

An abstract, colorful background image with a grid of white dots on the right side. The colors include red, orange, blue, and purple, suggesting a scientific or artistic theme.

2017 ANNUAL REPORT

AUSTRALIAN ACADEMY OF SCIENCE

CONTENTS

Highlights.....	1	Broadening our reach.....	14
Philanthropic support.....	4	Excellence in science.....	18
Fellowship.....	6	Inspiration and impact: education	22
Advocacy and policy influence.....	12	Science for everyone.....	25
Catalyst for change.....	13	Operational excellence.....	28

© Australian Academy of Science 2018

ISSN 1448-2037

GPO Box 783

Canberra ACT 2601

Tel +61 (0)2 6201 9400

Fax +61 (0)2 6201 9494

Email aas@science.org.au

www.science.org.au

This report is also available at www.science.org.au/annual-and-financial-reports

HIGHLIGHTS



1.

Development of digital communications capability

p 25



2.

Launch of major plans for space science and technology, and agricultural sciences

p 12



3.

Delivery of Regional Collaborations Programme

p 16



4.

Development of the 'Canberra Declaration' to establish an International Brain Initiative

p 13

5.

Delivery of national public speaker series on the science of polymers

p 26

6.

Publication of Australian climate science capability review

p 12

PRESIDENT'S MESSAGE



2017 was an exciting year for the Academy from many perspectives. We elected 21 leading scientists as new Fellows and welcomed two Corresponding Members. With now more than 520 Fellows in our ranks we are a force to be reckoned with.

We were globally very active—supporting international science organisations, regional connections

and emerging scientists, raising the importance of global health with the G20 as part of the S20 Science Forum, developing a Canberra Declaration for an International Brain Initiative, and managing the Australian Government's Regional Collaboration Programme among the most noteworthy.

We were catalysts for change through SAGE, the Australian Brain Alliance and Future Earth Australia. We leveraged the power of video and social media to engage millions of people from around the world in science. Many National Committees worked on plans for the future, and we published major 10-year plans for agricultural science and space science and technology.

The extraordinary impacts of our science and maths education programs are becoming more clear. We extended the programs' reach and focused on providing resources and professional learning for thousands of teachers—who told us what a difference we are making to classroom learning in Australia.

The Academy only succeeds in all these areas through donations and grants, and I am deeply grateful to all those individuals and organisations who partnered with us in so many ways. I am proud of the Academy's achievements, and encourage you to explore our annual report to gain a broad understanding of our achievements.

Professor Andrew Holmes AC PresAA FRS FTSE

CHIEF EXECUTIVE'S MESSAGE



2017 was my first full year at the Academy, and although the breadth of our activities guaranteed a challenge it is immensely satisfying to see so many achievements reported here.

The Academy's financial performance and efficient delivery of activities continue to provide a solid basis for future development and give donors and partners confidence in our ability to collaborate and deliver. This is essential for future growth.

We have maintained a strong focus on activities that support our strategic objectives. However, we have remained nimble enough to harness new opportunities such as the development of the Academy's new digital communications capability. With all of our activities we have deeply valued Fellows' expertise and guidance, and Fellows' enthusiasm to engage and participate. It is a privilege to lead an organisation with the skills and willingness to embrace change. I thank the Fellows and Academy staff for their commitment to growing and improving everything we do and for remaining focused on improving science in and for Australia.

I trust you will enjoy reading our annual report, and encourage you to contact me if it inspires you to become more involved in the Academy's work.

Anna-Maria Arabia

OUR STRATEGIC PLAN

Consistent with our Strategic Plan for 2015–2020, the activities of the Academy this year have been focused on five strategic themes, underpinned by a commitment to operational excellence.

Excellence in science—championing, celebrating and supporting excellence in Australian science

Influential voice—providing independent, authoritative and influential scientific advice

International engagement—promoting Australia’s international scientific engagement

Scientific literacy—building public awareness and understanding of science

Operational excellence—being an effective and efficient organisation that supports and values its staff

More: science.org.au/about-us/academy/strategic-plan

Australian Academy of Science **Strategic Plan 2015–2020**



PHILANTHROPIC SUPPORT



Many of the Academy's core activities such as scientific meetings, advice to support policy development, publications, education, public awareness and outreach, international activities, awards and fellowships would not be possible without philanthropic donations.

In 2017, the Academy received over \$750,000 in philanthropic support and saw our list of donors to Academy programs grow significantly. The Academy's Donor Honour Roll reflects that support. All donations of \$20,000 and over are acknowledged on the donor boards in the foyer of the Shine Dome.

ANNUAL GIVING PROGRAM

The Annual Giving Program offers the chance to support the Academy of Science through untied donations that are fully tax deductible. \$57,000 was received in donations across the year and through our end of tax year appeal. The May and December Shine On donor newsletters outline the fundraising successes in 2017.

BEQUEST PROGRAM

A bequest is a special gift that we preserve as your legacy. Unless specified, bequests are directed to The Australian Academy of Science's Australian Futures Science Fund.

In 2017 the Academy received a legacy of \$338,987 through a bequest from The Estates of the Late Professor John Newton FAA and Dr Silva Newton. Professor Mike Dopita FAA also pledged his bequest with a message to others who might be considering their support to the Academy:

'In my over 6 years as Treasurer of the Academy, I was constantly amazed by the enthusiasm, professionalism and dedication of the staff. They work to educate the general public on key issues such as climate change and the need for vaccination, labour tirelessly to instil a knowledge and understanding of science at both primary and secondary levels as an investment in Australia's future science literacy, build Australia's connections and standing with our international peers, and lobby and cajole Australia's politicians to help develop more rational policies with respect to science, STEM education and renewable energy.

At the same time, in my function as Treasurer, I was acutely aware of the limitations on our ability to act placed upon us by our budgetary limitations, and on more than one occasion a promising initiative could not be developed due to a lack of funding.

This is where bequests could help. Too often, the temptation of a giver is to memorialise one's own field of science, through striking a medal or creating a special purpose fund. This is eminently understandable, but does not greatly assist the functioning of the Academy in the long run. What is desperately needed now are untied donations which can be used for whatever purpose Council or EXCOM requires to develop the core mission of the Academy. For this reason, I have now made a binding bequest to the Academy of Science designed to add to the Australia Futures Science Fund, in the sure knowledge that the money will be well-spent in securing a more healthy, literate, rational and science-driven future for all Australians.'

AWARDS

Central to the purpose of the Academy is the recognition and support of outstanding contributions to the advancement of science.

The Academy acknowledges the following donors as members of the Science Circle. These donors contributed between \$20,000 and \$99,000 in 2017:

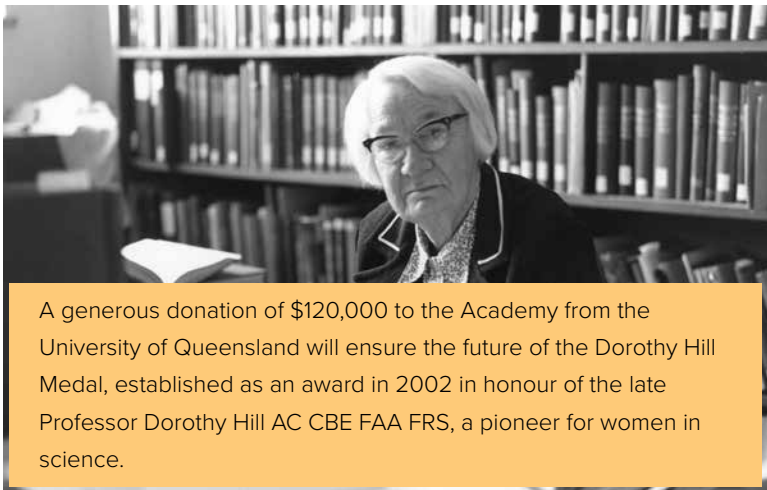
- Anonymous donor for contributions to support a new **Aboriginal and Torres Strait Islander Scientist Award**
- Dr Anna Rickards for her support of the **Rod Rickards Fellowship**
- Doug Hooley CSM for his support of the **Max Day Environmental Science Fellowship Award**.

Thanks to your support, we have been able to ensure the Academy of Science remains a vital, viable and visible presence in Australia. The receipt of a number of signature gifts tell only a small part of the story, and we will continue to bring you the stories that showcase the impact of your donations and partnerships.

More: science.org.au/about-us/support-us/



THANK YOU TO ALL OUR DONORS WHO SUPPORTED OUR WORK IN 2017



A generous donation of \$120,000 to the Academy from the University of Queensland will ensure the future of the Dorothy Hill Medal, established as an award in 2002 in honour of the late Professor Dorothy Hill AC CBE FAA FRS, a pioneer for women in science.



Continued annual support of \$45,000 from Dr Margaret Middleton for the Margaret Middleton Fund for endangered Australian native vertebrate animals was received. The award provides grants of up to \$15,000 to support field-based, high-quality ecological research. 76 young researchers have benefited from this award since 2000.

FELLOWSHIP

515

FELLOWS AT
31 DECEMBER

31

CORRESPONDING
MEMBERS LIVING
OVERSEAS

61

PRESTIGIOUS
AWARDS AND
HONOURS
RECEIVED BY
FELLOWS

21

FELLOWS
ELECTED

2

CORRESPONDING
MEMBERS
ADMITTED TO THE
ACADEMY

Fellows were active in the following Academy-related work:

- National Committees
- International meetings and collaborations
- Awards committees
- Academy policy submissions and reports
- Sectional committees for assessing nominations of new Fellows
- Participation in media
- Reviewers of videos and articles
- Symposium convenors
- Science at the Shine Dome
- National Speaker Series
- Regional groups

NEW FELLOWS 2017

More: science.org.au/academy-newsletter/jun-2017-108/new-fellows-2017



Igor Bray ranks in the top few in the world in the field of atomic and molecular collision physics, and is responsible for several major paradigm shifting research breakthroughs during his career.



Ian Chubb has been a strong and effective advocate for government and industry support of innovation and research in STEM. He has contributed to improving the infrastructure for scientific research and training and has raised the public profile of science in the media.



Tom Davis is a leading innovator in polymer and pharmaceutical science who is designing bespoke macromolecular chains for a range of therapeutic applications.



Jane Elith is interested in the methods used to model the distribution of species, and focuses on how they work, how to improve them for typical data types and applications, and how to deal with their uncertainties.



David Gardner is a world-leading embryologist. His research has laid the foundation for major clinical developments in human IVF.



Jozef Gécz is a human molecular geneticist internationally recognised for his contributions to the genetics of childhood onset neurological disorders, including intellectual disabilities, epilepsies, autisms and cerebral palsies.



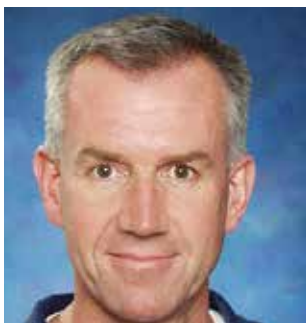
Karl Glazebrook is a world-leading astronomer whose research has led to major advances in our understanding of the evolution of galaxies and the Universe across cosmic time.



Anita Hill is recognised for her research in materials and process engineering and, more specifically, in the transport of atoms, ions and small molecules in condensed matter.



Philip Hugenholtz is a microbiologist who has made landmark contributions to the understanding of uncultured microbial diversity, evolution and ecology.



Cameron Jones is a recognised international leader in the emerging field of Modern Main Group Chemistry and has made numerous landmark contributions to the stabilisation of low-oxidation state and metal-to-metal bonded systems.



Evans Lagudah is a molecular geneticist who has made outstanding contributions to international agriculture through his work on disease resistance in crop plants.



Melissa Little is internationally recognised for her research on kidney development and her pioneering studies into novel regenerative approaches to the diagnosis and treatment of kidney disease.



Jennifer Martin is an internationally renowned protein crystallographer. She has made seminal discoveries in bacterial redox biochemistry and applies structure-based approaches to design and develop new drugs.



Dietmar Müller is a world-leading geophysicist whose research has transformed our understanding of the Earth's evolution over the past 200 million years. He has developed new capabilities for modelling tectonic, geodynamic, environmental and resource-formation processes.



John Patrick is internationally renowned for his theoretical and experimental advances in the regulation of nutrient transport and partitioning in plants.



Timothy Ralph is internationally acclaimed for his pioneering theories in quantum information science.



Lois Salamonsen is internationally recognised for her transformative contributions to human fertility/infertility related to the uterus. Her work addresses immense global challenges and is delivering new translational concepts to alleviate uterine infertility without IVF.



Mark Smyth is the most highly cited immunologist in Australia and is recognised for his significant contributions to tumour immunology.



John Volkman is internationally acknowledged as an authority on the discovery and application of lipid biomarkers in organic geochemistry, environmental studies, petroleum geochemistry and palaeoclimatology.



Branka Vucetic has made fundamental contributions to the science of coding theory, which underpins all modern telecommunications techniques.



Nicholas Wormald is one of an elite group of mathematicians globally who combine the most advanced probability theory, combinatorics and theoretical computer science to produce deep insights into the nature of random and complex networks.

HONOURS AND AWARDS TO FELLOWS

Graham Farquhar
Kyoto Prize

Jenny Graves
Prime Minister's Prize for Science

Justin Gooding
Eureka Prize for outstanding mentor
of young researchers

Name	Award
Professor Sam Berkovic AC FAA FRS	National Academy of Medicine – USA, Member
Emeritus Professor David Boger FAA FRS FTSE	National Academy of Engineering (US), Member LAS (US), Alumni Achievement Award
Professor Susan Clark FAA	Ramaciotti Medal for Excellence in Biomedical Research
Professor Peter Colman AC FAA FRS FTSE	Order of Australia: Companion in the General Division
Professor Michelle Coote FAA	ARC Georgina Sweet Australian Laureate Fellowship
Professor Graham Farquhar AO FAA FRS	Kyoto Prize ACT Senior Australian of the Year (applies to 2018)
Professor Geoffrey Fincher AO FAA	Order of Australia: Officer in the General Division
Professor Maria Forsyth FAA	Victoria Prize
Professor Ken Freeman AC FAA FRS	Order of Australia: Companion in the General Division National Academy of Sciences (USA), Foreign Associate
Professor David Gardner FAA	ASRM Distinguished Researcher Award
Professor Andy Gleadow AO FAA	Order of Australia: Officer in the General Division
Professor Justin Gooding FAA	Eureka Prize, UTS, Outstanding Mentor of Young Researchers
Professor Jenny Graves AO FAA	Prime Minister's Prize for Science Lorne Genome Conference Julian Wells Medal
Professor Min Gu FAA FTSE	Chinese Academy of Engineering – Foreign Member
Professor Richard Harvey AM FAA FRS	Order of Australia: Member in the General Division
Professor Andrew Holmes AC PresAA FRS FTSE	Order of Australia: Companion in the General Division
Professor Eddie Holmes FAA FRS	ARC Australian Laureate Fellowship Royal Society of London, Fellow NSW Premier's Prize: Excellence in Biological Sciences
Professor Ian Hume AO FAA	Order of Australia: Officer in the General Division
Professor Jagadish AC FAA FTSE	IUMRS Sômiya Award
Professor Brian Kennett FAA FRS	American Geophysical Union, Inge Lehmann Medal
Dr John Kirkegaard FAA	Farrer Memorial Medal
Professor Geoffrey Lindeman FAA	Victoria Prize
Professor Angel Lopez AO FAA	Order of Australia: Officer in the General Division
Professor Max Lu AO FTSE FAA	Order of Australia: Officer in the General Division
Professor Stephen MacMahon AO FAA	Order of Australia: Officer in the General Division
Professor Yiu-wing Mai AM FAA FRS FTSE	Chinese Academy of Engineering – Foreign Member
Professor Jennifer Martin AC FAA	Wunderly Orator, Thoracic Society of Australia and New Zealand
Professor Colin Masters AO FAA FTSE	Order of Australia: Officer in the General Division
Professor John Mattick AO FAA FTSE	Australian Academy of Technology and Engineering Fellow
Professor Trevor McDougall AC FAA FRS	NSW Premier's Prize: Excellence in Maths, Earth Sciences, Chemistry and Physics
Professor Geoff McFadden FAA	ARC Australian Laureate Fellowship
Dr Phil McFadden AO FAA	Order of Australia: Officer in the General Division
Professor Gerard Milburn FAA FRS	Royal Society of London, Fellow
Professor John Pate FAA FRS	WA Premier's Science Awards: Hall of Fame Inductee
Professor Harry Poulos AM FAA FTSE	American Society of Civil Engineers, OPAL Award for Design

Name	Award
Professor Jamie Rossjohn FAA	Academy of Medical Sciences, Fellow FAOBMB Award for Research Excellence
Professor Susan Scott FAA	Bruno Rossi Prize, American Astronomical Society – co-recipient
Professor Frances Separovic FAA	IUPAC Distinguished Women in Chemistry or Chemical Engineering
Professor John Shine AC FAA	Order of Australia: Companion in the General Division Doctor of Science honoris causa (ANU)
Professor Michelle Simmons FAA FTSE	NSW Australian of the Year (applies to 2018)
Professor Evan Simpson AM FAA	Order of Australia: Member in the General Division
Professor Jonathan Sprent FAA FRS	National Academy of Sciences (USA), Foreign Associate
Professor Fedor Sukochev FAA	ARC Australian Laureate Fellowship
Professor Mathai Varghese FAA	ARC Australian Laureate Fellowship
Professor David Vaux AO FAA	Order of Australia: Officer in the General Division
Professor Bob Vincent AM FAA	Order of Australia: Member in the General Division
Professor Jane Visvader FAA	Victoria Prize
Professor Susanne von Caemmerer FAA FRS	Royal Society of London, Fellow
Professor Gordon Wallace AO FAA FTSE	Order of Australia: Officer in the General Division New South Wales Scientist of the Year
Professor Malcolm Walter AM FAA	Order of Australia: Member in the General Division
Professor George Willis FAA	ARC Australian Laureate Fellowship
Professor Aibing Yu FAA FTSE	Chinese Academy of Engineering – Foreign Member

DECEASED FELLOWS



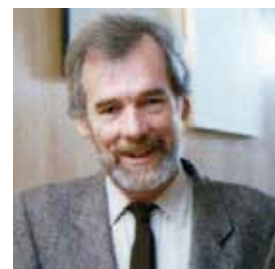
Professor Ken Campbell
FAA



Professor Ken Cavill FAA



Professor David Curtis AC
FAA FRACP FRS



Professor Ian Cowan FAA



Dr Maxwell Day AO FAA



Professor Neville
Fletcher AO FAA FTSE



Professor Brian Kay AM
FAA



Professor Anthony Linnane
AM FAA FRS FTSE



Professor Arthur McComb
FAA



Dr Keith Norrish AO FAA



Dr Colin Ward FAA FTSE

ADVOCACY AND POLICY INFLUENCE

22

Submissions to government—2 of which were by the Early- and Mid-Career Researcher Forum—covering issues from school education to the Great Barrier Reef

science.org.au/supporting-science/science-policy

1

Position statement on freedom of movement of scientists

NCI SUPERCOMPUTER



We worked with the National Computational Infrastructure (NCI) to secure parliamentary and government support for a \$70 million replacement of NCI's supercomputer announced in December.

More: science.org.au/news-and-events/news-and-media-releases/australian-scientists-welcome-critical-research-funding

AUSTRALIAN CLIMATE SCIENCE CAPABILITY REVIEW

The report recommends that government consider mechanisms to ensure better coordination of climate research across Australia's universities and climate agencies. It also recommends increasing climate science capability in a number of critical areas.

The review surveyed all of Australia's climate research agencies and centres, including the Bureau of Meteorology, the CSIRO, the Australian Antarctic Division and universities to identify how many Australian researchers are working across the various disciplines and sub-disciplines of climate science, and how well these different areas are performing.

More: science.org.au/news-and-events/news-and-media-releases/academy-releases-review-australias-climate-science-capability

MAJOR PLANS

We launched two major plans:

- **A vision for space science and technology in Australia:** Securing and advancing Australia's interests through space research
- **Grow. Make. Prosper.** The decadal plan for Australian agricultural sciences 2017–26.

More: science.org.au/support/analysis/decadal-plans-science



SCIENCE MEETS PARLIAMENT, AND SCIENCE MEETS BUSINESS

We supported and participated in **Science meets Parliament**, a two-day event bringing hundreds of scientists, political leaders, policy-makers and the media together, and in **Science meets Business**, a new approach to facilitating STEM–industry collaboration, showcasing success stories and breaking down barriers between science and business.

CATALYST FOR CHANGE

SAGE—EXPANDING OUR REACH

5 new institutional members joined SAGE, expanding program membership to **45 institutions** (33 universities, 6 medical research institutes and 6 publicly funded research organisations).

These institutions employ approximately **170,000** individuals, not including students.

Workshops

30 workshops were delivered, and **3** peer review workshops were held for SAGE members to support the peer review and accreditation process.

More: sciencegenderequity.org.au



‘SAGE is a catalyst for change within institutions.’

‘Analysis of data and culture has enabled institutions to identify actions for change.’

CRACK THE BRAIN’S CODE

The aim of the Australian Brain Alliance is to establish an **Australian Brain Initiative** that will create advanced industries in neurotechnology, develop treatments for debilitating brain disorders, and produce high-impact transdisciplinary collaborations that will increase our understanding of the brain.

The Australian Brain Alliance led the development of a **Canberra Declaration** to establish an **International Brain Initiative**, signed by 10 country programs and international organisations during ‘Brains at the Dome’ in December.

More: brainalliance.org.au



FUTURE EARTH AUSTRALIA

In a year of consolidation we built **national support** for the program. We signed an agreement with the Global Green Growth Institute to provide up to **10 placements** a year for early-career researchers and postgraduate students to pursue research placements with the institute, and partnered in the EcoCity World Summit in Melbourne.

We contributed to a **Future Earth teacher resource book** produced by the Australian Science Teachers Association for National Science Week, and participated in the **Young Australians Plan for the Planet**, launched during National Science Week.

More: science.org.au/future-earth-australia



BROADENING OUR REACH

‘Australia is recognised globally for its high-quality research. Despite having only 0.3 per cent of the world’s population, Australia contributed to almost 4 per cent of world research publications in 2016.’

PARTNERING WITH AUSTRALIA ON INNOVATION, SCIENCE AND RESEARCH, AUSTRALIAN GOVERNMENT 2017

We facilitated access to global science and technology and promoted strategic partnerships between Australian and overseas researchers.

GLOBAL NETWORKS

Australian expertise and leadership contributed to regional and global science networks. Australian scientists had extensive opportunities to contribute to international strategic planning and priority setting, and to establish research collaborations with other leaders in their fields.

Representatives of the Academy participated in numerous high-level international events, including the S20 Science Forum, where a **position statement on global health** was presented to German Federal Chancellor Dr Angela Merkel, and visits to Vietnam and Malaysia to meet with counterpart academies to strengthen regional networks.

The Academy is the Australian member of the International Council for Science (ICSU) and around 30 of its member organisations. Australia is represented on the Council’s Executive Board by Professor David Black FAA as Secretary-General and Professor John Buckeridge as Member. Australia’s **global science credibility and influence** is enhanced by high-level representation on the executives of ICSU organisations, and approximately **370 Australians** are involved with the organisations at any given time.

InterAcademy Partnership

The Academy is an executive member of the InterAcademy Partnership (IAP). Academy President, Professor Andrew Holmes, is a member of the Executive Committee of the IAP for Science, and Foreign Secretary, Professor Cheryl Praeger, is a member of the Board of the IAP for Research.

The academy was represented on 2 three-year IAP for research projects:

Harnessing Science, Engineering and Medicine to Address Africa’s Challenges

Engaging African and non-African leaders in science, engineering and medicine, African governments, bodies such as the United Nations and the African Union, the global donor community, industry, and other stakeholders in activities that demonstrate the value of independent academy science-policy advice, with the ultimate goal of ensuring sustainability of national investment of science and technology. Academy Vice President Dr TJ Higgins is a member of the project’s working group.

Improving Scientific Input to Global Policymaking: Strategies for Attaining the Sustainable Development Goals (SDGs)

Developing a framework for action that strengthens the global science-policy interface and facilitates productive collaboration and adoption of best practices among the organisations that generate scientific advice. The IAP has published a guide to the SDGs for the global science community. Academy Treasurer Professor Michael Barber is a member of the project’s working group.

Association of Academies and Societies of Sciences in Asia

Professor Praeger is a Member-at-Large of the Association of Academies and Societies of Sciences in Asia’s Executive Board. Professor Praeger also chairs the AASSA Special Committee for Women in Science and Engineering (WISE), which was established in 2017.

In 2017, the members of ICSU and the members of the of the International Social Science Council voted to support a merger of the two bodies. The newly-formed International Council for Science will be established in July 2018 and will lead stronger responses to future global challenges.

CONNECTING SCIENCE

197

researchers were supported to participate in the Academy's international activities in Australia

84

researchers were supported to participate in the Academy's international activities overseas.



Activity	Number of researchers supported in Australia	Number of researchers supported overseas
Regional Collaborations Programme	5	
Australia–Americas PhD research internship program	31	
Commonwealth Science Conference		30
APEC ASPIRE Prize	3	
JSPS Fellowships		14
HOPE meeting, Japan		6
Australia–China workshop: Measurement challenges for electrical energy security	50	
Australia–China symposium on synthetic biology	38	
Falling Walls Lab Australia	25	
Falling Walls Lab Berlin		2
France–Australia Science Innovation Collaboration (FASIC) Fellowships		4
Rod Rickards Fellowships (to France)		3
Science at the Shine Dome	3	
Australia–India Early- and Mid-Career Researcher Fellowships		14
Visit to the National Institutes of Health in the USA by a junior scientist		1
Italy–Australia Science and Innovation Forum	40	
Graeme Gaughley Fellowship		1
Lindau Nobel Laureate Meeting		9
Selby Travelling Fellowship	1	
Rudi Lemberg Travelling Fellowship	1	

‘I returned to Australia immediately after I completed the East Asia and Pacific Summer Institutes (EAPSI) program. In addition to returning to work with my host at Monash, I also secured a position with CSIRO Nanomaterial and Devices as a Postgraduate Fellow. I can’t thank the Australian Academy of Science enough for this opportunity!’

GIOVANNI DELUCA, GEORGIA INSTITUTE OF TECHNOLOGY, 2017 EAST ASIA AND PACIFIC SUMMER INSTITUTES (EAPSI) PROGRAM PARTICIPANT

‘I was ecstatic to learn that I would be representing Australia at the international Falling Walls Lab in Berlin. Falling Walls has inspired me to passionately work towards bringing change in the world through scientific research as well as promoting science education.’

MORTAZA REZAE, CURTIN UNIVERSITY, JOINT WINNER FALLING WALLS LAB AUSTRALIA AND PARTICIPANT FALLING WALLS LAB BERLIN

‘Falling Walls was the most ideal platform to put forward and share my current research project with a broad national and international audience. Falling Walls 2017 will be one of the most memorable and useful experiences of my research career.’

VINI GAUTAM , AUSTRALIAN NATIONAL UNIVERSITY, JOINT WINNER FALLING WALLS LAB AUSTRALIA AND PARTICIPANT FALLING WALLS LAB BERLIN

REGIONAL COLLABORATIONS PROGRAM

Australian-led collaborative projects to help address the Asia–Pacific affordable housing crisis, tackle hepatitis B and monitor the impact of coastal climate changes were among five research organisations to receive **\$897,210 collectively** in Australian Government funding.

The funding was provided under the first round of the \$3.2 million Regional Collaborations Programme, which is administered by the Australian Academy of Science and is part of the National Innovation and Science Agenda.

More: science.org.au/news-and-events/news-and-media-releases/asia-pacific-research-industry-collaborations

67TH LINDAU MEETING OF NOBEL LAUREATES

9 fellowships were provided under the Science and Industry Endowment Fund.

More: science.org.au/opportunities/travel/nobel-laureates-meetings/lindau/lindau2017

EARLY- AND MID-CAREER RESEARCHERS

The Academy:

- supported **337 EMCRs** across **17 programs**, including international activities
- piloted a flexible model to **support Australian early- and mid-career researchers** through the Theo Murphy Initiative
- launched **Kick-starting collaboration**, a guide to industry–academia collaboration developed by the EMCR Forum
- engaged with **211 EMCRs** in **4 events**

3458 researchers were members of the EMCR Forum.

More: science.org.au/emcr-forum

NATIONAL COMMITTEES FOR SCIENCE

The Academy:

- supported **22** National Committees for Science involving **250** members
- **fostered** science in Australia through the committees
- **linked** the Academy with the wider Australian and international scientific community
- published **10-year plans** for agriculture, and space science and technology

850+ scientists and stakeholders attended National Committee events.

National Committee Chairs

The success of the National Committees depends on active Chairs who are leaders in their disciplines. We thank the Chairs who retired and welcome the new Chairs.

National Committee	Outgoing Chair	Incoming Chair
Agriculture, Fisheries and Food	Professor Pat Michie FAA	Professor David Badcock
Data in Science	Professor Jane Hunter	Professor Lesley Wyborn
Space and Radio Science	Professor Russel Boyce	Professor Fred Menk

More: science.org.au/national-committees-science

Contributions to union subscriptions from Australian societies and organisations

Australian organisations contributed to Australia's annual subscriptions to international unions of the International Council for Science, partnering the Academy through our National Committees:

- **Australian Institute of Physics**—towards the International Union for Pure and Applied Physics
- **Royal Australian Chemical Institute**—towards the International Union for Pure and Applied Chemistry
- **Australian Mathematical Science Institute**—towards the International Mathematical Union
- **Geoscience Australia**—towards the International Union for Geological Sciences
- **Australian Antarctic Division**—towards the Scientific Committee for Antarctic Research

Decadal plans for science

Decadal plans are 10-year strategic plans for science disciplines, and are developed by the Academy's National Committees for Science. The purpose of a plan is to:

- assess the current state of knowledge in a specific science discipline
- identify and set priorities for the most important scientific questions for the next decade
- outline strategies to achieve these priorities and goals.

Decadal plans are produced by the research community, but the audiences for the documents are, to a large extent, policy makers and funding bodies.

Published in 2017

- **A vision for space science and technology in Australia:** Securing and advancing Australia's interests through space research
- **Grow. Make. Prosper.** The decadal plan for Australian agricultural sciences 2017–26.

Under preparation

- Discovering biodiversity: A decadal plan for taxonomy and biosystematics in Australasia 2018–2027
- Decadal plan for Australian geoscience
- Strategic directions for the geographical sciences
- Preparing for Australia's digital future: a strategic plan for information and communications sciences, engineering and technologies
- Decadal plan for nutrition science

More: science.org.au/support/analysis/decadal-plans-science

EXCELLENCE IN SCIENCE

AWARDED IN 2017

The Academy champions, celebrates and support excellence in Australian science through its awards and grants.

- Total value of awards: **\$341,583**
- **48** awardees

2017 HONORIFIC AWARDS

- **5** career, **3** mid-career and **9** early-career research awards announced
- **\$10,500** worth of associated honorariums and lecture funding

The 2017 awards listed below were announced in November 2016 and most were presented at the Academy's annual flagship event, Science at the Shine Dome, in May 2017.

More: science.org.au/opportunities/recognition



Emeritus Professor Ross William Griffiths FAA

Jaeger Medal



Professor Joss Bland-Hawthorn FAA

Thomas Ranken Lyle Medal



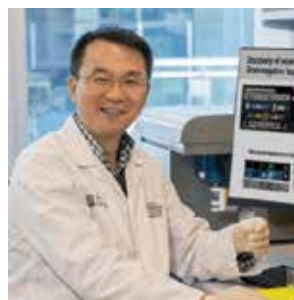
Professor Barend Marais

Gustav Nossal Medal for Global Health



Professor David Black AO FAA

David Craig Medal



Professor Jian Li

Jacques Miller Medal for Experimental Biomedicine



Dr Frank Robert de Hoog FTSE

Hannan Medal



Professor Kerrie Ann Wilson

Nancy Millis Medal for Women in Science

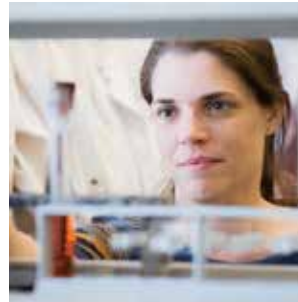


Professor Barry Ninham AO FAA

Matthew Flinders Medal and Lecture



Associate Professor Juan Carlos Afonso
Anton Hales Medal



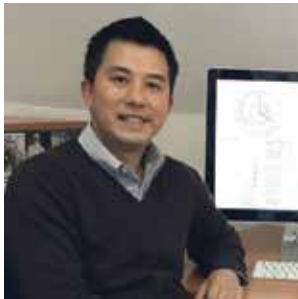
Associate Professor Deanna M. D'Alessandro
Le Fèvre Memorial Prize



Dr Joanne Whittaker
Dorothy Hill Award



Associate Professor Joshua Ross
Moran Medal



Professor Simon Ho
Fenner Medal



Associate Professor Igor Aharonovich
Pawsey Medal



Associate Professor Kathryn Elizabeth Holt
Gottschalk Medal



Associate Professor Sarah Medland
Ruth Stephens Gani Medal



Distinguished Professor Dayong Jin
John Booker Medal

2017 RESEARCH AWARDS

- Total committed in 2017: **\$265,583**
- **18** awardees

Moran History of Science Research—2018 awardees

Awarded in 2017

Dr Linden Ashcroft

Why observe? The motivation behind Australia's most prolific weather watchers

Ms Kelly McKinley

A history of activism and public attitudes in Australia towards genetic modification (GM) science in agriculture and food production

J G Russell Award—2017 awardees

Dr Nicole Rijs

To develop ion-mobility mass spectrometry methods to observe the molecular evolution of model self-assembly reactions with high temporal and structural resolution.

Dr Pengyi Yang

To map and model 'trans-omic' networks that cut through omic layers using machine learning and multi-omic data integration.

Dr Tong Wang

To understand the molecular mechanisms of neuronal communication and how neurons modify their synaptic strength.

Dr Brett Hallam

To understand hydrogen passivation mechanisms in silicon solar cells.

Margaret Middleton Fund for Endangered Australian Native Vertebrate Animals—2018 awardees

Awarded in 2017

Dr Christopher Gordon

University of Wollongong: Interacting impacts of persistent fire regimes and predation on threatened mammals.

Ms Katharine Senior

University of Melbourne: Spatial solutions for managing fire and native mammal conservation.

Ms Emma Spencer

University of Sydney: Does predation threaten the endangered night parrot (*Pezoporus occidentalis*)?

Max Day Environmental Science Fellowship Award—2018 awardees

Awarded in 2017

Ms Melissa Houghton

University of Queensland: Invertebrate monitoring and community ecology as a measure of change in island ecosystems to inform conservation decision-making.

Mrs Charlie Phelps

Edith Cowan University: Determining the cumulative effect of putative pathogenic microbes, increased temperature and herbivory on *Ecklonia radiata*.

Thomas Davies Research Grant for Marine, Soil And Plant Biology—2018 awardees

Awarded in 2017

Dr Ashlea Doolette

University of Adelaide: How do Australian native plants survive on low phosphorus soils? New insights using ³¹P NMR spectroscopy.

Dr Mark Farrell

CSIRO: An innovative method for probing active soil microbial function.

Dr Manoj Kumar

University of Technology Sydney: Identification of the molecular response of seagrasses to heavy metal pollution and ocean acidification.

Dr Zoe Richards

Curtin University: Enhancing coral threatened species management with integrated phylogenomics.

Professor Isaac Santos

Southern Cross University: Coral reef calcification in the Great Barrier Reef following widespread bleaching.

Dr Allison Van De Meene

University of Melbourne: Dissecting mechanisms of cell wall deposition and variability for improved understanding of our crop plants and products.

Douglas And Lola Douglas Award—2017 Awardees

Dr Bianca Middleton

Menzies School of Health Research and Charles Darwin University. Strategies to reduce the burden of gastroenteritis in Aboriginal children.

More: science.org.au/opportunities/research-funding



Dr Graeme Nugent

2018 Graeme Caughley Fellowship—Landcare Research in New Zealand

CONFERENCE AWARDS AND LECTURES

- Total committed: **\$30,000**
- **9** joint organisers

Boden Research Conference

Ecological surprises and rapid collapse of ecosystems in a changing world

Elizabeth And Frederick White Research Conference

Gas–solid reactions in earth sciences and astronomy

Fenner conferences on the environment

The use of gene drive technology in conservation

More: science.org.au/opportunities/conference-and-lecture-funding



Dr Stefanie Dimmeler

Selby Travelling Fellowship—Goethe University



Dr Christina Kellogg

Rudi Lemberg Travelling Fellowship—United States Geological Survey

TRAVELLING FELLOWSHIPS AND LECTURES

- Total committed in 2017: **\$35,500**
- **4** awardees
- 11 lectures at 10 universities or institutes with an estimated **780** attendees
- 3 associated lectures at 3 universities or institutes with an estimated **330** attendees

More: science.org.au/opportunities/travel



Professor Paul Mulvaney

Lloyd Rees Memorial Lecture—University of Melbourne

INSPIRATION AND IMPACT: EDUCATION

ACADEMY SCIENCE AND MATHS PROGRAMS IN AUSTRALIAN SCHOOLS

The Academy has a strong track record delivering evidence-based school science and mathematics professional learning and curriculum resources for Australian teachers and students. Our flagship programs

Primary Connections: linking science with literacy and **Science by Doing** are used by teachers and students throughout Australia and many other countries, and its newest program, **reSolve: Maths by Inquiry**, is generating great interest and uptake from teachers around the country.

More: science.org.au/learning/schools

CURRICULUM RESOURCES

Resources are developed by curriculum experts and reviewed by hundreds of educational experts, teachers and scientists from Australia and abroad. The resources cover every strand of the mathematics curriculum from Foundation to year 10. To date, the multi-year programs have produced the following:

38

Curriculum-linked primary science modules

Digital and hard copy; linked to literacy

18

Interactive curriculum units for high school

Years 7-10

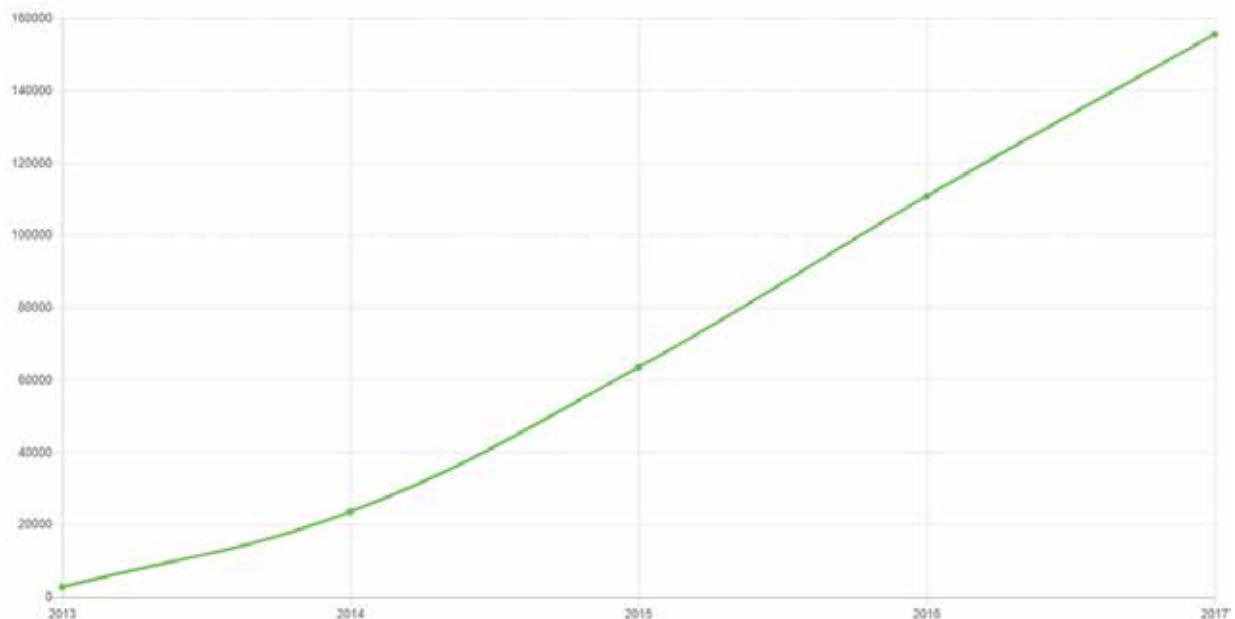
88

Maths modules and lesson plans

covering every strand of the mathematics curriculum from Foundation to year 10

Number of Science by Doing program registrations over time

(recorded 30 December annually)



REACH

94%

of Australian primary teachers are aware of Primary Connections

290

reSolve Champions from across Australia were selected for professional learning and evaluation

50,000

registrations received for Science by Doing in 2017, an increase of 45% to 160,000 (up from 110,000 in 2016)

PARTNERSHIPS

- Australian Association of Mathematics Teachers
- Australian Mathematical Sciences Institute
- Australian Science Teachers Association

Eucalypt Australia supported and collaborated on the development of the Primary Connections curriculum unit

'Among the gum trees'. Its funding also supported the provision of four free copies of the information text to every primary school in Australia.

PROFESSIONAL LEARNING AND UPTAKE

To date, the multi-year programs have produced the results below:



23,500

primary teachers have participated in Primary connections professional learning workshops, including 2,200 preservice teachers



160,000

Registered users of Science by Doing, including 2 in every 3 high school teachers



32,000

regular users of Science by Doing download 9 terabytes of curriculum resources each month

2500

maths teachers and educators subscribed to reSolve during pilot phase



WHAT TEACHERS SAY

‘I think the resources and the whole Science by Doing program is quite literally the best resource available for interactive and meaningful science teaching. I wanted to thank you and your team for designing everything in this magnificent set of curriculum activities.’

MATHS AND SCIENCE TEACHER, QUEENSLAND

‘I highly recommend this workshop and think it should be compulsory! Primary Connections puts students in the driver’s seat and encourages them to find answers to their own questions. This model should be encouraged in all teachers.’

PRIMARY SCIENCE TEACHER, WESTERN AUSTRALIA

‘The reSolve resources provide excellent opportunities for reflection and use of mathematical language. They cater for all levels and have excellent scaffolding to builds students’ skills and language. Discussions were very robust and it was lovely to hear the variety of ideas and sharing of concepts.’

PRIMARY MATHS TEACHER, NEW SOUTH WALES

SUPPORT AND RECOGNITION

Program support from the Australian Government since 2004

Numerous awards for excellence in educational publishing

IMPACT OF OUR PROGRAMS

More science is being taught in primary school: Primary Connections increases confidence in teaching science, and supports collegial approach to professional learning

Science by Doing results in an estimated 50% increase in student group work, cooperative learning and student investigation

Preliminary evaluation of reSolve: Maths by Inquiry shows students are highly engaged, including those who lack confidence or motivation

SCIENCE FOR EVERYONE

SOCIAL MEDIA DIGITAL COMMUNICATION STRATEGY



We are reaching people who wouldn't normally engage in science.

From October, content was published on **Facebook**, **Twitter**, **YouTube** and **Instagram**, and included translated content on **Weibo** and **Toutiao** in China. With sharing and boosting of posts, we reached millions of previously unengaged people in Australia and globally, who now know about the Academy and are watching, reading and sharing credible science content.

Many of our videos, articles and photos were inspired or supplied by Fellows, members of National Committees, early- and mid-career researchers and awardees. All content was also published on our website.

We established publishing relationships with major media organisations including News Corp and The Conversation. Content was regularly offered to other media through the Australian Science Media Centre.

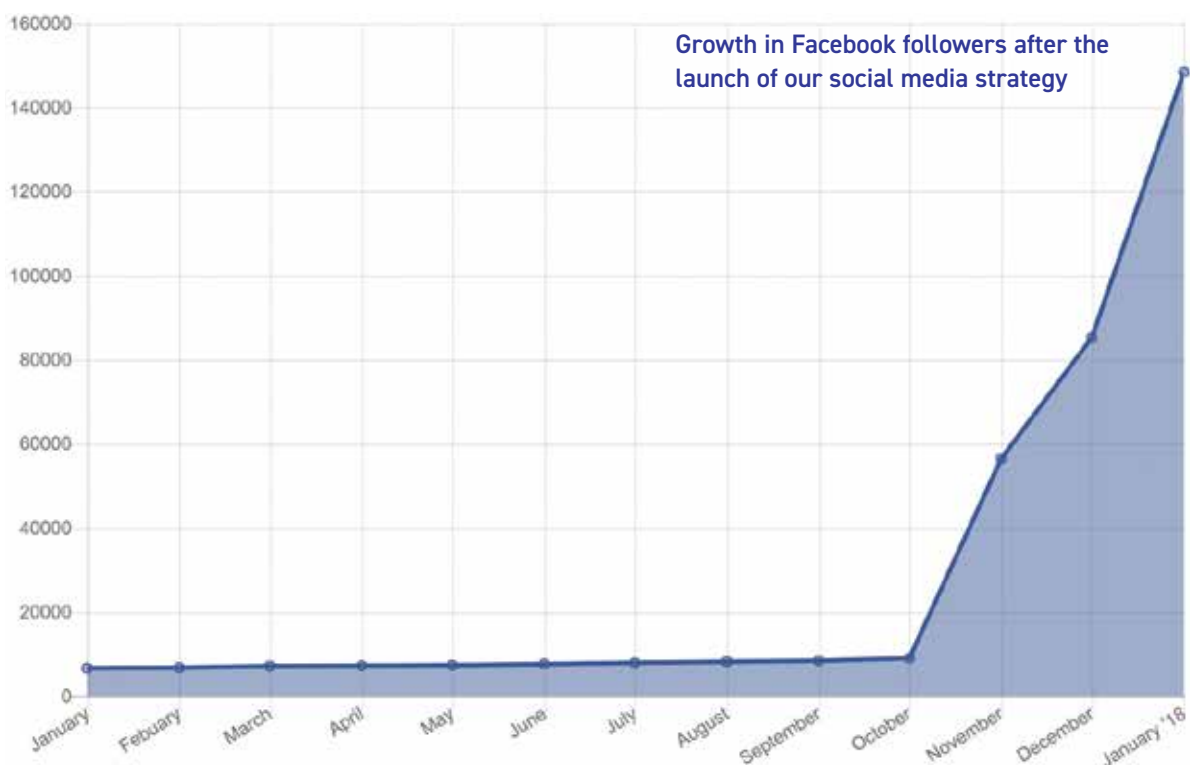
The Academy's Council invested in the project start-up and provided strong governance structure and quality assurance. Many Fellows were involved in the videos and articles themselves, and reviewed content to ensure scientific accuracy.

Website: www.science.org.au/curious

Facebook: [AustralianAcademyofScience](https://www.facebook.com/AustralianAcademyofScience)

Twitter: [@Science_Academy](https://twitter.com/Science_Academy)

Instagram: [@ausacademyofscience](https://www.instagram.com/ausacademyofscience)



MEDIA

27

media releases
issued

58

news articles
published on
our website

2149

mentions of the Academy across Australian
print and Australian broadcast, and online
(global and Australian sites)

1240

mentions of the
Academy on social
media

434

pieces of media coverage across broadcast (radio/TV),
print and online about the launch of the review of
Australia's Climate Science Capability

More: science.org.au/news-and-events/news-and-media-releases

EVENTS

National speaker series— Polymers in a Material World, and Making Better Humans with Polymers

- Total speakers: **9**
- Total audience: **585**

The 'Polymers in a Material World' lecture was held in Melbourne during February and Sydney in March. 'Making Better Humans with Polymers' was held in Wollongong in August, Brisbane in October and Adelaide in November.

Canberra speaker series— Dawn of the New Space Age

- Total speakers: **6**
- Total audience: **915**

This speaker series was held in the Shine Dome.

February—Gravitational Waves and Space Time

April—Exploring the Milky Way

June—Cleaning up space junk with lasers

August—Australian Satellites and where to find them

October—Journeying to the centres of planets

December—Australia's role in looking for life on Mars

More: science.org.au/news-and-events/events



Science at the Shine Dome, 23–25 May



21

New Fellows
admitted

15

Academy
awards
presented

4

EMCR
workshops

1322

total attendees

More: science.org.au/news-and-events/events/science-shine-dome/science-shine-dome-2017

The Shine Dome

The Shine Dome was hired on **105 days** and earned a total of **\$99,000**.

The Academy's unique and iconic building started tweeting in May, and by year's end had hundreds of Twitter fans following the much-loved quirky home of science in Australia.

@ShineDome



JOURNALS

Historical Records of Australian Science

- 10 articles on the history of science
- 6 biographical memoirs
- 18 book reviews

More: publish.csiro.au/hr

CSIRO Publishing Journals of Scientific Research

- 14 peer reviewed scientific journals

More: publish.csiro.au/journals

OPERATIONAL EXCELLENCE

GOVERNANCE

The Academy is governed by a Council of 17 Fellows, which met four times. To ensure Academy business was progressed effectively between Council meetings, the Executive Committee (EXCOM) met five times. The Finance Committee met twice.

Education Committee

An Education Committee, chaired by Professor Ian Chubb, was convened as an advisory body to the Academy Council. It strategically aligns the Academy's three education programs and assists Council and the Chief Executive in planning future directions and identifying needs and opportunities.

FINANCIAL SUMMARY FOR THE 2016-17 FINANCIAL YEAR

The Academy raised \$15 million:

- \$10 million government and grant funding
- \$2.7 million investment revenue
- \$2.3 million self-generated revenue

The Academy's investment portfolio grew from \$51.7 million to \$55.7 million, an increase of 7.9%

We invested \$14.9 million, with major investments in:

- \$8.2 million grant-related expenditure
- \$1.8 million administration
- \$1.3 million project-related expenditure
- \$1.3 million Primary Connections

More: science.org.au/about-us/governance/annual-and-financial-reports/financial-report-2016-17

STAFF

The number of employees increased from 68 (full-time equivalent 61) to 75 (FTE 68) during the year. At year end there were 52 female and 23 male employees.

Due to program changes and natural attrition, 18 people left the Academy and 29 people were recruited

OPERATIONAL IMPROVEMENTS

The Academy:

- engaged a new Investment Manager and developed a Strategic Investment Policy
- developed an ICT Strategic Plan
- developed a five-year Capital Management Plan for the Shine Dome and Ian Potter House
- commenced a review of the Heritage Management Plan—last updated in 2008
- developed a Code of Conduct (to be published in 2018)
- commenced implementation of a new Financial Management Information System
- finalised Phase 2 of audio visual upgrades in the Shine Dome and Ian Potter House

THE ACADEMY WEBSITE

Our website received nearly 523,000 visits, an increase of 13% on the previous year.

More: science.org.au





Cover image from *A vision for space science and technology in Australia: Securing and advancing Australia's interests through space research*: On 12–13 October 2015, NASA astronaut Scott Kelly took a series of 17 photographs from the International Space Station during a single flyover of Australia. Image Credit: NASA