing in our best research and our best researchers	Government has a clear role in setting priorities for research, and in supporting research which underpins discovery. The independent expert assessment process should be used to identify excellence and to coordinate the best researchers, research programs and groups.

bodies in science, medical research, higher education, social sciences and humanities, as well as all four Learned Academies.

Science Sector Group

The Academy is a foundation member of the Science Sector Group, an *Inspiring Australia* initiative, formed to conduct joint public education campaigns for emerging scientific issues that have the potential to become contentious. The group includes leading non-government science organisations, including the Royal Institution Australia (RIAus), Australian Science Communicators, the Australian Academy of Technological Sciences and Engineering, and the Academy of Social Sciences in Australia. The group selected immunisation and food security as focus areas for 2013/14 and conducted parallel media activities when the Academy released its tablet app for the *Science of immunisation Q&A* (see Strategy 10).



Brian Schmidt at the launch of the Research Alliance

9

PROVIDING AUTHORITATIVE ADVICE TO INFORM POLICY AND DECISION MAKING

While the Academy does not take part in political debate, its membership of Australia's top research scientists with internationally recognised expertise represents a potent source of independent, expert advice to inform and clarify debates and answer questions on science, technology and research issues.

TAKING A STAND FOR SCIENCE IN THE 2013 ELECTION

On 3 July 2013 Academy President Professor Suzanne Cory AC PresAA FRS launched the Academy's pre-election statement 'Election policy 2013: science priorities for Australia' (see below) at the National Press Club, and delivered an address *D/evolving Australia*, calling on all political leaders to take a strategic and visionary approach to science in Australia. See the transcript at www.science.org.au/events/lectures-and-speeches/documents/npc2013.pdf.

During the election campaign the Academy also closely monitored and responded in public and private to science policy announcements from the Coalition, Labor and the Greens. There were a number of positive comments about science and research from the present Government before and after the election.

'AUSTRALIA MUST INVEST MORE IN RESEARCH AND DEVELOPMENT TO PROTECT OUR ECONOMIC COMPETITIVENESS, OUR SOCIAL WELL-BEING, AND OUR QUALITY OF LIFE: TO BUILD OUR RESILIENCE AND TO PROTECT OUR FUTURE PRODUCTIVITY'

SUZANNE CORY, NATIONAL PRESS CLUB, 3 JULY 2013

INFLUENCING THE BUDGET PROCESSES

The Academy's 2013 submission to the Treasurer's call for Budget submissions (see www.science.org.au/sites/default/files/user-content/2013pre-budgetsubmissiontotreasury_1.pdf) strongly advocated for investment in school science and maths teaching, major research infrastructure, continuation of ARC Future Fellowships and reduced administrative burden for research funding schemes.

In the lead up to the May 2013 Budget, the Academy actively stressed to government and through the media the importance of protecting science and research. Some funds were made available in the Budget for two years for research infrastructure planning, and an additional year of Future Fellowships. In its public statements the Academy welcomed these specific measures but

The Academy's pre-election statement involved extensive national consultation on a draft document with Fellows and other science and research organisations to determine the concerns of sector stakeholders. This helped to improve the statement's focus and helped the sector to better align its key priorities ahead of the election.

The statement argued that for an economically developed nation such as Australia, the creation and use of knowledge through research is not merely one of a range of choices, but an essential foundation, and that strategic support for Australian science is central to any rational vision for Australia's future. A copy is available at www.science.org.au/sites/default/files/user-content/electionpolicy2013.pdf.

'OUR LIVES TODAY ARE TESTIMONY TO THE LINKS BETWEEN SCIENTIFIC RESEARCH AND THE INDUSTRIAL APPLICATIONS THAT HAVE SHAPED THE MODERN WORLD. IT WILL BE THE RESEARCH OF OUR SCIENTISTS TODAY THAT WILL CHANGE THE LIVES OF MILLIONS OF PEOPLE AROUND THE WORLD TOMORROW'

PRIME MINISTER, THE HON TONY ABBOTT MP, AND MINISTER FOR INDUSTRY, THE HON IAN MACFARLANE MP, JOINT MEDIA RELEASE, 30 OCTOBER 2013

emphasised the need for longer term planning. In May 2013 the Government also announced a review of higher education regulation — the review’s recommendations for reducing the burden of regulation are now being implemented.

The Academy’s 2014 pre-Budget submission to Treasury highlighted the critical state into which many areas of science policy have fallen. Issues such as the lack of a government science strategy, the absence of a long-term funding plan for major national research infrastructure, and the planned end of mid-career Fellowships, have continuously been highlighted by the Academy over the past few years as needing urgent attention. The situation is now more critical than ever, and with Australia’s federal budget forecast to be in deficit for the next few years at least, the Academy once again brought to the Government’s attention the need to deal with these issues and to invest in science to build a strong and sustainable economy.

EXPERT INPUT TO UNDERPIN SCIENCE AND RESEARCH POLICY

Drawing on the expertise of the Fellows, the Academy undertakes rigorous research and review processes to prepare submissions and responses for consultations, reviews and inquiries, to provide scientific assessment and evidence on issues of public concern, or those affecting the sustainability of science and research, in Australia.

The Academy responded to seven consultations, reviews and inquiries on topics relevant to Australian science and research (see Table 18, on page 64). These included submissions to the National Commission of Audit, the wider benefits of university based research, development of northern Australia, and cattle grazing in the

Alpine National Park. The Academy was also invited to provide comment on draft strategy documents by a number of agencies.

Submissions to the Department of Foreign Affairs and Trade (DFAT) regarding five country strategies prepared by its Asian Century Implementation Unit were informed by the extensive international research experience of Academy Fellows. Input to national and international strategic plans for Antarctic research benefited from the discipline-specific advice of several National Committees for Science.

The Academy’s previous submissions have contributed in a meaningful way to state and federal policy formulation. The Academy has helped to make a real difference in important areas including allocation of research funding, health and medical research, climate change science, international research collaboration, space policy, and the use of animals in research (see Appendix 7).

IDENTIFYING EXPERTS TO SUPPORT STRATEGY AND POLICY

The Academy responded to a number of requests to identify experts to participate in review and assessment processes, including nominating Fellows with relevant expertise to interview applicants and conduct reviews for Cooperative Research Centres; help develop new national strategic research priorities; and review applications to the ACT Government Strategic Opportunities Program. These are summarised in Table 17.

May 2013	Development of strategic research priorities, Office of Chief Scientist
May 2013	Consultation on proposed new Colombo Plan, to the then Opposition
June 2013	ACT Government Strategic Opportunities Program expert selection panel to develop major proposals focused on infrastructure
July / August 2013	Design of review of facilities supported under National Collaborative Research Infrastructure Strategy NCRIS and Super Science initiative for then DICCSRTE
July / September 2013	Consultations for Canberra Science and Innovation Precinct CSIP Vision Project for ACT Government, ANU and CSIRO
November / December 2013	Interviewers and reviewers for the 16th CRC selection round

Table 18: Academy submissions and responses to government reviews and inquiries	
Australia in the Asian Century — country strategies	June 2013
Following the release of the 'Australia in the Asian century' white paper in October 2012, the Department of Foreign Affairs and Trade invited the Academy to prepare a submission to assist in the development of country specific strategies for Japan, China, Indonesia, India and South Korea. The Academy's submission stressed the importance of a strategic program for Australia's international scientific engagement. See www.science.org.au/sites/default/files/user-content/asiancenturywhitepapercountrystrategies_1.pdf	
Assessing the wider benefits from university research	August 2013
In November 2012 the Government announced its intention to assess the broader economic, social and environmental benefits arising from all elements of government research investment, including from university-based research. In support of this, the then Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education (DIICCS RTE) prepared a discussion paper 'Assessing the wider benefits arising from university-based research' and asked for comments from the sector. The Academy put forward a detailed response, supporting the general principle of communicating the benefits of public investment in university research, but outlining a number of areas that need further consideration before such an exercise could be undertaken. See www.science.org.au/sites/default/files/user-content/benefitsofresearchdiscussionpaper.pdf	
National Commission of Audit	November 2013
The National Commission of Audit was established by the Coalition Government to undertake a full-scale review of spending activities of the Commonwealth and make recommendations to achieve savings to deliver a surplus of 1% of GDP before 2023-24. The Academy's submission highlighted substantial funding cuts to the science sector during the previous two years, and argued that further cuts would likely cause irreparable harm. It put forward a compelling case for investing in science and innovation, emphasising that such investment is our best hope for developing innovation-led productivity gains to create a strong, resilient and sustainable economy. See www.science.org.au/sites/default/files/user-content/nationalcommissionofaudit.pdf	
Federal Government review of the Australian Curriculum: Science	February 2014
In its submission the Academy emphasised its strong support for the science curriculum. The submission stated that the curriculum had taken considerable time to develop, and had only been partially implemented, and that substantial changes at this stage would damage teacher engagement and delay its effective implementation. See www.science.org.au/sites/default/files/user-content/australiansciencecurriculum.pdf	
Joint Select Committee inquiry into development of northern Australia	February 2014
A Joint Select Committee on northern Australia was established in late 2013 to inquire into the future of northern Australia, with the aim to establish the region as an economic powerhouse. The Academy's submission stresses that scientific knowledge must be integrated into any future plans, noting that the expansion of industry will require an increased use of land and water resources. It points to recent reviews of scientific evidence showing that northern Australia is 'water limited', and careful planning and management of land and water resources will need to be adhered to, to avoid risk of economic failure and ecological damage. See www.science.org.au/sites/default/files/user-content/jointselectcommitteenorthernaustralia.pdf	
Proposed cattle grazing trial in the Victorian Alps National Park	February 2014
The Victorian Government's application to hold a 'scientific trial' to assess the impact of cattle grazing on bushfire fuel load reduction was referred by the Federal Minister for the Environment on the grounds that it might adversely impact on a National Heritage Place, and on listed threatened species. The referral of this application has allowed for comments on the proposed trial. The Academy's submission opposed the application, highlighting that scientific evidence already shows that cattle grazing does not reduce bush fire fuel loads, but does cause adverse ecological effects. In addition, the Academy stated the proposed methodology put forward by the Victorian Government in its experimental design was scientifically flawed. See www.science.org.au/sites/default/files/user-content/grazingimpactonbushfirefueltrail.pdf	
20 Year Australian Antarctic Strategic Plan	March 2014
The Academy's submission to the Federal Government's development of a 20 Year Australian Antarctic Strategic Plan outlined the crucial importance of being seen to be active in science within the region. Australia currently makes claim to 43% of the Antarctic continent, but the perception of relative strength of claim by any nation is dependent to a large extent on its current activities in the continent. The most significant part of this activity currently comes from Australia's science leadership and research effort, but the number of science projects being supported has fallen. In its submission the Academy outlined fundamental requirements that the 20 Year Plan must include, such as reliable access to Antarctica for scientists; reliable and adequate funding for science projects and flexible funding structures to facilitate national and international collaboration. The National Committees for Antarctic Research, Astronomy, Earth System Science, and Space and Radio Science contributed to the submission. www.science.org.au/sites/default/files/user-content/20yearaustralianantarcticstrategicplan.pdf	

Note: all of the Academy's public submissions are available from the Academy's website at www.science.org.au/reports

EXAMINING THE FUTURE OF SCIENCE

In April 2013 the Academy published the first of a series of Future Science reports, with support from the Defence Science and Technology Organisation, which explore possible development pathways for different scientific fields. The reports provide guidance on likely research challenges to be overcome, and opportunities for new scientific endeavour.

The first report was on computer science, chosen because it is an enabling science and also because

of its growing social impact worldwide. *Future science — computer science: meeting the scale challenge* (www.science.org.au/publications/future-science-computer-science) scopes future capacities and applications of computer science, and identifies scientific challenges that are likely to drive the development of computer science for the next 10 to 20 years. The second project in the series, *Future science — accelerator based sciences and applications* commenced in February 2014.

10

MONITORING AND COMMUNICATING SCIENTIFIC DEVELOPMENTS

The Academy proactively identifies and provides expert commentary on emerging or contentious science issues, and works with other Learned Academies to promote interdisciplinary consideration of complex issues.

COMMENTARY ON EMERGING OR CONTENTIOUS SCIENCE ISSUES

Science Questions and Answers series

The Academy's *Questions and Answers* (Q&A) publications aim to address confusion in the public domain created by contradictory information on science matters. They set out to explain the current state of knowledge, including where there is consensus in the scientific community and where uncertainties exist.

The Academy seeks funding from appropriate organisations to cover project management and publishing costs but retains complete editorial control of the publications. Panels of Academy Fellows and other leading experts on the subject matter are assembled and provide their skills and expertise pro bono to produce comprehensive, authoritative and easy-to-read documents.

In mid-December 2013 the Academy launched a new *Science Q&A* application for Apple and Android tablets, presenting the booklets in a tablet-friendly format. Available in Apple's app store and through Google Play, the app brings together the information in *The Science of Immunisation: Questions and Answers* and *The Science of Climate Change: Questions and Answers*. The app had been downloaded almost 1000 times at 31 March 2014.

Science of Climate Change Q&A

In June 2013, the Department of Environment allocated funds to update *The Science of Climate Change*, launched in 2010, to incorporate the



Gus Nossal, Steve Hambleton and Suzanne Cory at the launch of the Q&A app, Walter and Eliza Hall Institute, Melbourne

emergence of new data including the *5th report of the Intergovernmental Panel on Climate Change* and additional climate topics that would benefit from clarification. Work has commenced on the revision, which is scheduled for release in late 2014. See www.science.org.au/climatechange. More than 1300 copies of the 2010 edition were distributed during the year.

Science of Immunisation Q&A

Since its release in November 2012, *The Science of Immunisation* has proved a valuable resource for public health professionals. A number of medical and public health organisations have funded the printing and distribution of copies to their members: the Australian Medical Association (7500); Health Protection NSW (7000); and the Pharmacy Guild (5000), and a further 21,780 were distributed by the Academy. See www.science.org.au/immunisation

SCIENCE LITERACY SURVEY GRABS MEDIA ATTENTION

A science literacy survey conducted by the Academy made headlines around the world when the results were released in July. The survey, *Science literacy in Australia*, conducted by Auspoll on behalf of the Academy, asked respondents questions about basic science. The Academy's Secretary Science Policy

Professor Les Field AM FAA gave interviews about the survey to numerous major Australian media outlets. The story was picked up by more than 600 national and international news outlets, including the *New York Times*, Agence France-Presse, the *Bangkok Post* and the *International Business Times (UK)*.

Science literacy declines among the young

The results from a repeat of the popular survey, *Science literacy in Australia*, conducted in May 2013, indicated that the science literacy of young Australian adults had fallen in the three years since the survey was first conducted in July 2010. However, the proportion of Australians who said that science education was absolutely essential or very important remained high at 79%, virtually the same as in 2010 (see media response above).

Australia 2050

The Academy's Australian Research Council Learned Academies Special Project *Australia 2050: towards an environmentally sustainable and socially equitable way of living* entered phase two of its three-year work program with a preparatory meeting at Government House on 18 October, hosted by Her Excellency Professor Marie Bashir AC CVO, Governor of NSW, on behalf of the Governor-General. The project organising committee and representatives from 20 relevant organisations and industries met to plan a workshop to further explore the living scenarios identified in the phase one publication *Negotiating our future: living scenarios for Australia to 2050* that was launched by Her Excellency Quentin Bryce AD CVO in February 2013 (see page 68).

Australian Council of Learned Academies

ACOLA comprises the presidents of Australia's four Learned Academies: the Australian Academy of Science, the Australian Academy of the Humanities, the Academy of Social Sciences in Australia, and the

Australian Academy of Technological Sciences and Engineering. The ACOLA Secretariat Pty Ltd, established concurrently with the Council, is made up of the Chief Executive equivalents of the Learned Academies, and conducts projects and activities on behalf of the Council.

Securing Australia's future with a strong evidence base

In the May 2012 Federal Budget \$10 million was allocated over three years through the ARC Learned Academies Special Projects (LASP) scheme for a series of strategic research projects within the overarching framework *Securing Australia's Future* (SAF). The research findings are intended to provide the Prime Minister's Science Engineering and Innovation Council (PMSEIC) and the Chief Scientist with a strong evidence base to underpin future policy development.

ACOLA established a Program Steering Committee (PSC) made up of three Fellows from each Learned Academy to oversee the research conducted under SAF. Expert Working Groups (EWGs) were put in place for each of the six projects initiated so far (for more information see www.acola.org.au/index.php/projects/securing-australia-s-future).

Although the expertise of all four Academies is represented on each EWG, different academies have assumed responsibility for particular research projects. The Academy of Science is supporting EWG 5 on 'New technologies and their role in our security, cultural, democratic, social and economic systems' (see Table 19, overleaf for more information about the Academy's representation on SAF and EWGs).



AUSTRALIA 2050 — EXPLORATION OF LIVING SCENARIOS

A fundamental challenge for Australia — indeed for any society — is to shape its own future. Through its ‘Australia 2050’ project, the Academy is contributing to a national conversation about how the future might unfold via the shared, ongoing exploration of ‘living scenarios,’ leading to evolving visions for the future that are simultaneously plausible (consistent with natural laws), acceptable (consistent with aspirations for human well-being) and workable (agreed to the extent necessary for action).

At a two-day workshop held at the Shine Dome on 23–24 October, 60 participants

from diverse fields including health, higher education, Indigenous groups, women’s organisations, agriculture, defence and the media, discussed possible scenarios for science and society envisaged for Australia in 2050. To help present outcomes of the process, a short documentary capturing key elements and aspects of both events is now in production. For more information go to www.science.org.au/publications/negotiating-our-future-living-scenarios-australia-2050

Table 19: Academy representation in securing Australia’s future research program

Committee/Working Group	Delegate
Program Steering Committee (PSC)	Professor Michael Barber FAA FTSE (Chair) 2013– Professor Graham Mitchell AO FAA FTSE (member) 2013–14 Dr Jim Peacock AC FAA FRS FTSE (member) 2013–14 Professor James Angus AO FAA (member) 2014– Professor Steve Powles FAA FTSE (member) 2014–
Expert Working Group 1 <i>Australia’s comparative advantage</i>	Professor Graham Farquhar AO FAA FRS
Expert Working Group 2 (complete) <i>STEM: country comparisons</i>	Professor Nalini Joshi FAA
Expert Working Group 3 <i>Asia literacy — language and beyond</i>	Professor Chennupati Jagadish FAA FTSE
Expert Working Group 5 <i>New technologies and their role in our security, cultural, democratic, social and economic systems</i>	Professor Rob Evans FAA FTSE (Co-Chair), Professor Bob Williamson FAA (Co-Chair)



**ACADEMY
INFRASTRUCTURE**

ACADEMY INFRASTRUCTURE

THE SHINE DOME AND IAN POTTER HOUSE

The Academy is housed in two beautiful heritage-listed buildings, the purpose-built Shine Dome constructed in 1959 (and the first Canberra building included on the National Heritage List); and Ian Potter House (IPH), built for the transfer of public servants to Canberra in 1927 and entered in the ACT Heritage Register in 1998. The Academy took over the IPH site in 1985 and, following refurbishment during 1986–87, renamed the building in recognition of philanthropist and Academy Fellow, Sir Ian Potter Kt FAA.

*'I JUST WANTED TO ESPECIALLY
THANK YOU FOR LOOKING AFTER ME
AND MY GROUP SO WELL LAST WEEK.
THEY ALL SEEM TO BE VERY HAPPY'*

ACT HEALTH

A range of capital works were completed in 2013–14 to address building code compliance, workplace health and safety issues and energy conservation. Ageing and wear and tear necessitated the resealing and repair of the moat and the replacement of the carpet in the Jaeger Room. The Academy successfully



SOUNDING THE SHINE DOME

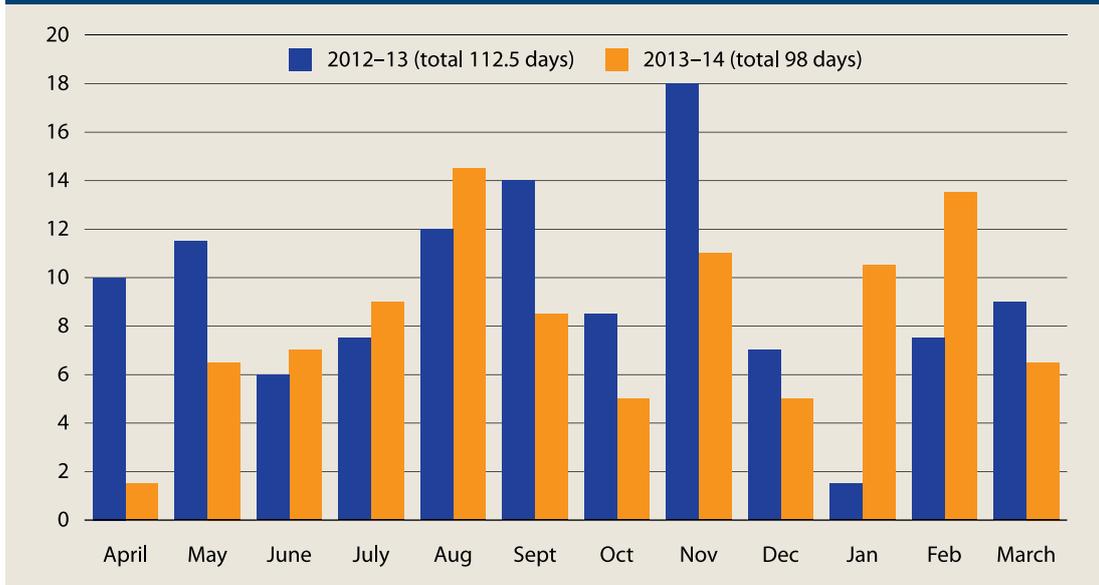
A highlight of the Dome calendar was a collaboration with the International Music Festival for its 2013 *Amazing Spaces* series, run jointly with the Australian Institute of Architects, as part of the Centenary of Canberra celebrations.

On 16 May 2013, in two separate performances before hundreds of music and architecture enthusiasts, San Francisco-based performance

duo Paul Drescher and Joel Davel entertained with electronically supported instruments, while architect Roy Grounds' daughter Victoria Grounds spoke of her father's determination and optimism in designing the Shine Dome.

The architecture of the Dome was also the focus of a speculative design exercise by architecture students from the University of Canberra.

Figure 8: Shine Dome use (days per month), April 2012 – March 2013 compared with April 2013 – March 2014



'THANKS AGAIN FOR YOUR SUPPORT IN THE LEAD UP AND ON THE DAY — THE LEVEL OF DETAIL AND ATTENTION WAS MUCH APPRECIATED SO WE WERE REASSURED THAT FOR OUR EVENT, WE HAD COVERED AS MANY CONTINGENCIES AS POSSIBLE'

FEDERAL DEPARTMENT OF AGRICULTURE, FISHERIES AND FORESTRY

applied for a 50% funding contribution from the Australian Government's Community Heritage Program for the former.

As well as housing the Basser Library and Fenner Archives (see Strategy 7) and offices for a number of Academy staff, the Shine Dome is used regularly as a meeting, lecture and conference venue by the Academy, including by the National Committees for Science. It also remains a popular conference venue for government and other organisations. Total use days were 98 in 2013–14 compared with 112.5 in the previous reporting year. Clients continued to report positive experiences while hiring the Dome.

The early calling of the 2013 federal election affected external hire of the Shine Dome: a number of tentative bookings were cancelled due to the anticipated change in government and subsequent restrictions on departmental budgets. Restoration of the moat and the laying of new carpet also affected external hire. However,

bookings picked up slightly after the September election, and bookings and enquiries for 2014 rose significantly in the first months of the year.

To assist with promotion of the Dome to external users and to inform prospective hirers of the facilities, the Academy produced a brochure highlighting the Dome's unique features and commissioned a 3D virtual tour. (See www.science.org.au/hiring-shine-dome).



IT MOVES TO 'THE CLOUD'

During January 2014 the Academy transitioned from its ageing in-house server to a cloud based application. Benefits of this system are already being recognised, including improved security, reduction in spam, improved off-site access, improved service desk response times, and greater expandability and adaptability.



APPENDICES

APPENDIX 1

REPORTS FROM REGIONAL GROUPS

ACT

Chair: Professor John White CMG FAA FRS

At the meeting of Fellows, a letter from the Academy President regarding increased participation of the Fellowship was noted with satisfaction. The Council's intention to use 'a range of methods to increase Fellows' awareness of, and increased participation in, the various activities ...' was appreciated.

There was discussion about increasing the number of Fellows participating in the vote for Council elections. The possibility of a move towards electronic voting was mooted. Increased participation in policy and public statements was again discussed as well as the operation of the Academy within financial constraints. The meeting also appreciated the presentation by Dr TJ Higgins FAA FTSE on the Academy's fundraising drive. The 2014 meeting will explore further options to increase Fellowship participation.

NSW

Chair: Professor Aibing Yu FAA FTSE

The NSW group held several functions in 2013, together with the NSW branch of the Australian Academy of Technological Sciences and Engineering (ATSE). Guest speakers included Professor Branko Celler FTSE; Professor Rose Amal FAA FTSE; Professor Katrina Fairley-Grenot FTSE; and Professor Martin Cole FTSE.

In August, the NSW group and the NSW branch of ATSE organised 'Science Academy night — the Academies meet high school students', sponsored by the University of New South Wales (UNSW) Faculty of Science. Speakers included Professor Rose Amal FAA FTSE, Professor Nalini Joshi FAA, Professor Bryan Gaensler FAA and Professor Peter Waterhouse FAA, who gave wonderful presentations to inspire the more than 100 students attending to study science and engineering. And an AAS–ATSE Joint Academies dinner was held with guest speaker Professor Peter Lay FAA presenting on cancer treatment and prevention.

QUEENSLAND

Chair: Professor Mark Blows FAA

The Queensland chapter of the Academy welcomed five new Fellows in 2013: Professors Matt Brown, James Craik, Ove Hoegh-Guldberg, Max Lu (also FTSE) and Andrew White. To showcase their work, a series of public lectures given by the new FAAs, and also new Fellows from the Australian Academy of Humanities and the Academy of Social Sciences in Australia, was held during The University of Queensland's Research Week celebrations in September.

Professors Perry Bartlett FAA and Max Lu joined the Chair, Professor Blows, and Fellows of the other Academies (Professors Graeme Turner FAHA and John Simmons FTSE) for a workshop for outstanding younger researchers interested in understanding how the Australian academies function and their selection procedures for new Fellows. The workshop was particularly useful in clarifying the differences in approaches and scope between the Academy of Science and ATSE.

The group is particularly grateful to Professor Mark von Itzstein FAA, who has taken on the task of leading the Queensland Taskforce for the Academy's *The Enlightening* campaign. After an initial meeting on 14 November, attended by members of the Queensland chapter and President Professor Susanne Cory AC PresAA FRS, work is underway to develop strategies for the implementation of this campaign in Queensland.

SOUTH AUSTRALIA

Chair: Professor Robert Vincent FAA

Fellows from South Australia met with Academy President Suzanne Cory in July. The focus of the meeting was a briefing on the Academy's *The Enlightening* campaign, but it also provided an opportunity for a broader discussion about Academy matters and local issues. Subsequently, there have been regular meetings of an SA branch taskforce under the chairmanship of Professor Tanya Monro FAA FTSE to further the local campaign effort.

The meetings also provide a platform to discuss local issues pertinent to the Academy.

VICTORIA

Chair: Professor Tony Klein AM FAA

The annual Victorian *New Fellows' and award winners' symposium* was held on 4 July, and as usual a varied range of fascinating topics was covered in brief talks. Other events included:

- The very well attended Combined Academies' Dinner, organised by our group this year, in August. Dr Richard Gillespie, Head of Humanities at Museum Victoria, gave an excellent illustrated after-dinner talk about 'The great Melbourne telescope — history, technology and science'.
- The annual Christmas Dinner on 21 November included outstanding entertainment by world-

renowned jazz pianist Dr Allan Zavod playing 'Gershwin and friends'. He also accompanied Ms Elizabeth Finkel, editor of *Cosmos* magazine, who gave a highly acclaimed impromptu soprano performance. It was a night to remember!

WESTERN AUSTRALIA

Chair: Professor Bruce Hobbs AO FAA FTSE

On 9 December Fellows from the Western Australian Regional Group attended a joint Christmas dinner at The Vines north of Perth. The evening was distinctly astronomical in flavour with an address on radio astronomy by Professor Peter Quinn (Director of the International Centre for Radio Astronomy Research) and after-dinner gazing at stars through telescopes.

APPENDIX 2

AUSTRALIAN VOTING DELEGATES FOR INTERNATIONAL MEETINGS

Committee	Organisation	Date	Location	Delegate/s
Nutrition	International Union for Nutritional Sciences	15–20 September 2013	Granada, Spain	Prof Andrew Sinclair
Biomedical Sciences	International Union of Physiological Sciences	21–26 July 2013	Birmingham, UK	Prof David Saint Prof Stefan Boer
	International Union of Toxicology	30 June – 4 July 2013	Seoul, Korea	Prof Phil Burcham
	International Union of Immunological Sciences	22–27 August 2013	Rome, Italy	Prof David Tarlington Dr Su Heinzel Dr Margaret Jordon Prof Franca Ronchese
Chemistry	International Union of Pure and Applied Chemistry	11–16 August 2013	Istanbul, Turkey	Prof Curt Wentrup FAA Prof Brynn Hibbert Prof Mary Garson Dr Rob Loss
History and Philosophy of Science	International Union for History and Philosophy of Science — Division of History of Science and Technology	21–28 July 2013	Manchester, UK	Prof Gavan McCarthy

APPENDIX 3

AUSTRALIAN EXECUTIVE COMMITTEE MEMBERS OF INTERNATIONAL ORGANISATIONS

Scientific organisation	Office holder	Position
Future Earth	Dr Mark Stafford Smith	Chair
International Council for Science	Prof David Black AO FAA	Secretary General
International Astronomical Union	Prof Matthew Colless FAA	Vice-President
International Commission on Mathematical Instruction	Prof Cheryl Praeger AM FAA	Vice-President
International Geosphere-Biosphere Programme	Prof Jean Palutikof	Vice-Chair
International Mathematical Union	Prof Cheryl Praeger AM FAA	Member-at-Large
International Union for Quaternary Research	Prof Allan Chivas FAA	Past President
International Union of Biological Sciences	Prof John Buckeridge	Past President
International Union of Crystallography	Prof Mitchell Guss	Member
International Union of Geological Sciences	Dr Ian Lambert	Secretary General
International Union of History and Philosophy of Science (Division of Logic, Methodology and Philosophy of Science)	Prof Cliff Hooker	Second Vice-President
International Union of Immunological Societies	Prof Alan Baxter	Councillor
	Prof Nicholas King	Treasurer
International Union of Pure and Applied Chemistry	Dr Robert Loss	Member

APPENDIX 4

PROPOSED EXPANDED NATIONAL COMMITTEE LINKS TO INTERNATIONAL SCIENCE ORGANISATIONS

* Indicates organisation of which the Academy is a member

International organisation	National Committee
Committee on Data for Science and Technology *	Astronomy; Data in Science
Committee on Space Research *	Space and Radio Sciences; Astronomy
Diversitas	Earth Systems Science; Ecology, Evolution and Conservation
Global Climate Observing System	Earth Systems Science
Global Ocean Observing System	Earth Systems Science
Global Plant Council	Agriculture, Fisheries and Food
Global Terrestrial Observing System	Earth Systems Science
ICSU Future Earth Program	Earth Systems Science; Ecology, Evolution and Conservation
ICSU World Data Centre program	Data in Science
InterAcademy Medical Panel	Medicine and Public Health

International organisation	National Committee
International Associations of Cryospheric Sciences	Earth Systems Science
International Astronomical Union *	Astronomy
International Brain Research Organization	Biomedical Sciences; Brain and Mind
International Commission for Acoustics	Physics
International Commission for Optics *	Physics
International Commission on Mathematical Instruction *	Mathematical Sciences
International Council for Industrial and Applied Mathematics	Mathematical Sciences
International Crop Science Society	Agriculture, Fisheries and Food
International Federation for the Promotion of Mechanism and Machine Science *	Mechanical and Engineering Sciences
International Federation of Human Genetics Societies	Biomedical Sciences
International Genetics Federation	Biomedical Sciences; Cellular and Developmental Biology
International Geographical Union *	Geographical Sciences
International Geosphere Biosphere Program *	Earth Systems Science; Ecology, Evolution and Conservation
International Human Dimensions Programme on Global Environmental Change	Earth Systems Science; Ecology, Evolution and Conservation
International Mathematical Union *	Mathematical Sciences
International Organisation for Medical Physics	Physics
International Society for Photogrammetry and Remote Sensing	Antarctic Research
International Society of Plant Pathology	Agriculture, Fisheries and Food
International Union of Biochemistry and Molecular Biology *	Biomedical Sciences; Cellular and Developmental Biology
International Union of Biological Sciences *	Cellular and Developmental Biology
International Union for Physical and Engineering Sciences in Medicine	Biomedical Sciences
International Union for Pure and Applied Biophysics *	Biomedical Sciences; Cellular and Developmental Biology
International Union for Quaternary Research *	Earth Science
International Union for Soil Sciences	Agriculture, Fisheries and Food
International Union of Basic and Clinical Pharmacology *	Biomedical Sciences
International Union of Crystallography*	Crystallography
International Union of Food Science and Technology	Agriculture, Fisheries and Food; Nutrition
International Union of Forest Research Organizations	Agriculture, Fisheries and Food
International Union of Geodesy and Geophysics *	Earth Science; Space and Radio Sciences
International Union of Geological Sciences *	Earth Science; Space and Radio Sciences
International Union of History and Philosophy of Science (Division of History of Science and Technology and Division of Logic, Methodology and Philosophy of Science) *	History and Philosophy of Science
International Union of Immunological Societies *	Biomedical Sciences
International Union of Materials Research Societies	Materials Sciences
International Union of Microbiological Societies *	Cellular and Developmental Biology; Biomedical Sciences
International Union of Nutritional Sciences *	Nutrition
International Union of Physiological Sciences *	Biomedical Sciences; Cellular and Developmental Biology
International Union of Psychological Science	Brain and Mind; Biomedical Sciences
International Union of Pure and Applied Chemistry *	Chemistry

International organisation	National Committee
International Union of Pure and Applied Physics *	Astronomy; Physics
International Union of Radio Science *	Space and Radio Sciences; Astronomy
International Union of Theoretical and Applied Mechanics *	Mechanical and Engineering Sciences
International Union of Toxicology *	Biomedical Sciences
Meteorology and Atmospheric Sciences	Earth Systems Science
Physical Sciences of the Ocean	Earth Systems Science
Scientific Committee on Antarctic Research *	Antarctic Research; Astronomy
Scientific Committee on Oceanic Research *	Earth Systems Science; Antarctic Research
Scientific Committee on Solar-Terrestrial Physics *	Space and Radio Sciences
The Asian Crystallographic Association	Crystallography
World Climate Research Program *	Earth Systems Science
World Climate Research Programme/International Arctic Science Committee/Scientific Committee on Antarctic Research Climate and Cryosphere Programme	Antarctic Research

APPENDIX 5

PRINTED AND DIGITAL PUBLICATIONS

Publication	Month	Link	Sponsor
<i>Annual Report 2012–13</i>	May 2013	www.science.org.au/publications/annual-report-2012-2013	N/A
<i>Historical Records of Australian Science</i> vol 24 nos 1 and 2	June, December 2013	www.publish.csiro.au/nid/108.htm	N/A
<i>The Australian Academy of Science</i> (booklet)	July 2013	Printed copies available on request: aas@science.org.au	N/A
<i>Questions and Answers</i> series, tablet app for Apple and Android	December 2013	www.science.org.au/publications/qa-series	N/A
<i>Academy Newsletter</i>	June, September, December 2013, March 2014	www.science.org.au/academy-newsletter	N/A
<i>Early Days</i> : early- and mid-career researcher newsletter	July, September, December 2013	www.science.org.au/early-days-newsletter	N/A
<i>Recommendations from the 2013 Theo Murphy Think Tank: Inspiring smarter brain research</i>	February 2014	www.sciencearchive.org.au/events/thinktank/thinktank2013/index.html	Theo Murphy Australia Fund

Publication	Month	Link	Sponsor
2013 public lecture series videos			
Prof Jenny Graves AO FAA	April 2013	www.sciencearchive.org.au/events/publiclectures/gi/graves.html	La Trobe Institute for Molecular Science; University of Canberra
Prof Stephen Simpson FAA FRS	June 2013	www.sciencearchive.org.au/events/publiclectures/gi/simpson.html	University of Sydney, Charles Perkins Centre
Prof Graeme Clarke AC FAA FRS	July 2013	www.sciencearchive.org.au/events/publiclectures/gi/clark.html	ARC Centre for Excellence for Electromaterials Science
Prof Ian Frazer AC FAA FRS FTSE	August 2013	www.sciencearchive.org.au/events/publiclectures/gi/frazer.html	
Dr Steve Rintoul FAA	September 2013	www.sciencearchive.org.au/events/publiclectures/gi/rintoul.html	Centre for Australian Weather and Climate Research
Dr John O'Sullivan FAA	October 2013	www.sciencearchive.org.au/events/publiclectures/gi/osullivan.html	CSIRO
Professor Thomas Maschmeyer FAA FTSE	November 2013	www.sciencearchive.org.au/events/publiclectures/gi/Maschmeyer.html	RACI
Professor Andrew Holmes AM FAA FRS FTSE	December 2013	www.sciencearchive.org.au/events/publiclectures/gi/holmes.html	CSIRO; RACI
2014 speaker series videos			
Professor Brian Gaensler FAA	February 2014	www.science.org.au/events/magnets-sky-0	
Dr Judy-anne Osborn	March 2014	www.science.org.au/events/tipping-balance-towards-scientific-thinking-zombies-and-maths	



2013 public lecture series sponsors

APPENDIX 6

EDITORS-IN-CHIEF OF ACADEMY—CSIRO AUSTRALIAN JOURNALS OF SCIENCE

Journal	Editor/s-in-Chief 2013
<i>Invertebrate Systematics</i>	Prof Andy Austin
<i>Australian Systematic Botany</i>	Dr Dan Murphy
<i>Marine and Freshwater Research</i>	Prof Max Finlayson
<i>Australian Journal of Zoology</i>	Prof Paul Cooper
<i>Australian Journal of Botany</i>	Prof Bob Hill
<i>Crop and Pasture Science</i>	Prof Zed Rengel and Dr Sergio Atienza
<i>Functional Plant Biology</i>	Dr Rana Munns FAA
<i>Reproduction Fertility and Development</i>	Prof Tony Flint
<i>Wildlife Research</i>	Prof Stan Boutin, Dr Andrea Taylor, Prof Piran White
<i>Australian Journal of Chemistry</i>	Prof Curt Wentrup FAA
<i>Soil Research</i>	Prof Bob Gilkes
<i>Environmental Chemistry</i>	Prof Kevin Francesconi
<i>Animal Production Science</i>	Prof Wayne Bryden

APPENDIX 7

IMPACT OF ACADEMY SUBMISSIONS TO CONSULTATIONS, REVIEWS AND INQUIRIES

Date	Impact on consultations, reviews or inquiries	Date of submission	Background
April 2013	<i>Strategic Review of Health and Medical Research (McKeon Review)</i> — high degree of alignment between report recommendations and Academy submission and response: www.science.org.au/sites/default/files/user-content/response_to_strategic_reviewof_health_and_medical_research_summary_paper.pdf www.science.org.au/sites/default/files/user-content/submission-mckeon-committee_0.pdf	March and November 2012	A public review — prepared by Fellows with medical and clinical expertise as well as Fellows from relevant cross-disciplinary fields.
April 2013	Consultation on Australia's satellite utilisation policy — included establishment of new Space Coordination Office, as recommended by Academy: www.science.org.au/sites/default/files/user-content/consultationonaustraliassatelliteutilisationpolicy_0.pdf	November 2012	A public review — prepared by the National Committee for Space Science in consultation with NCs for Antarctic Research; Radio Science; and Earth Sciences.

Date	Impact on consultations, reviews or inquiries	Date of submission	Background
June 2013	Final report of Standing Committee on Climate Change, Environment and the Arts <i>Inquiry into Australia's biodiversity in a changing climate</i> , positively referenced Academy submission several times, with particular reference to points made regarding climate change adaptation and mitigation: www.science.org.au/sites/default/files/user-content/biodiversity-in-changing-climate.pdf	August 2011	A public review — prepared by Fellows and experts, including those who prepared <i>The Science of Climate Change Q&A</i> publication (2010).
July 2013	DFAT <i>Indonesia Country Strategy</i> — as per invited Academy submission, science features very prominently and sets a goal to develop more partnership and cooperation: www.science.org.au/sites/default/files/user-content/asiancenturywhitepapercountrystrategies_1.pdf	June 2013	Invited to contribute to a public review. Prepared via a Fellowship survey of Asian country expertise and experience.
July 2013	8th edition of <i>Australian Code of Practice for care and use of animals for scientific purposes</i> published July 2013 — as per Academy recommendation, mandating the use of veterinarians for research with rats and mice was not included: www.science.org.au/sites/default/files/user-content/care-and-use-of-animals-submission.pdf	December 2011	A public review — prepared by Fellows with expertise in research ethics and/or the use of animals in research.
August 2013	Invited submission to Senate Standing Committee on Environment and Communications 'Inquiry into recent trends in and preparedness for extreme weather events' — cited multiple times in the final report, and used to shape the report recommendations: www.science.org.au/sites/default/files/user-content/senateinquiryextremeweatherevents.pdf	January 2013	Invited to contribute to a public review. Prepared by Fellows and experts including those that prepared <i>The Science of Climate Change Q&A</i> publication (2010).
September 2013	DFAT Country Strategies for China, Korea, Japan and India — as per invited Academy submission, science features very prominently in all of the country strategies and points are noted re past collaborations with China, and potential to grow Australia's relationship with Korea. www.science.org.au/sites/default/files/user-content/asiancenturywhitepapercountrystrategies_1.pdf	June 2013	Invited to contribute to a public review. Prepared via a Fellowship survey of Asian country expertise and experience.
January 2014	Academy position paper reflected concern of research sector regarding reduction in number of ARC Discovery Project Grants able to be held by Chief Investigator on NHMRC project grant from two to one — restriction removed from the 2014 ARC Discovery Project Grant rules.	March 2013	An Academy initiated contribution. A position paper was developed to inform discussions with CEOs of ARC and NHMRC.

Note: all Academy public submissions are available online at www.science.org.au/reports

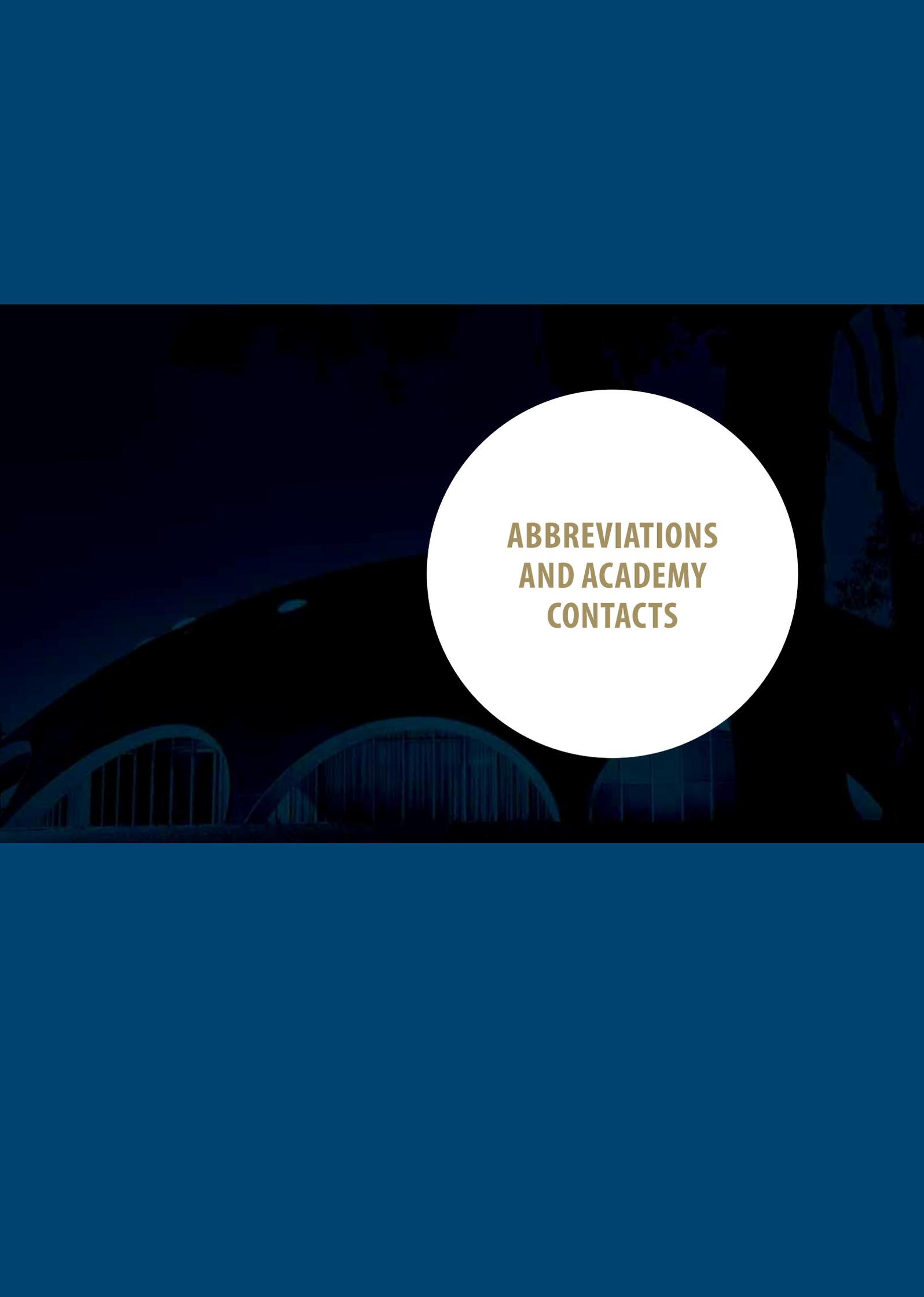
APPENDIX 8

SUPPORT FOR ACADEMY ACTIVITIES

General Academy grants		
Funding body	Project/program	Amount
Department of Innovation, Industry, Science, Research and Tertiary Education	Higher Education Research Promotion (Grant in Aid)	\$1 689 775

Special grants		
Funding body	Project/program	Amount
Australian Antarctic Division	SCAR subscription contribution	\$25 606
Australian Council of Learned Academies	Securing Australia's Future	\$456 636
Australian Council of Learned Academies	Social Compacts Review	\$8 100
Department of Education	2014 US Summer Program in Australia	\$102 673
Department of Education	Primary Connections — Linking Science with Literacy Stage 5	\$900 000
Department of Education	<i>Science by Doing</i> Stage 3	\$500 000
Department of Environment	Moat waterproofing	\$58 286
Department of Environment	Earth Systems Science Outlook project	\$365 100
Department of Industry	Australian National Nanotechnology Research Strategy	\$47 996
Department of Industry	Increasing the Profile of Australia's International Education Sector	\$275 000
Department of Industry	Third European Union — Australia Workshop on Research Infrastructure	\$175 000
Department of Industry	Travel support for Japan-Australia Marine Science Workshop	\$3 000
Education Services Australia Ltd.	<i>Science by Doing</i> Stage 2	\$472 000
Science and Industry Endowment Fund	Academy Fellowships to the Lindau Nobel Laureate Meeting	\$75 800

UNCOVER Program	
Organisation	Amount
Geoscience Australia	\$16 000
Geological Survey of NSW, NSW Department of Trade and Investment, Regional Infrastructure and Services	\$6 000
Geological Survey of Victoria, Earth Resources Development, Department of Primary Industries	\$6 000
Metallic Minerals and Geochemistry, Mineral Resources Tasmania	\$6 000
Geological Survey of South Australia, Mineral Resources Division, Department of Manufacturing, Innovation, Trade, Resources and Energy	\$6 000
Geological Survey of Western Australia, WA Department of Mines and Petroleum	\$6 000
Northern Territory Geological Survey, Department of Resources	\$6 000
Geological Survey of Queensland, Department of Natural Resources and Mines	\$6 000



**ABBREVIATIONS
AND ACADEMY
CONTACTS**

ABBREVIATIONS

AASSA	Association of Academies and Societies of Sciences in Asia	EAPSI	East Asia and Pacific Summer Institutes
AC	Companion of the Order of Australia	EEDM	electronic direct mail
ACT	Australian Capital Territory	EMCR	early- and mid-career researcher
AD	Dame of the Order of Australia	ENTPE	École Nationale des Travaux Publics de l'État
ACOLA	Australian Council of Learned Academies	ESA	Education Services Australia
AM	Member of the Order of Australia	EWG	Expert Working Group
ANU	Australian National University	FAA	Fellow of the Australian Academy of Science
AO	Officer of the Order of Australia	FAICD	Fellow of the Australian Institute of Company Directors
ANSTO	Australian Nuclear Science and Technology Organisation	FAHA	Fellow of the Australian Academy of the Humanities
AOGS	Asia and Oceania Geosciences Society	FRS	Fellow of the Royal Society
ARC	Australian Research Council	FTSE	Fellow of the Australian Academy of Technological Sciences and Engineering
ATSE	Academy of Technological Sciences and Engineering	HLF	Heidelberg Laureate Forum
BHP	Broken Hill Proprietary Company	HRAS	<i>Historical Records of Australian Science</i>
CAS	Chinese Academy of Sciences	IAC	InterAcademy Council
CBE	Commander of the Order of the British Empire	IAMP	InterAcademy Medical Panel
CEO	Chief Executive Officer	IAP	IAP (previously the InterAcademy Panel)
CMG	Commander of the Order of Saint Michael and Saint George	IBSE	Inquiry Based Science Education
CRC	Cooperative Research Centre	ICSU	International Council for Science
CSIRO	Commonwealth Scientific and Industrial Research Organisation	INQUA	International Union for Quaternary Research
CVO	Commander of the Royal Victorian Order	INSA	Indian National Science Academy
DEED	Victorian Department of Education and Early Childhood Development	IPH	Ian Potter House
DFAT	Department of Foreign Affairs and Trade	IUNS	International Union of Nutritional Sciences
DIICSRTE	Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education	ISUs	international scientific unions
DNA	deoxyribonucleic acid	JSPS	Japan Society for the Promotion of Science
DNG	Discipline Nominating Groups	KBE	Knight Commander of the Order of the British Empire
		Kt	Knight Bachelor

LASP	Learned Academies Special Projects	R&D	research and development
MEXT	Japanese Ministry of Education, Culture, Sports, Science and Technology	RACI	Royal Australian Chemical Institute
MOU	memorandum of understanding	RiAus	Royal Institution Australia
NCRIS	National Collaborative Research Infrastructure Strategy	RMIT	RMIT University
NHMRC	National Health and Medical Research Council	SAF	<i>Securing Australia's Future</i>
NCs	National Committees for Science	SbD	<i>Science by Doing</i>
NRIP	National Research Investment Plan	SC	Sectional Committee
OAM	Medal of the Order of Australia	SCAR	Scientific Committee on Antarctic Research
OM	Order of Merit	SEAMEO	Southeast Asian Ministers of Education Organization
PC	<i>Primary Connections</i>	SIEF	Science and Industry Endowment Fund
PRAISE	Promoting Real Australian–Indonesian Science Education	STEM	Science, technology, engineering and mathematics
PresAA	President of the Australian Academy of Science	UJP	University Joseph Fourier
PMSEIC	Prime Minister's Science Engineering and Innovation Council	UNCOVER	Unincorporated National Collaborative Venture for Exploration Geoscience Research
PSM	Public Service Medal	UNESCO	United Nations Educational, Scientific and Cultural Organization
PSM	Program Steering Committee	UNSW	University of NSW
Q&A	<i>The Academy's Questions and Answers</i> publication series	WUNDER	Washington University Neonatal Development Research
QITEP	Quality Improvement of Teachers and Education Personnel		



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